PLAINTIFF'S EXHIBIT
tabbies
NSC-373

PROCEE

OF TH

National Cou

THIRTEENT
SAFETY C

Held
Brown and S
Louisvi
September 2
1

Copyright, 1925, by N

National Safety Council

168 North Michigan Avenue, Chicago

HONORARY MEMBERS

Association of Iron and Steel Electrical Engineers
Elbert H. Gary, Robert W. Campbell, Ralph C. Richards

OFFICERS (1924-1925)

C. B. Auel, President.
C. B. Scott, Vice-President and Treasurer.
L. A. DeBlois, Vice-President in charge of General Activities.
G. T. Fonda, Vice-President in charge of Local Councils.
L. R. Palmer, Vice-President in charge of Public Relations.
H. A. Reninger, Vice-President in charge of Industrial Safety.
David Van Schaack, Vice-President in charge of Public Safety.
W. H. Cameron, Managing Director and Secretary.

EXECUTIVE COMMITTEE (1924-1925)

Harry A. Adams, Union Pacific Railroad Company.
Major Thos. H. Allen, Commissioner of Fire and Police, Memphis.
C. B. Auel, Westinghouse Electric & Manufacturing Company.
W. F. Austin, W. E. Wood Company.
J. P. Barnes, Louisville Railway Company.
E. W. Beck, United States Rubber Company.
L. A. DeBlois, E. I. du Pont de Nemours & Company.
Marcus A. Dow, Bureau of Public Safety, Police Dept., New York City.
H. K. Ferguson, H. K. Ferguson Company.
G. T. Fonda, Fonda-Tolsted, Inc.
Dr. Otto P. Geier, The Cincinnati Milling Machine Company.
Charles E. Hill, New York Central Lines.
S. H. Kershaw, Hercules Powder Company.
Walter G. King, American Optical Company.
Harold T. Martin, The Fisk Rubber Company.
T. H. McKenney, Illinois Steel Company.
Homer E. Niesz, Commonwealth Edison Company.
L. R. Palmer, The Equitable Life Assurance Society.
C. E. Pettibone, American Mutual Liability Insurance Company.
H. A. Reninger, Lehigh Portland Cement Company.
Nelson Studebaker Riley, Studebaker Riley Company.
Dr. A. D. Risteen, Travelers Insurance Company.
G. E. Sanford, General Electric Company.
C. B. Scott, Bureau of Safety.
Col. James Sinke, Director of Public Safety, Grand Rapids.
David Van Schaack, Aetna Life Insurance Company.
Joseph M. Ward, D. L. & W. R. R. Company.
A. L. Watson, Hooker Electrochemical Company.
Harry Webber, Illinois Bell Telephone Company.
A. W. Whitney, National Bureau of Casualty & Surety Underwriters.

Harry A. Adams, U
Major Thos. H. Alle
C. M. Anderson, Me
C. B. Auel, Westingh
W. F. Austin, W. E
J. P. Barnes, Louis
Dr. D. C. Bayless, H
E. W. Beck, United
Oscar Beuchel, Bat
David S. Beyer, Lit
E. F. Blank, Gener
John L. Boardman,
T. H. Boyd, Seattle
John T. Broderick,
Shepard Bryan, At
John L. Bryant, Br
L. D. Burlingame,
A. C. Burnett, San
R. W. Campbell, E
C. L. Close, United
C. C. Collmus, Jr.,
Howard Coonley,
L. A. DeBlois, E. J
R. P. DeVan, R. F
H. W. Donald, Am
J. B. Douglas, The
Louis I. Dublin, D
Frederic W. East
C. Oscar Ewing, I
Dudley Farrand,
H. K. Ferguson, J
G. T. Fonda, Fon
James E. Ford, Y
Frank Frey, Jr.,
Huston L. Gaddi
Dr. Otto P. Geier
Isaiah Hale, Atl
H. H. Hall, Ame
R. Dawson Hall,
Julien H. Harve
E. L. Hewitt, U
Chas. E. Hill, N
G. H. Hill, Chie
M. G. Hoyman,
C. M. Husted, S
J. H. Jenkins, M
A. H. Jones, Ar

J. D. Jones, Algoma Steel Corporation.
Ira V. Kepner, Pennsylvania Salt Manufacturing Company.
S. H. Kershaw, Hercules Powder Company.
H. M. Keyser, Washington Railway & Electric Company.
Walter G. King, American Optical Company.
W. M. Kreglow, New Jersey Zinc Company of Pennsylvania.
Harold A. Ley, Fred T. Ley & Company.
R. M. Little, New York Department of Education.
James Madden, Paterson, N. J.
John B. Madden, Sherwood Manufacturing Company.
Harold T. Martin, The Fisk Rubber Company.
Julius W. Martin, May Hosiery Mills.
J. P. McGoldrick, McGoldrick Lumber Company.
T. H. McKenney, Illinois Steel Company.
L. L. Miles, Louisville Taxicab & Transfer Company.
C. T. Minor, Louisville Taxicab & Transfer Company.
S. C. Mumford, Detroit Edison Company.
H. L. Murray, Murray Coal Company.
E. D. Murphey, Cosden & Company.
Homer E. Niesz, Commonwealth Edison Company.
B. W. Nutt, Safety Equipment Service Company.
J. A. Oartel, Carnegie Steel Company.
Lew R. Palmer, The Equitable Life Assurance Society.
Clarence Parker, Seattle Safety Council.
Oscar E. Parrish, Broad Street Bank.
George Perring, Beloit, Wisconsin.
C. E. Pettibone, American Mutual Liability Insurance Company.
Ramsey Probasco, Oakland, California.
H. T. Ragsdale, Swift & Company.
F. H. Ransom, Eastern & Western Lumber Company.
Oliver T. Remmers, Attorney, St. Louis, Missouri.
Henry A. Reninger, Lehigh Portland Cement Company.
Chester P. Rexford, Union Street Railway Company.
Nelson Studebaker Riley, Studebaker Riley Company.
Dr. A. D. Risteen, Travelers Insurance Company.
A. W. Robertson, Philadelphia Company.
A. V. Rohweder, Duluth, Missabe Northern Railway Company.
H. A. Rowe, Delaware, Lackawanna & Western Railroad.
J. T. Ryan, Mine Safety Appliance Company.
G. E. Sanford, General Electric Company.
Dr. C. F. N. Schram, Fairbanks-Morse & Company, Inc.
Fred A. Schwarze, Pfister & Vogel Leather Company.
Chas. B. Scott, Bureau of Safety.
E. J. Senne, Vacuum Oil Company.
Dr. L. A. Shoudy, Bethlehem Steel Company.
Col. James Sinke, Director of Public Safety, Grand Rapids.
Matthew S. Sloan, Brooklyn Edison Company.
Al. T. Smith, Midland Creosoting Company.

H. B. Springer, J
Miss Margaret T.
Robbins B. Stoec
Thomas B. Strob
W. G. Stuck, Lex
Major Robert Sy
C. M. Talbert, I
R. F. Thalner, E
B. F. Tillson, N
C. P. Tolman, N
John H. Truett,
David Van Scha
E. W. Viets, Fli
Joseph M. Ward
A. L. Watson, J
Harry M. Webb
W. E. Welch, T
A. W. Whitney
D. E. Wiedman,
Arthur William
Dr. Frederick W
Prof. C. E. A.
J. M. Woltz, Y
R. J. Young,

The Natio
and public
trial concer
and individ
their combi
tion in the

No great
tive inform
participatio

This volu
Annual Saf
report of t
introductio
sion and d
meetings t
is containe
by that int

CONTENTS

	Page
Annual Meeting of Members	7
General Session	39
General Session—Education and Public Safety	65
General A B C Session	83
Annual Banquet	115
Automotive Section	141
Cement Section	181
Chemical Section	233
Joint Meeting of Chemical and Rubber Sections	265
Construction Section	305
Education Section	327
Electric Railway Section	357
Employees Benefit Associations	397
American Society of Engineering—Engineering Section	437
Health Service Section	455
Ice and Refrigeration Section	493
Marine Section	511
Metals Section	539
Mining Section	573
Packers and Tanners Section	633
Paper and Pulp Section	661
Petroleum Section	693
Plant Publication Section	753
Public Safety Section	805
Women's Division	915
Joint Meeting of Public Safety and Education Sections	931
Public Utilities Section	951
Joint Meeting of Public Utilities and Electric Railway Sections	1005
Rubber Section	1031
Steam Railroad Section	1061
Taxicab and Delivery Section	1131
Joint Meeting of Taxicab and Delivery and Ice and Refrigeration Sections	1149
Textile Section	1157
Woodworking Section	1177

Natio

An

CHAIRMAN, I

THE annua
Congress,
September 29t
Monday, Septe

PRESIDENT D
pronounced by
Louisville.

DR. E. Y. M
great assembl
and property—
property. W
do here and

We pray f
concerned th
We confess o
heedlessness,
humble ourse
been guilty o
the hearts o
condition. Y
presides and
May this me
in enlighten
in us respec
be observed
to our peopl

May every
thought, fre

he grip and hold the audience, and may there come to all of us a new vision, a new sense of what we can do for our fellowmen, a new love for humanity and a new love for God.

These things we ask in the name of Christ our Lord, Amen.

(A motion was regularly made, seconded and carried that the roll-call be dispensed with.)

ADDRESSES OF WELCOME

Norvin E. Green, President, Louisville Safety Council; President, Louisville Car Wheel and Railroad Supply Company.

MR. PRESIDENT, MR. MAYOR, LADIES AND GENTLEMEN: On behalf of the Louisville Safety Council I welcome you to Louisville, the gateway to the South. You are here to study a serious matter, the question of safety, and while it is a serious problem, let us not be too solemn.

We are glad you are here, we hope that every one of you will go away with many new ideas and also that you will contribute much of interest. You know that if John and Bill each have a dollar and they exchange, then they still each have a dollar, but if they have an idea and they exchange, then each has two ideas. It is along this line that these Congresses are run, and I hope that this is going to be as successful as its predecessors.

Again I welcome you with a good old Kentucky, "Howdy, folks! Come in. The latchstring is on the outside."

Now I have a very great pleasure, that of introducing to you a man whom I would only have to mention if I were introducing him to a Louisville audience, and there would be loud applause. In fact, I think he is so well known that I might almost just mention his name here and sit down. He is undoubtedly the finest mayor that Louisville ever has had. In fact, I think he is the finest mayor that ever was anywhere. With that I introduce our mayor, Huston Quinn.

MAYOR HUSTON QUINN: For several months this week has held a very conspicuous place in Louisville's busy calendar, and we are glad that this eventful day has come. No one can study or even read this well built program without realizing or appreciating the great importance of this session now being held in the City of Louisville. It is amazing to those on the outside to see the remarkable progress that has been made by you and those associated with you in the short time that you have been organized for this work. We realize some of the opposition that you had to start with, but in transposing the words of Goldsmith in "The Deserted Village," many of those who came to scoff have remained your warmest supporters today.

My friends, the eradication of the disease carrying mosquito has practically eliminated typhoid fever and yellow fever, and diphtheria no longer has the dread it had in yesteryear: Medical science has made wonderful progress in recent years to alleviate pain, to extend the span

of life and to r
great horror.

Along with th
Movement spon
the saving of l
co-operation an
new day not on
United States.

Some one ha
as we go along
or the dead, an
accidents to a r

Realizing wha
Louisville, we
represent.

Every client
opportunity to
merchant, and
to make good,
to render valu
because of the
are, and we lo
Whether you h
of the East, or
the Golden W
right in the ce
all Kentuckian
to the world A
Henry Clay to

Nature, my
make for wea
share these th

We are glad
grand old com
women, where

You will be
major industr
pay-roll to th
gotten out of
we lead the
in 14 the larg

Here you w
the optimism
combination,
Louisville, an

to make you have a good time. My friends, we are not so large nor yet so busy but what our officials and the heads of our great industries are going to give a great deal of their time to the sessions of this Congress, because we know we are going to profit by it and we are going to be a better and a safer city by reason of the fact that you have come to our midst. I know we have things to discourage you, my friends; we have had them in our city in the past week to discourage those in charge of the safety program, but it is only little by little, if we persist, that we get the greatest results. It was the sale of chewing gum at a cent a cake that made possible the National League Franchise in the City of Chicago. It was the profits on five and ten cent sales that erected the largest building in the City of New York, the largest in the United States today. It was the branch of a tree that saved the life of Columbus and made possible the discovery of America at the time it was discovered. It was the absence of a comma that cost this government one time $1,000,000.

Mr. President, if there is any word that I might say or any service that I might render that would make this the happiest, the pleasantest and the most successful Congress in the history of your organization, you may consider that word as having been said and that service rendered, and if you have a good time I am sure we are going to have one, like the case of a fellow named Ben marrying a girl named Annie. She will be benefited and he will be animated.

RESPONSE TO WELCOME

PRESIDENT DEBLOIS: Mr. Mayor and Mr. Green: It is a very difficult task for me, on behalf of these delegates and Council officers, to express a fitting appreciation not only of the great efforts of the Louisville Safety Council to make this Congress a success but of the real welcome that we have already received in your city.

As you may have discovered already, I have come more recently out of the East, though I claim to have been born in the South. I think there are two kinds of invitation that we are accustomed to receive; there is one which is very probably from the East, and it generally takes the form of "Come in and see me some time." There is another form of invitation which I know is the form that you and I have received here in Louisville, which says, "Come in and make yourself at home."

I can say, for one, that I felt myself at home the moment I set my foot in Louisville. Louisville is famous of all the cities of our country for its hospitality. Even the slogan for this Congress, "Welcomes Safety Council," breathes the very spirit of the hospitality of the city.

Before the President's address I want to announce that your executive committee has appointed Paul F. Stricker, chairman; R. C. Haven, and E. H. Potcher, as inspectors of the election, and the chair will now also appoint them tellers of the election.

The reports of
Mr. Cameron, ha
me not only to r
to report on beh
of divisional org
has had assigned
acting, of course,
and in order tha
imposing too mu
this part of my
plishments in th
been one of subs
the purpose of
purpose, that of
ing this report
progress in acci
doned for expre
the essentials to

The National
of its gross reve
from sale to m
and a monthly
be a credible in
year the total a
mately $100,000
sales of our saf
amounted to $1
this $26,702 has
This represents
but in order to
that only three

The encouragi
indicate a unifo
Moreover, there
for last year a
earnest plea by
"each member
membership of
work of soliciti
was not attain
Therefore, I wis
Dow spoken a
for you to mak
Council by bri

year." And to this let me add that the members of the retiring executive committee, busy as they have been with other matters, have themselves shown you not alone by precept but by example wherein your duty lies. Viewing the success which has attended their earnest efforts to gain members will you not as individuals do as much for the Council in the year to come? It is your duty, for it is your Council.

National Bureau of Casualty and Surety Underwriters

We have continued to receive from the National Bureau of Casualty & Surety Underwriters as substantial evidence of their sincere interest in the promotion of the Safety Movement and of their faith in the Council an appropriation sufficient to adequately finance the Education Section and the expense of one field secretary, amounting this year to somewhat over $29,000. Valuable as this is, of greater worth to us is the cordial and mutually helpful relationship which exists between the Council and the Bureau and its member companies, as well as with insurance interests throughout the country—life, fire and casualty, stock, mutual and state. Time was when there were occasional mutterings of "insurance domination" but those of us who have been privileged to be close to the heart of this great organization know that there has never been "domination" or any sort by anybody within the Council and there never will be. Our success rests on co-operation; co-operation and domination cannot live together within the same organization.

The industrial division of the Council under Vice-President H. A. Reninger, who is not only an able leader but an indefatigable membership-getter, made distinct advances during the year toward standardizing the work of its 14 industrial sections in respect to bulletins, memberships, the annual Congress program and the compilation of uniform accident statistics. This is of significance for we hold the belief that our sections cannot do effective work until fundamental standardization such as this has been effected. The compilation of uniform injury records is particularly important and you will be glad to know that already 10 of the sections have compiled the accident experience of their members on the national basis. In addition to the usual business meetings of section officers one two-day meeting of the entire division was held.

During your attendance at this Congress you will undoubtedly note not only the excellent programs contributed by the sections but numerous other indications of general as well as special activities, such as the committees on benzol poisoning of the Chemical Section and the several joint sessions for discussion of common problems. For all of this much credit is due the officers of the individual sections. The existence of close and friendly relations with outside organizations, with the commissioners of labor of many states and with the U. S. Department of Labor and Bureau of Labor Statistics is also noteworthy.

The public safet
Utilities, Steam R
tions, has been un
who as president
In addition to th
much done by the
our Chicago staff,
posters, stickers,
News, reprints of
pamphlet on radio
fortunate in retair
politan Life Insur
on national accide

The breadth of
the closest co-ope
voluntary, and a
Council has for y
noticeably acceler
portant developme
on Street and Hig
merce Herbert H
conception of such
of The Insurance
and representative
Safety Council.
been appointed a
in December. T
mendations leadi
traffic accidents
efforts of all age
happy to say tha
representation on
bers of our staff

With the appro
Commissioners o
ferences in the S
moting the defin
to operate in th
western groups.
promise and are
to give.

The local coun
T. Fonda has m
fine feeling now
Safety Council w
possibilities and

to the one end of saving life. The quarterly meetings of secretary-managers held during the year at New York, Chicago, Detroit (through the courtesy of the General Motors Corporation) and Louisville have been invaluable as a medium for exchange, stimulation and standardization. Through these meetings, the *National Safety News*, the monthly news letters and the visits of our field secretaries we have been able to counteract any tendencies toward overstressing street and highway safety at the expense of other activities and to promote interest in other important matters such as gas and home hazards and co-operation with the local chapters of the American Red Cross in organization to diminish the number of deaths from drowning.

Community Safety Councils

At the beginning of the fiscal year there were 51 active chartered local councils, 30 of which were provided with salaried managers. We are finishing the year with 56 locals, 38 of which have salaried managers. New locals were organized at Battle Creek, Denver, Knoxville, Brooklyn, Tulsa, Charleston, Norfolk, Reading, Beloit, Cincinnati, Chattanooga, Fort Wayne, Duluth, New Haven and at Newark, Paterson and Jersey City, New Jersey, although a few of these have not as yet been chartered. Our long delayed entrance into the latter state is significant, and much credit for a difficult piece of organization is due Vice-President Fonda, Field Secretary Carl Smith, Mr. A. J. Van Brunt and other officers of the Public Service Corporation of New Jersey who took a sincere interest in the work, and Mr. Fred M. Rosseland, formerly of our headquarters and now manager of the Newark Safety Council.

During the year local councils at Washington, D. C., Reading, Pa., and Toledo were discontinued. We are convinced that adoption and following out the standard method of financing developed by the National Safety Council is as essential to the life and effectiveness of a local council as its proper organization and the *temporary possession* by it of sufficient funds. Next in importance is the selection of the salaried manager, (and let me add that there is at present not only an absence of trained men to draw from, but a dearth of men temperamentally suited to this work who have had the necessary safety experience). But of the efficacy and reasonable permanence of a well-organized, properly financed local safety council there is no question whatever and we should continue and, if possible, accelerate their organization in cities able to properly support them. On the other hand, we have learned that more or less continuous field service from the National Safety Council is almost indispensable to going Councils and that if the work is to prosper and our finances will permit we shall need additional field secretaries of the efficient and experienced type like Carl Smith and W. R. Rasmussen.

I want to mention also in connection with public safety work a new development represented by the safety surveys recently completed at Cincinnati and at Kansas City, an entirely new development on the part

of the National Sa
of valuable effect.

The general activ
Engineering, Healt
Publications Secti
President C. B. Au
A. W. Whitney, c
generously provid
Underwriters pern
Idabel Stevenson,
rapidly extending
established not on
with such organi
National Child W
Association, the G
Congress of Pare
cluded some of th
has functioned mo
Education" was p
tin was issued fo
subscription list o
a complete exhibi
of the field secret
out the country a
designated where
on a uniform basi

The General F
only in the work
safety activity fo
council. This int
the Women's Divi
and other membe
and in spreading

The record of
district conferenc
Francisco, a mos
jointly with the

Membership in
by far the most
American Societ
faction of both o
The new body, w
and Section, wil
neers—Engineeri

that it is unnecessary for me to bespeak for our professional brothers the most cordial of welcomes to their first National Safety Congress. This long hoped for amalgamation was made possible by the earnest efforts of the officers of the two bodies and their special committees, but I desire to mention in particular Mr. W. S. Paine, chairman of our section, and Mr. A. J. Van Brunt, president of the society, whose hearty co-operation and entire unselfishness has made the difficult work of amalgamation a pleasure to all who took part in it. And in this connection mention should also be made of two other men who in the early stages of the work were the spokesmen of their respective organizations—Messrs. David Van Schaak and W. E. Welch.

The Council was represented on sub-committees of the American Engineering Standards Committee in the preparation of 34 national safety codes and its chief engineer has been chairman of the safety code correlating committee. The Health Section has also been active, has taken a definite part in four of the Engineering Section conferences and has interested itself in nation wide radio-broadcasting of the prone pressure method of artificial resuscitation.

Public Relations

A comparatively new office is that of vice-president in charge of public relations held, until the pressure of other duties forced his resignation, by David Van Schaak and lately by Lew R. Palmer. In the speaker's opinion no more important vice-presidential office exists in the National Safety Council and since its creation so much has been accomplished that I find myself unable to cover it adequately in this report. Among the high spots may be mentioned the establishment of closer relations with the Chamber of Commerce of the United States, whose president, Mr. Richard F. Grant, honors us with his attendance at this Congress; with our good friend, the National Fire Protection Association, represented here by its secretary, Mr. Franklin Wentworth, and with whom we are entering into a mutually satisfying agreement on education in fire prevention through the medium of the local safety councils; with the American Red Cross and especially its national chairman, Judge John Barton Payne; with the Boy Scouts of America, leading towards the development of a national program of life conservation and a campaign on "every scout a swimmer"; with the National Association of Life Underwriters through its annual convention; with the American Railway Association through its Safety Section; with the American Electric Railway Association, the National Electric Light Association and the American Gas Association; with the National Association of Railroad and Utilities Commissioners at whose First Annual Conference we had the privilege of representation; with the National Automobile Chamber of Commerce through its committee on safety and traffic planning; with the International Association of Chiefs of Police in whose recent convention we also had the pleasure of participation; with the American Automobile Association and numerous state, county or city

automobile clubs s
us this week; wi
Safety Council and
Association of Indi
This list is not cc
our earnest desire
interested in accid
to do the safety v
assist all other offi

In attempting to
I have purposely
permeating the wl
tion of our Chicag
I heartily wish tha
of these individua
that I must refer
report published i
satisfied with call
items:

1. Sal[illegible] of 1,0
2. Answering
3. Producing
4. Completio
5. Compiling
giving con
ing a local
and exper
6. Inaugurati
members.
7. Continuing
magazine.

The chiefs of
headquarters org
respect and than
swerving loyalty,
ties, very little w
highest terms of
mission at the d
League of Nation
42 nations and l
numerous request
world and added
its work.

It would be of
director general

Nations, not able, of course, to be present himself, but personally and sincerely interested in this work, has directed his Washington representative to be here and represent him at this Congress. We also expected representatives from the British and French Labor Offices, both of which have a direct personal and real interest in our work, but unfortunately they will not be represented here during the week.

Film Committee

It is also fitting that I should express our appreciation of the work of the film committee, at present under the chairmanship of Dr. A. D. Risteen, which had a most difficult task assigned to it in conducting the safety motion picture contest and producing a new industrial safety film in time for this Congress and of the personal work of Mr. David S. Beyer, its former chairman in producing the film "Ask Daddy," which has been most favorably received especially by school authorities; also our appreciation of the conference committee of fifty safety engineers and its chairman, Mr. R. J. Young, for reviewing the text of our safe practice pamphlets, and to our lately organized development committee, an institution which, as a clearinghouse for the executive committee, gives promise of permanent worth. And, last but not least, I feel that we should whole-heartedly thank the thousand-odd voluntary workers who as elected officers or committeemen have given freely of their personal time and thought, and their employers who have permitted them to take time from their regular duties and have defrayed their expenses as well. In dollars and cents, the value of this unaudited contribution to the Council and to the great cause of safety probably lies between $100,000 and $500,000—but it is priceless to us and to the country. It is "service" in the truest and noblest sense. And I, as your retiring president, cannot adequately express my own appreciation of the personal loyalty, help and friendship of these men and of the members of the headquarters staff and of the local council managers which has made the year's work a happy experience never to be forgotten.

Accident Prevention

Turning now to the subject of actual accident prevention it is fitting at this time that we should ask ourselves what reduction in accidents has been effected in this country by the Safety Movement in general and what by the efforts of the National Safety Council in particular. To these questions, however, I find myself unable to give a satisfying answer. We are told by actuaries that the span of life is increasing. Very recently I studied carefully the curve of accident death-rate in continental United States and noted a generally declining rate from 85.4 per 100,000 of population in 1901 to 78.0 in 1908, which I believe was a year of low activity following a financial depression. The curve then rises somewhat to a new maximum of 85.3 in 1913. From 1913 on there are indications of profound changes. During our war years, 1916, 1917, and 1918, there is a peak reaching the high point of 87.2, but this

peak seems to be sup
in 1914 and continuin

In 1922 and 1923 i
creasing automobile
fact that the Nation
the Safety Movement
the decrease in the
have commenced at t
is interesting and pe
which was the lowes
constant from 1907
persons would have
case, and this in spit
At a modest valuatic
we might multiply b
non-fatal injuries p
$2,176,000,000. How
due to the growth o
organization in whic
conditions, more whc
health and such ke
first, that the accide
be in any event but
shown any appreciab
war (notwithstandin
health) the total ra
therefore, I am incl
dental death-rate *is*
in which the Nation
the answer to such
our work without pa

We have many m
successful safety wo
even in large cities
Safety Movement sa
co-operative relation
these illustrious exa
slow and frequently
a hypothesis that ha
cations of the safety

To the average m
Not getting hurt, ho
of safety. Safety is
life. Let us suppos
side of the street, t

five millions invested in first mortgages and bonds, the South Pole by airplane, or what not—and some means or course must be selected (consciously or unconsciously) to attain it; before the attempt were made, the perfect safety man would, I suppose, ask himself certain questions, such as—is the objective worth while?—what is the degree of hazard in the undertaking?—what is the penalty for failure?—is there an equally effective, but less hazardous way? By contrasting this with a 100 per cent imperfect safety man who does not ask himself these questions we confirm our impression that safety is actually a conscious mental attitude to be followed by appropriate actions. This the average individual misses entirely, mistaking the results for the act itself, and while he applauds the movement for its known results continues to risk his life. He is not a hypocrite, although he may appear so to us, but merely unenlightened.

I take it that the work before us then is to acquaint the unenlightened with a true knowledge of the meaning of safety and to inculcate a conscious habit of mind—the habit of thinking safety. I submit to you, however, that if while purporting to extend the safety idea in any industrial plant or, in fact, in any human enterprise whatsoever, I persist in relegating to myself the function of thinking safety, I absolutely destroy every possible chance of success. It is wholly obvious that neither I nor any one man can, at one and the same time, do all the safety thinking and teach others to do all the safety thinking. It is an impossibility! And yet it is my personal belief that there exist in this country today innumerable examples of safety advertised, but not taught as a habit of mind, to the workman, the pedestrian, the motor-vehicle driver and the child—solely because the teaching agency, whether safety engineer, safety committee or safety council, persists in doing all the safety thinking and in absorbing entire credit for the safety work in his environment. I will go still further and assert that if we are to succeed in this work you and I must do less safety ourselves and teach others to do more.

The instinct of self-preservation is essentially selfish but the instinct of self-sacrifice is essentially altruistic and the desire to save human life comes of the latter and not the former. With all possible seriousness I say to you today that *the safety movement cannot progress where the actuating body—safety engineer, safety committee or safety council is guided, consciously or unconsciously, by other than altruistic motives or is afflicted with the canker of craving for priority, recognition and advancement.* The Safety Movement is essentially an unselfish movement, and could not be otherwise. Indeed, it has seemed to me that for the high privilege of saving the lives of the unknown we are called upon to make some sacrifice from our own abundance.

Looking ahead toward the distant future I can see for the National Safety Council only prosperity and success, provided always it continues to remain itself wholly unselfish and avoids the pit-fall of "recognition" and self-sought national prominence. Its work will be accomplished

when it has taught othe
and has asked no thank
need for broadening it
membership, including
inherently interested in
funds for carrying on a
educational work includ
information. That such
and more widely know
I do not doubt, for the
"universal safety."

COOPERATION
O

Richard F. Gran

It is a matter of gre
of safety has now ass
unselfish work and dev
find the best possible sc
day life. The National
in keeping this vital qu
public interest but pul
work in traffic safety
and that there has bee
men of the country, bot
complex problems.

It goes without sayi
cooperation of all natio
and cities and this coo

Out of your delibera
gratitude of our people

While I am keenly in
basis of your deliberati
and when I think abo
preservation of the inst
our great business. Th
the subject for though
safety problem.

There is no greater
can perform than to p
spared neither pains
own thinking. In our
million pupils, and we
To our colleges, univer

another quarter of a billion or more. Probably, we spend altogether two billion dollars a year on education. We do not stop there. We spend upwards of another billion dollars a year for the products of the printing press, and the printing industry outstrips all others in the variety of its products. More than a quarter of a billion copies of books and pamphlets come from our presses a year, and in the last ten years there have been some striking changes. In number of copies, books of reference have doubled. History has more than doubled, medicine and hygiene have multiplied by five. Even philosophy and poetry have increased. But fiction has fallen off by almost half. Our daily papers have an aggregate circulation per issue well over thirty million, and our monthly publications total over ninety million.

Training In Clear Thinking

There can be no question about our national belief that every American should be given the training that will enable him to do his own thinking. That is an article in the American faith. But, admitting the training and the equipment, we are too prone to let someone else do our thinking for us. Loose speech and loose writing find large audience here.

This situation places us at a disadvantage, particularly in the period which follows a great war. Things have so come to pass in this world that on the economic side everybody loses in war. Neutral, vanquished, conquerors have to take consequences that differ only in degree. All countries have their economic disturbances, and economic disturbances inevitably give opportunity for devotees of new formulas to seek to do our thinking for us.

To clarify public thinking is a duty which the United States Chamber of Commerce has recognized. It is trying to do its part. Such advocacy of principles is a duty the Chamber owes to itself and to its constituency of American business organizations and American business men.

This is the sort of duty that is performed by making analyses, drawing distinctions and framing definitions which are essential if there is to be real understanding and conclusions that will prove sound with future experience. These processes the Chamber has repeatedly used. They were last utilized in May, 1924, when the Chamber undertook to describe the function of business. The Chamber's description was formulated as a result of careful study, made by a representative committee. The study resulted in the Chamber's declaration that the function of business is "to provide for the material needs of mankind, and to increase the wealth of the world and the value and happiness of life."

Development of Modern Business

Providing for the material needs of mankind is no small task. Upon the extent and manner of its accomplishment a very great deal depends for each one of us. Our business files are short-dated, but the economists have files of figures carrying back over centuries.

These figures reflect wond
enterprise in its modern fo
with events which were so s
political, they are described
Liberation might be a more
practical applications which
tury substituted machine pr
was a tendency to confuse
discovery were characterize
took a new meaning; for it
new mechanical aids of pro
finding means for disposing
is acknowledged even by th
the first hundred years after
had "created more massive
have all preceding generatio
man, machinery, applicatio
steam-navigation, railways,
nents for cultivation, canali
out of the ground,—what e
such productive forces slum

Those populations of hun
a deep significance to stude
population of England and
four million in 650 years. T
there was a starvation limit
the Industrial Revolution
increased by eight million, a

For such statistics we do
of the United States was
23,000,0000. But in 1900 it
No country ever grew so fa
possible because business
requirements of the popula
for still more. The functio
as the conversion of resou
benefits have been constan
less success in fulfilling the
Americans could not even

Production

We have not reached ou
the last period in which ou
national production. In suc
in our business ability,—in
fits from a supply of raw
inventor and the scientist

the possibilities for human benefits that exist in the discoveries of science and in the developments of invention.

If anyone inclines to doubt he has only to look at some details in the record. During the first seventy years of our national existence no one of our mineral resources supplied adequately the needs of our growing manufactures. A century ago the country produced something like 50,000 tons of pig iron a year, 12 pounds per capita of the population in those days. At our war peak we produced 45,000,000 tons of steel in a year, and in 1920 we turned out 42,000,000 tons,—just short of 900 pounds for every man, woman and child in the country. In 1820 our imports of coal almost equaled our domestic production, and the domestic production was from mines near Richmond, Virginia. The national supply of coal that year was about 85,000 tons. At our war peak we turned out 605,000,000 tons in a year, and in 1920 we produced 587,000,000 tons. When our Constitution was adopted, textiles were made in a good part of the country in ways that would have been familiar to the ancient Greeks. Our first cotton mills in New England looked to the West Indies and South America for their cotton. We now have 35,000,000 spindles working upon cotton grown in our own fields and are the world's great source of supply for raw cotton as well as an exporter of more than $100,000,000 in cotton goods a year.

This record can be continued throughout the articles we know in everyday life. Some significant facts would stand out. Many of our industries did not have their origin in abundance of domestic materials. Not one of our textile industries, which today have combined annual output valued well up in the billions of dollars, was founded because of abundant domestic materials. For even coal and iron the country depended upon imports, and its mineral resources seemed inadequate. The herds of cattle did not even produce enough tallow to make the candles the country required. It took as long to go from Philadelphia to Pittsburgh by canal as it now takes to cross the continent by rail, and the cost of freight transportation corresponded.

Those were the conditions out of which American business enterprise has created the country as we know it, has provided all the commodities and facilities of living that we accept as matters of course, but which were unknown to our forefathers and which are unknown today to vast populations the world over. If we wish a demonstration of the success of our fundamental policy of seeking the benefits that come from private initiative and business ability, we have only to look around us, or at most to glance backward for a few generations. If we think about those tallow candles we may remember that for light alone we last year used nearly twelve billion kilowatt hours of electric energy, that engineers seem confident we shall be using more than twice as much in ten years, and that the geological survey estimated this spring that as yet we have developed but 12½ per cent. of our potential water powers. As an incidental record of what business enterprise is accomplishing, I might cite the facts brought out in June, that between 1919 and 1923 our electric

plants using steam power have
energy for each ton of coal used b

Reliance of the country upon bu
single force that has advanced u
to produce the results which init
and perseverance bring, it will giv
to look back upon us and the wo
look back upon the meager world

At rather regular intervals we
books and in the press with the
money our God, and that the onl
is to cast aside the materialistic
more spiritual in our outlook an

Material and Spiritual

The thought that we can provi
same time grow spiritually is co
business men generally there is a
does not exist for itself alone, b
the common lot and inspire me
the common good. This rising tid
development in business. Reflec
higher learning, our organizatio
the vast number of our social in
and maintained by our business
fashion in every community an
activities are far from sordid in
values in the lives of business m

And then, clearly, the whole
rising. Business men are pract
fashion that a man's word is in
filled and his representations mu
deal fairly with the public. Th
know that it is striding on to
accomplishment.

There is one thing sure about
and it does provide for the ma
a great public service to promo
judgment to understand the rea
them afterwards. Now our pre
accomplishment in providing fo
mankind which reads like a ro
promise. The clear facts about
accomplishment will make the c
of business should stand as the

REPORT OF NOMINATING COMMITTEE

NORVIN E. GREEN: This committee has unanimously nominated the following for election as directors of the National Safety Council to succeed the directors whose terms of office expire at that time, and to hold office for three years:

Walter G. King, Vice-president, American Optical Company, New York City.

Louis I. Dublin, Statistician, Metropolitan Life Insurance Company, New York City.

Earl F. Blank, Director, Safety Division, Industrial Relations Section, General Motors Corporation, Detroit, Mich.

E. W. Beck, Director of Safety, Tire Division, U. S. Rubber Company, New York City.

Prof. C.-E. A. Winslow, Yale University, New Haven, Conn.

The names of the following directors whose terms expire September 29, 1924, are submitted for re-election:

C. B. Auel	L. L. Miles
R. W. Campbell	Dr. L. A. Shoudy
George T. Fonda	Robbins B. Stoeckel
Ira V. Kepner	C. M. Talbert
R. M. Little	R. J. Young

(The nominees for directors were unanimously elected for the terms appointed.)

REPORT OF RESOLUTION COMMITTEE

MR. ARTHUR H. YOUNG: I submit the following as the report of the Resolutions Committee:

"WHEREAS, This Thirteenth Annual Congress of the National Safety Council has been so successfully arranged because of the sincere interest and support of the public officials, civic organizations, industries, and leading citizens of the City of Louisville, Ky., and

"WHEREAS, The National Safety Council has studied, admired and desires to pay tribute to the exceptional interest and ability which these forces have demonstrated in overcoming the accident problem of Louisville, and

"WHEREAS, We feel that their demonstration of this successful safety work forms a most valuable contribution to the cause of safety, therefore be it

"RESOLVED, That a vote of thanks be extended to the City of Louisville, its public officials, civic organizations, industries and leading citizens for the help and the inspiration which their successful demonstration of accident control has given to the broad national safety problem, and be it further

"RESOLVED, That this Council e
through its Mayor, the Honorable Hu
and the Police Department, to the Fir
safety and health of the Board of Educ
Club and the Automobile Dealers' Ass
and Publicity League, the Louisville R
the retail merchants, the railroads, tl
the clubs and co-operative organizatic
women's organizations, the ministers
the Louisville Safety Council, its Pr
manager, Mr. F. F. Gilmore, Jr., an
others who are contributing to the su
and appreciation of this opportunity
pitality of a place and a people far fa

(The resolution was adopted unanim

MR. ARTHUR H. YOUNG: Because of t
to service on the part of the founders
Safety Council has been permitted to
interest of safety with many nation
too long to be here recited, but recen
trend toward the inclusion, as part a
of specific safety planks in the platf
neering societies and commercial and

The mutual helpfulness of the Nat
societies and associations to each o
accelerated the solution of the safet
we feel to be more truly of us tha
further precludes an attempt to list

Therefore, Mr. Chairman, I move th
that we view with hearty commendat
activities as an essential part of t
organizations, and pledge to all suc
support.

Council Pledges Su

MR. YOUNG: Among the evidences
sciousness, there is one which in i
out preeminently.

It is generally known that the Secre
that the street and highway traffic ha
constitute it a national menace, is
national conference at which careful
the work of months on the part of
mittees will be presented as a bas
action.

The National Safety Council has d
its part in the furtherance of this

that this conference called under such favorable auspices with the co-operation of all interests may well prove to be the occasion for the most significant advance that has been made in the field of street and highway accident prevention.

Therefore, I move that the National Safety Council expresses to Secretary Hoover its grateful appreciation of the step he is taking, and that it pledge its further support in every way in which it can be of help. (The motion was seconded and carried.)

MR. YOUNG: Mr. Ralph C. Richards, whom all of us know and love so well, I deeply regret to report is still very seriously ill. As you probably know, Mr. Richards was compelled to resign his position as safety director of the Chicago & Northwestern Railroad several months ago on account of this illness. I know I but voice the message of sympathy and encouragement that dwells in the heart of each of us as I read this simple telegram:

> "Heartiest greetings and best wishes to you, our beloved comrade and past president and the pioneer of organized safety work on railroads, from all of the members of the National Safety Council assembled today at its Thirteenth Annual Meeting."

which I respectfully suggest be sent by your President in the name of all of us.

PRESIDENT DE BLOIS: That will be done, but I would like to ask, in respect to Mr. Richards, a rising vote on that motion. (Carried by a rising vote.)

Public Safety Resolution

MR. YOUNG: "WHEREAS, Statistics and study show that more than 75 per cent of the 53,000 deaths and millions of injuries caused yearly by accidents in the home, on the street and in other public places are avoidable, and

WHEREAS, Experience has repeatedly shown that where intelligent organized effort has been directed to the task, these avoidable accidents have been definitely reduced in frequency and severity, thus demonstrating the need of a more far-reaching application of methods of proven efficiency, and

WHEREAS, The avoidance of such accidents is a public responsibility to be met with proper realization of their menace, judicious consideration of causes and effective means of combat, therefore be it

RESOLVED, That the National Safety Council, in its Thirteenth Annual Congress assembled in Louisville pledges its continuing assistance to the host of public officials and public agencies now engaged in public safety work, and advocates:

1. The organization of community safety councils wherever practicable in every sizeable city and town, along lines similar to the sixty community safety councils now functioning in our larger cities, the

purpose of which is to create community in
of increased safety in the home, on the s

2. The education of the motorist and th
the principle that both have rights on t
to recognize these rights must result in inj
persons and property but by an aroused pu
laws that will further interfere with their

3. The incorporation of organized inst
principle of personal and public safety i
public and parochial school of primary and

4. The more concentrated study of the
by public officials by means of traffic cha
uniform statistics to relieve local centers c
to provide adequate information on how,
automobile accidents are occurring.

5. The issuance of state drivers' license
vehicles upon their qualification by test a
and fitness, and revocation of such licenses

6. The formation and adoption of uniform

7. The consideration of street traffic mo
cipal problem of engineering importance,
of through traffic routes, city and county, w
determined by engineering analysis and re

8. The co-operation of federal, state an
steam and electric railroads in the continue
crossing accidents.

9. The arousing of the public consciousn
bility of accidents in the home and the educ
intelligently with home hazards to the end
against accident.

10. The strict enforcement of all laws,
are designed to remove hazards of every-day
which would otherwise result from uncontrol

I move the adoption of these resolutions.
and carried.)

Industrial Safety Reso

MR. YOUNG: "WHEREAS, The problem of
dents has come to be recognized as fundam
ing personal habits and attitudes, and ther
social problem as well as a matter of wo
industrial establishment, and

WHEREAS, The history of the safety m
that permanent progress in accident preve

favorable over periods of years under conditions of increasing efficiency, therefore be it

RESOLVED, That the National Safety Council in its Thirteenth Annual Congress assembled in Louisville urges,

1. Careful study of the fundmental causes of possible industrial accidents and the development and immediate application of effective preventive measures;

2. Adoption of the principle that industrial safety cannot become permanently established in our shops until we have community-wide interest in safety and thus reach the employees in their home and public life;

3. The development of industrial equipment and processes along lines of inherent safety for the double purpose of eliminating accident hazards and increasing production efficiency;

4. The education of all workman and their supervisors in methods and habits of safe operation, and that the management lend its influence to the success of the educational program;

5. That the industries of America be accorded the thanks of a grateful nation for their unswerving support during the past decade of the safety movement, with its attendant conservation of life and of property."

I move the adoption of the resolution. (The motion was seconded and carried.)

Council Commends President DeBlois

MR. YOUNG: RESOLVED, That the members of the National Safety Council by a rising vote express to Mr. Lewis A. DeBlois, its president, their appreciation and commendation of the splendid leadership, keen executive ability, untiring effort, and inspiring personality which he has so conscientiously shown, and from which is reflected the substantial growth and definite accomplishment of the National Safety Council during the past year.

I move the adoption of this resolution, and I will put the vote. (The motion was seconded and carried by a rising vote.)

MR. YOUNG: This particular resolution I offer at the special request of Mr. DeBlois, but I confess a definite feeling of jealousy (which perfect frankness causes all of you to likewise plead guilty to) that its authorship should be so indicated. I think, on the whole, I shall assert an undefined prerogative of past presidents and offer it as the product of the syndicated authorship to the whole membership.

WHEREAS, The National Safety Council is so generally and so generously credited with having made conspicuous contribution to the steady, onward march of the Safety Movement in America and internationally, and

WHEREAS, The successful functioning of the has been due so largely to the indefatigable effc of the headquarters staff, now therefore be it

RESOLVED, That the members of the Nati assembled in annual meeting do, by this resolu and appreciation of the high character of pi diligent application to duty so well performed each and every one of his associates on the st

I move the adoption of this resolution. unanimously.)

ANNUAL REPORT OF MANAGI

W. H. CAMERON

Four hundred and sixty-eight new membe tional Safety Council during the past fiscal the total membership for the past two years

Membership, July 31, 1924.....
Membership, July 31, 1923.....

Or a net gain of.....

The National Safety News has gained in ci tance in the Safety world. The quality has ir of special features and articles has increase increase in the total circulation and in the ordered by members for their Safety comr superintendents. The success of this magaz lication field—is made possible only through of members in contributing special articles special hazards and safeguards and statistica valuable character.

The Safety Bulletins have been continued per month and have steadily improved in q money has been spent upon the bulletins th known artists have been employed to add v tions provided by the Sectional bulletin com million one hundred and seventy-five thousand have been ordered during the past year.

The Safe Practices Pamphlets have appeare supervision of Mr. R. J. Young and the C seventy-five safety engineers. Seven of the been revised and reprinted. This "Safety enc seventy-one separate treatises on the fundar eering practice in practically all industrie

ordering complete sets of the pamphlets for reference purposes and older members are adding to the sets already in use.

The Information Bureau has answered 6,293 requests for information —nearly double the number received during the preceding year— involving the distribution of over 55,592 pieces of information, including books, pamphlets, bulletins, exhibits, portfolios, photographs and similar material. More than 23,000 new pieces of material have been added to the Library files during the past year.

Films and Slides have been in demand by members in increasing quantities. The two albums of photographic reproductions of the entire slide collection (now numbering more than 1,500) are in constant circulation among members. The Council's first new Public Safety film, "Ask Daddy," shown first at the Buffalo Congress, has been kept in constant circulation. Eleven copies of this film have been sold; seven copies kept in constant circulation and the demand is increasing. The second film in the series of three new National Safety Council's films relates to industrial accidents and will be exhibited for the first time at the Thirteenth Annual Safety Congress at Louisville, September 29-October 3.

The Safety Calendar increases yearly in popularity as a medium for reaching the worker and his family. Nearly 500,000 copies of the 1924 Calendar were distributed. The 1925 Calendar will be ready for mailing within two weeks and will be an improvement over the 1924 edition in size and quality of illustrations. On the reverse side of each of the calendar sheets will be printed valuable data on general public safety subjects.

The 1923 Congress eclipsed every previous convention of its kind! The Proceedings of that Congress contained eleven hundred and sixty-six pages of general and special Safety information with complete alphabetical index.

National Safety Codes have continued to receive the careful attention of your Committees and Staff. Representatives of members of the Council are assisting in the formulation of thirty-four of the national standard codes. The Chief Engineer of the Council has been the Chairman of the Safety Code Correlating Committee of the American Engineering Standards Committee. Several slight amendments have been made to the Codes sponsored by the Council on Power Presses; progress has been made on the Codes on Construction, Forging and Paper and Pulp Mills and the Code on Colors for Traffic Signals is nearing the final stages for presentation to the American Engineering Standards Committee for approval. Your Council is aiding in the efforts to have these Codes accepted and adopted as standards in all of the states.

Editors of Employees' Magazines have continued to receive a special service including original Safety illustrations and accompanying stories. Other special material and assistance have been accorded mem-

bers publishing plant magazines or contemplati
of this type of publication. The program unde
Plant Publications Section at the 1924 Congress
contribution to the plant publication field.

The Industrial Sections have been more active t
of the Sections have held executive committee
continued their intensive service to the members
Many of the sectional committees have conducte
ship campaigns and performed invaluable service
bers by stimulating the furnishing of statistica
bulletins and an interchange of Safety experience
Council's Vice-President-in-charge of Industrial S
Chairmen have met and discussed general polici
aims of these specialized groups of members. Se
held important district meetings during the year.

The Engineering Section held five successful dist
ing the year, including the Pacific Coast Safe
Francisco in cooperation with the Society of
California. Announcement has already been n
mation of the American Society of Safety Engin
eering Section and to be formally effective at the
Many new members have been added to this Sec

Sections General: Sixteen industrial sections h
service to the members during the year, plus th
Engineering, Taxicab, Public Safety, Plant Publica
Benefit Associations.

Public Safety: The significant development duri
the initiative of Herbert Hoover, Secretary of Co
together seven National Committees to study an
and Highway Safety problems. Your Council's
serving on these committees and the Director
Division is giving special assistance to the direct
reports of these committees may be ready for sul
conference in Washington in the Fall. Consider
activities for safety on the streets and in the hom
towards the formation and upbuilding of commu
tions. The report of the Committee on Public A
been widely distributed. Traffic studies have be
eral local experiments made. Efforts have been
to organize the Southern and Pacific Coast Motor
conferences. The Mid-Western States Motor V
functioning actively. The Public Safety progra
gress has been greatly expanded. A special Pu
is projected. The Public Utilities, Electric Rail
and Taxicab and Delivery Sections have cooperate
of the program of national public safety.

The Education Section has made unusual progress through the services of an executive secretary and a traveling secretary, made possible through the continued generous assistance of the National Bureau of Casualty & Surety Underwriters, which has also helped to finance the field secretarial service to local councils. (See record of money contributions in the Treasurer's report). The Education Section has been represented at all of the important meetings of educational leaders, has continued contact with hundreds of public school systems throughout the country, has established a bi-monthly bulletin for school teachers, has printed and distributed large-sized school Safety posters and has established eleven new demonstration centers.

Our Publicity Service in the Industrial and Public Safety fields has been considerably increased. Series of special articles, safety lessons and other propaganda have been sent to and used by hundreds of newspapers and magazines. Dispatches and feature stories have been sent out through the national news distributing agencies. Radio talks have been broadcasted through the cooperation of the larger radio stations. Special material and assistance have been given to Local Councils and members for local publicity campaigns.

Local Councils: Our intimate contacts with and services to the Local Councils have been greatly developed. Fourteen new Councils, employing salaried managers, have been organized during the year. The quarterly conferences of local council managers and executive committee have been widely attended. A set of ten loose-leaf binders has been prepared, presenting the entire organization and administrative problems of the community councils. These are now being used as a guide in all community councils' activities. A monthly newsletter of specific information is being sent to the community councils' officials with valuable enclosures. The field representatives have given all of their time to the organization and service of the community safety councils. Bulletins and other printed service have been furnished on request. Extensive correspondence has been maintained both with the existing councils and with communities desiring to organize for community safety work. State and municipal authorities have been furnished with copies of the Council's public safety material and have been encouraged to greater activities in public accident prevention fields.

External Relations: As announced at the Buffalo Safety Congress, your Council sent a representative to the annual meeting of the International Labor Office of the League of Nations, Geneva, Switzerland, last October. This evidence of cooperation with the forty-two nations of the League was appreciated and very cordial relations have been established with many of the safety representatives of these nations. Your representative also visited Paris and London and was cordially received. Friendly relations have been maintained with other institutions interested in Safety, such as the American Museum of Safety, the Chamber of Commerce of the United States, the Canadian Safety

League, the American Association of Industrial Phys geons, the Safety Section of the American Railway Safety Bureaus of the insurance companies, and st Government departments, as well as the American E dards Committee and the National Bureau of Cas Underwriters. Safety exhibits have been furnished trade associations' meetings and other affairs.

Staff: The real "staff" of the National Safety Cou bership, a large percentage of which has contributed *Safety News*, the bulletin service, the Safe Practices upbuilding and service of the sections, annual congre slide collections, and all of the committees, both nat

During the year Fred M. Rosseland, the chief of o Division for the past three years, resigned to become the Newark (N. J.) Safety Council. This necessitated ments in the personnel of the headquarter's staff w forty-eight persons, including:

W. H. Cameron, Managing Director and Secretary.
Sidney J. Williams, Director, Public Safety Divisio
W. Dean Keefer, Director, Industrial Safety Divisi
A. Mark Smith, Director, Business Division.
George Earl Wallis, Editor and Director of Publici
R. T. Solensten, Supervisor of Bulletins.
Carl L. Smith, Field Representative.
W. R. Rasmussen, Field Representative.
John M. Sandel, Safety Engineer.
C. T. Fish, Associate Editor.
Mary Noel Arrowsmith, Executive Secretary, Educa
Idabelle Stevenson, Field Representative, Educatio
Mary B. Day, Librarian.
Mary M. Wells, Assistant Librarian.
Myrtle Mollan, Chief Clerk.

ANNUAL REPORT OF THE TREASURER NATIONAL SAFETY COUNCIL

Treasurer's Report for Fiscal Year Ending July

ASSETS

	As at July 31, 1924	As at July 31, 1923
Current Assets:		
Cash	$ 11,561.12	$14,265.28
Investment Securities	19,913.75	9,986.25
Accts. and Notes Rec.	16,585.94	10,782.49
Advances for Traveling Expenses	2,650.00	660.00
Inventory of Supplies	4,496.13	3,283.91
Deposit with Postmaster	131.62	464.54
		$

Total Current Assets	$ 55,338.56	$39,442.47	$15,896.09
National Safety Council Reserve Fund Investment	26,702.12	12,629.18	14,072.94
Office Furniture and Equipment	11,570.58	11,093.86	476.72
Deferred Charges	14,434.63	11,069.10	3,365.53
	$108,045.89	$74,234.61	$33,811.28

LIABILITIES

	As at July 31, 1924	As at July 31, 1923	Increase	Decrease
Current Liabilities:				
Accounts Payable	$ 2,284.10	$ 4,002.85	$	$1,718.75
Current Accounts (Local Councils)	507.68	465.68	42.00	
			$ 42.00	$1,718.75
Total Current Liabilities	$ 2,791.78	$ 4,468.53	$	$1,676.75
Accrued Expenses	342.00	315.15	26.85	
Special Film Fund	16,456.55	10,100.00	6,356.55	
Unexpended Balance—Education Section	211.93		211.93	
Reserve for Future Service to Members	26,702.12	12,629.18	14,072.94	
Surplus	61,541.51	46,721.75	14,819.76	
			$35,488.03	$1,676.75
	$108,045.89	$74,234.61	$33,811.28	

Statement of Gross Revenues and Expenditures

Fiscal Year Ending July 31, 1924

GROSS REVENUE

Membership Dues:		
Active		$187,929.51
Sales of Pamphlets, Bulletins, Chauffeurs' Lessons, 1924 Calendars and Miscellaneous Receipts		139,838.80
Contribution by National Bureau of Casualty and Surety Underwriters toward Expense of Education Section		20,337.40
Contribution by National Bureau of Casualty and Surety Underwriters towards Expense of Field Work		9,166.63
Gross Revenue, National Safety News (Dues from Council Members not included)		17,388.26
Interest Earned		1,288.03
Total Gross Revenue		$375,948.63
Add: Reduction in Reserve for Dues Cancellations		$ 1,500.00
		$377,448.63

GROSS EXPENDITURES AND DISPOSITION OF NET REVENUE

Annual Congress Expense	$ 3,877.29
Annual Congress Exhibit	550.48
1923 Annual Congress Proceedings	5,616.41
Automobile Dash Cards	209.82
1924 Calendars	71,438.82
Cartoon Service	59.27
Chauffeurs' Lessons	427.36
Depreciation, Office Furniture and Equipment	1,955.70
Exchange	280.50

Expenses of Various Local Councils	
Field Work, including Salaries	
General Bulletin	
General Office Expense	
Library Expense	
Membership Solicitation Expense	
Miscellaneous Publication Expense	
NATIONAL SAFETY NEWS	
Office Printing and Supplies	
Postage	
Publicity	
Rent of General Offices	
Safe Practice Pamphlets	
Salaries of Officers and Staff	
Sectional Activity Expense, including printing Bulletins	
Education Section Expense from Contributions of National Bureau of Ca and Surety Underwriters	
Sundry Activities	
Taxes and Insurance	
Telephone and Telegraph	
Traveling Expense—Administrative, including National Committee Expens	
Loss on Exchange of Equipment	
Reserve for Bad Debts	
Total Gross Expenditures	
Transfer to Reserve for Future Service to Members	
Transfer to Surplus	

HOMER E. NIESZ, Vice-President an

We have examined the above comparative balance sheet of the Nationa as at July 31, 1924, and July 31, 1923, and the attached statement c expenditure for the year ending July 31, 1924, and have compared them and vouchers and have found them correct.

ARTHUR YOUNG &
Certified Publi

Chicago, Illinois, August 12, 1924.

ADJOURNMENT

General Session

September 29, 1924

CHAIRMAN, C. I. HITCHCOCK, President, Insurance Field P Company, Louisville, Ky.

CHAIRMAN Hitchcock: Mr. President, ladies and gentlen one who attended the session this morning and listened dent DeBlois present the progress of this greatest peace move world has ever seen for the people's happiness, can fail in ap of the mighty impress that safety is making upon the imagi the thoughtful American people.

FUNDAMENTALS OF OUR INDUSTRIAL SAFETY PROBLEM

Hon. James J. Davis, Secretary of Labor, Washington, D

For some years we have been spending large amounts of tim and money to safeguard the lives and limbs and health of the m labor makes this the greatest industrial nation in the world. pose is a laudable one from every point of view. It is a wor service both to the individual and to humanity. It means the r a better industry for America and a better America for industr life we save, every disability we prevent, every vocational di overcome, or avoid, means something added to the sum total happiness. It likewise means something added to the sum tot economic prosperity.

I have no doubt that we have come a long way in the last two in the matter of industrial safety, but I would like to b prove it. So would you. So far as I can find out (and I some of our experts gathering this information for me) w know what we are doing or where we are going as a nation in of preventing industrial accidents and fighting industrial dise whole struggle for safety in industry from a national point of fight in the fog. We are surrounded and bewildered by a c rising mist of slogans and campaigns and drives and estima know that in certain individual plants and in certain individu tries we are making tremendous strides toward safety operat know that our slogans and campaigns get results in many c do you realize that no human being on the face of the earth t tell within thousands how many workers were killed in indu year? I have seen estimates, but the very best authorities fix

mated number of fatalities annually in industrial accidents at 12,500, 25,000, 35,000, a range of more than 20,000.

The experts of the Bureau of Labor Statistics have estimated these fatalities at about 21,000. We say that such information as we have indicates that there are 2,453,418 industrial accidents annually, with a resulting wage loss of $1,022,264,886. Truly these figures are appalling. They indicate a terrible wastage of human life and human effort. They call for our best efforts to end conditions which make that waste possible, but in the end their estimate is based on statistical data, relative hazard, and other more or less abstruse calculations of the expert. I want facts; so do you. I believe the American people are entitled to know exactly what price we pay in human life and limb for our industrial prosperity. I believe the American people are entitled to know where, when and how men and women are killed and maimed in industry. I believe that all of us who are working to cut down this human cost sheet of American industry, are entitled to have the facts upon which to base our effort. I believe we ought to know where, when and how these accidents occur if we are to make an intelligent, effective fight to prevent them. I believe we must know the condition which causes vocational diseases before we can find out the means to avoid them.

Fundamental Need is Facts

Our fundamental need in the fight for safety in industry is facts. Without them we are working in the dark; we are nationally like a physician who would undertake to treat a patient without first making a diagnosis of his ailments. You can make no true diagnosis without facts. I propose to make an effort to get the facts, and all of the facts, as to industrial accidents in the United States. I want, and I know I will have, the support of your organization and of every other organization interested in the saving of human life and limb.

I am not one of those who believe that the federal government ought to busy itself about the affairs of every individual American. I am not one of those who seek to have the federal government poking its nose into everybody's business. I am old-fashioned enough to hold that the function of the government is to govern, not to conduct the private business of its citizens. This, however, is a national problem. That is clearly recognized when we note the wide range of industry and territory represented in this National Safety Congress under the auspices of the National Safety Council.

The federal government is the only agency which can properly and efficiently assemble the facts which are fundamental in meeting this problem of industrial safety nationally. Our difficulty today lies in the wide diversity of the statistics as to industrial accidents as those accidents are collected and collated by the individual states . State laws as to workmen's compensation, under which most of the data as to industrial accidents are collected, differ widely. Industries covered in one state may not be covered in another. What is an industrial accident in

one state may not be classified as an industrial accident in another st
Six states and the District of Columbia have no machinery for report
industrial accidents. The result is that when we come to look at t
matter, naturally we have only a hodge-podge of information, most
it utterly useless for the compilation of data covering the nation.

I propose to put some order into this chaos. I propose to ask C
gress for authority, the men and the money to enable us to undert
real industrial safety research work in the Department of Labor, eit
through the present Bureau of Labor Statistics or some other agen
I am having legislation drafted which will accomplish this end
which I propose to submit to the proper committee of the House
Senate when Congress convenes this winter.

Provisions of Proposed Legislation

Under the legislation I propose to seek the following:

Provisions for the collection of all information, data and statistics
to industrial accidents and their prevention and industrial diseases
their prevention by the Department of Labor in cooperation with
various state agencies engaged in this work. By this means we wo
seek the cooperation of all state agencies in making all of our d
uniform and comparable.

Provision for the publication and dissemination of this informati
through American industry by the Department of Labor.

Provision for the maintenance by the Department of Labor at Wa
ington of an industrial safety exhibit where we would be able to gat
together information for the benefit of American industry as a whol
models, devices, plans and methods for safeguarding the worker
American industry.

Is there a place in America now where you can go to see such thing
I would provide for having this exhibit a thorough and complete expo
tion of every machine or method proved by experience to be a contri
tion to the advancement of safety in industry. I would make it possi
for any manager to find there in Washington the latest word in effecti
and practical means to make his plant safe for his employees. I wo
not confine this to mechanical safeguards alone. I would have it embra
every feature of industrial safety engineering and safety organizatio

Under such a law and with such machinery, we would gain mu
information for industrial safety, we would provide for all America t
real facts upon which to base accident prevention and vocational d
ease prevention. We would be able to pave the way for uniform sta
laws, not alone as to industrial accident statistics, but as to accide
prevention and the installation of industrial safety devices. At prese
safeguards required by law in one of the states may not be requir
across the state line just a few miles away. A workman accustom
to working a machine properly safeguarded, by changing his place

employment may find himself at an unguarded machine, exposed to the loss of life or limb. Uniform state laws would end this danger.

In putting forward this program of Federal aid in industrial accident prevention, I ask your cooperation and support. I hope that when this legislation is placed before the Congress you will be behind it. The need for it should be apparent to all. Your work for industrial safety has my earnest and wholehearted support. After all, the vital factor in industry is the human factor. There is no excuse for wasting it or neglecting it.

I look forward to the day when American industry will be conducted without loss of life or limb beyond the normal hazards of every-day existence. I look forward to the day when the worker will be as safe at work as he is in his home, when our prosperity will come to us without the payment of a great price in flesh and blood.

MENTAL CAUSES OF ACCIDENTS

A. L. Jacoby, M. D., Director, Psychopathic Clinic, Recorder's Court, Detroit, Mich.

Such terms as the "human element," "personal equation," "personal factors" and others of similar import, have been used in industry a very long time to indicate the recognition of the fact that behind every mechanical device there is a human operator. And it has been recognized for a very long time that the operation of a machine, no matter how perfect it may be, may fail if handled by the wrong operator. Every safety engineer has recognized this human element that enters into every operation in every factory and into every accident everywhere. But it has been only within the relatively recent past, more definitely perhaps, with the development of psychiatric research and the mental hygiene movement, that attempts have been made to more accurately describe, define and understand this "human element." Studies of the "human element" have been made to gain a more accurate understanding of such issues as unemployment, strikes, industrial unrest, accident prevention, increased production, sales promotion, traffic regulation, vocational guidance and, in fact, every problem where humans are involved, in the light of the recent researches in psychiatry and psychology, and it has ben noted that all these industrial problems are interrelated because the human factor is present in all of them. As these studies have progressed, the terms "human element," "personal equation." "personal factor" are being replaced by such terms as "mental element," "psychological factor," "physic element," etc., as an indication of the application of psychiatry and psychology to the problem. Valuable contributions to the literature of the last few years have been made by the late Dr. E. E. Southard, by Dr. Thos. W. Salmon, Dr. Herman Adler, Boyd Fisher and others, dealing with one phase or another of the mental factors in industry.

The organized efforts toward the decrease of injuries and deaths by accident in industry, as exemplified in the Safety Movement, have many

points of similarity to the organized efforts at disease prevention which have met with such great success within the past quarter century The same scientific method is applicable in each instance. Sir William Osler defined science as the habit or faculty of observation, and before Osler, Plato defined it as the discovery of things as they really are. In a preventive medicine, the observation of the life habits of the malaria organism and of the mosquito in which the malaria organism spends a portion of its life cycle has made possible the prevention of infection by this organism. In typhoid fever, the observation of the habits and characteristics of the typhoid bacillus has resulted in typhoid fever becoming a very infrequent disease instead of one of the most frequent. Observations and studies of the mind have shown us that there are mechanisms of complex sort controlling behavior and that these mechanisms go on operating without the conscious control of the individual and we have learned from these observations that there are no two minds exactly alike, either quantitatively or qualitatively.

Determination of Mental Capacity

That there are quantitative differences between minds was recognized by our legislators when they fixed the age of an individual after which he may vote, and when he may contract marriage and when he may be regarded as responsible for a crime. It was conceived that sufficient mental development had occurred when ages were attained to render the individual capable of handling the specific issues involved. As our observation of mental functioning has progressed, however, we have noted that the chronological age attained is not always an index of the mental development attained. Out of this observation have grown methods of determination of the quantity of mind. So we no longer need to depend upon the chronological age to estimate the degree of mental development. By the use of psychometric tests we frequently find that individuals of full adult years have not developed beyond childhood, mentally. This observation has a bearing of great importance in accident prevention, and especially in traffic accident prevention. If high powered automobiles are entrusted to individuals whose mental development is that of the average child of 7, no matter what the chronological age of the indixidual may be, we must expect accidents. Obviously, the same is true of complex machines in the factory. Methods of examination, which may be applied to machine operators and to the applicants for licenses to operate motor vehicles, are now available for the determination of the mental age.

Thorough and reliable psychomertic tests in the hands of experienced examiners require about an hour for the examination, and hence it is readily seen that where large numbers are to be examined, in a short space of time, such complete tests would be of small practical value. There are, however, the so-called group tests which were used with great success in the army during the war. These tests are of two general types, one for literates and one for illiterates, and require about 40

minutes to apply to a group as large as 75 or 100. Where it is known what quantity of mind is required for a given operation, the use of group tests can readily, and with much more accuracy than the so-called trial and error method, eliminate many quantitative mental hazards. Where the result of such examination is doubtful, a supplementary and more thorough individual examination might be the final determinant. With the widespread application of such examinations in industry, there will develop as has already been begun, special methods of examination for fitness for special kinds of work. The need for this attention to the quantity of mind of the machine operator is everywhere apparent.

Adaptability

A single example will serve to illustrate. In my city, a 30-year-old automobile driver ran down a lady crossing the street and killed her. He then drove on, in a panic of fear, until he was stopped by some witnesses to the accident and turned over to the police. He was charged with manslaughter. Examination very quickly showed his mental development to be about that of eight years. Further than that, he had always been a resident of a rural community and had come to the city only on rare occasions. He had never liked to come to the city because as he said he "got rattled." He was tried and convicted and is now serving a term in prison. The prosecuting attorney laid great emphasis upon the fact that he attempted to run away from the accident as evidence of his evil and malicious character. Prosecuting attorneys usually want convictions. Not only was he defective in mind, but such mental development as he had, he was only capable of using most clumsily in the complex and unfamiliar traffic conditions of the city, while he was undoubtedly able to use his eight-year mentality much more efficiently in the simplified country environment, because it was familiar to him. It is quite obvious that his sentences to prison will not prevent future similar accidents on the part of mentally defective drivers, and it is equally obvious that the only method of prevention is the restriction of license. by proper examination, to those of adequate mentality.

It is impossible in a paper of this length and general character, to discuss all the various tests, or even any small portion of them. which may be used in determining the adequacy of the mental development of machine operators, for specific tasks, but it may safely be said that the state of the present psychiatric and psychological knowledge is such that it is not a difficult problem to devise tests for any sort of operation, of such accuracy that a very large proportion of the hazards of quantitative kind may be excluded.

Of quite as much, or of even more importance than the quantitative defects of mind in the production of accidents, are a group of mental states which we may for convenience speak of as qualitative conditions. Under the qualitative heading, we recognize a large class of conditions which we refer to as attitudes, not the result of disease, but the result of individual evaluations of oneself in reference to one's environment. The

second subdivision, under the qualitative heading, is composed of those mental states which are the result of disease processes in the nervous system, or elsewhere in the body.

Attitude Toward Life

It is within the experience of each of us, in the observation of our friends and acquaintances, that there is a very wide range of difference in individual attitudes toward life in general, and toward specific problems of life. In every business office there is the tried and true employee, who is always extremely reliable and dependable in any emergency. He is always on time, his work is always of the highest quality, and he manifests on all occasions a very live and active interest in the welfare and progress of the organization which employs him. As a contrast to him, we have been associated with the employee who is characterized by irregular habits, slovenly work, frequent absences from duty, and his general lack of interest in th eprogress of his firm. He is often the individual who watches the clock, and talks much about "his rights". Examination of these two individuals might easily show them to have equal mental endowment from the quantitative viewpoint, or possibly the slovenly one may have more intelligence than the dependable one. In neither case would we expect to find, upon examination, any acquired mental disease to account for their differences, but they are nevertheless very different individuals, and very different accident risks. The differences lies in their attitudes. It is not within the scope of this paper to discuss the factors which enter to determine our various attitudes, but it should be mentioned that the individual attitude is determined in general by the influences of his very early environment upon his instinctive development. Each of us is born with certain longings, desires or instincts. The instinct for self-preservation, the instinct for race-preservation and the herd instinct are some of these. Faulty handling and management in the period of infancy and early childhood result in the thwarting or in the over-accentuation of some of these instincts, with the result that the individual comes into the adult period of life with a twisted attitude toward society. An example of the effect of attitudes in the production of an accident, may be seen in the following:

Habits

An experiment in a chemical laboratory required the services of two men, one to turn a stop cock upon a signal from the other. The experiment was very long and difficult and had been repeated many times by the same two workers. The stop cock was a two way cock, the proper turn at the proper instant allowing the operation to go on, while the turn in the opposite direction emptied the apparatus and ruined the experiment for that day. Worker B, whose business it was to turn the cock was an individual whose attitude was in general that the world owed him a living, and he was in the habit of shirking or taking days off on the slightest excuse. Worker A, who had charge of the experiment,

had been a good influence upon B, in keeping him at the task, but it was often with very special effort. On the day in question, B had tried to persuade A not to work, but to take a holiday, because of the fine weather or because B wished to pursue some trivial pleasure. A had, that morning, had a more than usually difficult task in getting B to work. Upon the signal to turn the cock, B turned it in the wrong direction with the result that the experiment was ruined and the day lost. There was no reason to believe that B made the mistake deliberately, with malice aforethought, but his self-centered interests had made him careless, and by a subconscious reflex mechanism, his automatic movement used in turning the cock was in the wrong direction. His attitude influenced all his reflex activity and in this particular incident the result was disastrous.

Unfortunately, we have no methods of measuring attitudes with the precision that we are able to measure mental defects, but we are able to estimate them, and classify them into several general groups. Every factory executive does classify his men on this basis, more or less subconsciously, and the general attitude of the worker is usually recognized before he has been in the organization a great while.

It should be mentioned that attitudes change in the same individual, due to emotional stresses and strains under which he finds himself. These changes bear a relation to the production of accidents. A worker whose home life is unpleasant, and who is subjected to emotional storms at home, is obviously a greater hazard, other factors being equal, than the worker whose home life is tranquil and happy. Sudden emotional shocks will render workers greater risks, until the effect of shock has worn off.

Attitude of Auto Drivers

This question of mental attitudes is of unusually great importance in the determination of motor car accidents. The intolerant driver, who blows his horn vigorously when he finds himself in an impasse in traffic; the driver, who leisurely occupies the middle of the road in a busy thoroughfare; the restless driver, who dashes in and out of the line of cars, to gain a vantage of perhaps 50 feet, are examples of traffic hazards, growing out of attitudes of mind, for the most part, of egotistic kind. Education is, of course, the factor upon which we must largely depend to give such drivers a proper social attitude, but there are some things which might well be done by the law-enforcing authorities in this direction. *If traffic officers were to pay more attention to those drivers who manifest dangerous egotistic attitudes in their driving, and less to the arrest of individuals driving beyond the legal speed limit on an open road, where no danger could possibly result, we might expect some improvement.*

Among the acquired mental diseases, there are some disorders of mind, which frequently play important parts in accident incident. The most common of this type of mental condition which figures in the production of accidents. are the mental disorders resulting from alchool,

There are several kinds of mental disorder caused by alcohol, the most frequent of which is the acute alcoholic intoxication. Little need be said here concerning the hazard, which the drunken driver represents, and every factory executive has had some experience with the disaster which may result from the actions of the clouded consciousness from alcohol. Long continued alcoholic use or abuse may result in the production of ideas of persecution. These delusions may lead the patient to the conclusion that fellow-workers are conspiring against him, or that his employer is trying to kill him. In one such case, the worker smashed his machine before leaving the factory one day, in his belief that his machine had been tampered with by his employer, so that it would kill him when he started it in the morning. The development of this patient's disorder had been slow and insidious, and was not suspected by the man on the next machine till after this incident. Fortunately, this type of case is not very frequent. Chronic alcoholism, a condition of steadily decreasing mental efficiency, with forgetfulness, finally reaches a point in the worker, where he becomes an extremely great risk. Amongst railway engineers, this is a factor to be seriously considered. And any known steady drinker, whose occupation carries any element of risk, should be watched for the small careless acts which are the earliest evidences of his mental deterioration.

Mental Diseases

Epilepsy, a term in mental medicine, under which are grouped conditions in which occur transitory states of unconsciousness, is a condition worthy of special consideration in these efforts toward accident reduction. Obviously, an epileptic should not be employed at a hazardous occupation. And the usual case of epilepsy, with its fits of greater or lesser severity, is usually rather easily recognized. There are, however, cases of temperamental explosions, without actual loss of consciousness, classed as epileptic equivalents, or as psychic epilepsy, which are less easy to recognize, and which may be responsible for injuries to life or property before they are detected.

The group of nervous and mental conditions known as the psychoneuroses have frequently, as part of the manifestations of the disorder, periods of abstraction of attention or of absorption of interest, often in the form of fantasies or day-dreams. This condition of affairs, I believe, is a much more important contributor to accidents than is generally recognized. It is my belief that not a few of which appear to be the most stupid accidents, accidents for which there appears to be not the slightest excuse, fall in this category. Whenever such an accident occurs, it is worth while, as part of the investigation, to examine the worker for these psychoneurotic manifestations. One such case recently was that of a 20 year old boy, who lost a finger in some gears. There was not the slightest apparent reason in his environment for the accident. He, himself, said he did not know just how it happened. Upon examination, he showed many evidences of his day-

dreaming and he had previously had long periods of abstraction but, fortunately, none of them had resulted disastrously. He had suffered an hysterical paralysis about a year earlier, from which he had completely recovered.

Brain Diseases

Mention should be made of the group of brain diseases resulting from destruction of brain tissue, from one or another cause. We have already mentioned one of these, in the chronic alcoholic. Syphilis and hardening of the arteries of the brain are other common diseases of this type. An illustration of an accident of this type of case occurred in a 28 year old man, who fell into a deep excavation, while walking along its edge. The walking was rough, and, at first, this was regarded as the cause of the accident. Examination of him, however, showed a well advanced brain syphilis, and he had had for some time past suffered dizzy attacks. It was in one of the dizzy attacks that he fell. He had fallen in similar attacks at his home, but never at his work.

In conclusion, it is my desire to point out that there exists a field of no greater fertility for profitable scientific research, than that of the mental factors entering into accidents. The expenditure, upon the investigation of the minds of machine operators, of but a small fraction of the amount of money that has been expended in the manufacture of safety signs alone, would I am sure be productive of surprisingly valuable results. As a result of such investigations, not only will there develop better methods of examination designed to separate mental hazards, but also better methods of education through the media of signs and instructions. In the factory, the mind of every worker who figures in an accident should be investigated, as part of the routine investigation of the accident, and the same is true of automobile accidents. By such a program of routine mental observation, there would very quickly grow up preventive procedures, quite as valuable in the reduction of accidents, as any of the developments in the field of disease prevention have been in the reduction of disease.

THE PUBLIC SAFETY PROBLEM

C. F. Kettering, Vice-President and Chief Engineer, General Motors Research Corporation, Dayton, Ohio

In the discussion of safety, it seems to me that we must analyze as a research engineer would the forces with which we are working. If you have difficulty with any sort of apparatus, you can apply all sorts of cook-book recipes to it, you can stop the headache with a cold rag maybe, but the best thing is to find out what the cause of the headache is.

In working on safety, we must analyze first our motives, and second our primary forces. What do you want to keep a man from being killed for anyhow? He is going to die sooner or later. There must be some

reason for it. Those reasons can be divided into two classes: first, that particular thing which distinguishes the human family from all other organisms on earth, and that is human sympathy; second, the economic phase of it. We can talk about our economics in terms of dollars and cents, but the only economic value we have is that of man power. All that civilization has ever done or ever will do has been to transform parts of the earth's crust over into human utilities. There isn't a thing that you wear or eat or use in your household that doesn't represent just such a thing. Therefore, the man power is the great economic basis of all of our work. If you will go back and analyze civilizations we have had, the Egyptian, the Roman, the Grecian, and so forth, you will find out that they prospered and passed out. The reason that they prospered was because they enslaved or brought into their civilization some forces entirely external from themselves, and when the net result of that impetus was lost they failed to sustain themselves.

Our great American industrial development has been due to the fact that we have had abundant natural resources, and the fact that our population has increased, as Mr. Grant pointed out this morning, was due entirely to our ability to sustain in a high order an increasing population. Therefore, the work of safety is to conserve the time value of individuals, looking upon it from an entirely economic standpoint, but from the other standpoint, that of human sympathy of the mental shock to friends and to relatives, there is the humanitarian side of it.

Every human being is a mixture of two things, instinct and intelligence. If you ever have time, get some of the books of the great naturalist Fabre and read them. Take the Hunting Wasp as the first one. Forget that you are reading a book about a wasp, and read it as a fundamental book on human psychology.

Example of Instinct

The hunting wasp is a solitary wasp which lives in the ground. It is found in a great many countries and operates upon crickets. Its method is to catch three crickets and to sting them in the motor nerve centers. It doesn't kill them; it only disables them physically. It takes those three crickets into its nest, turns them upside down, lays them on their backs, and the egg is laid on the middle cricket at exactly a certain place so that when the egg is hatched the mouth of the worm which is going to be a wasp later comes at the softest and tenderest part of the cricket. It eats the three crickets, spins a cocoon around itself, and lies there until the next May or June. In the meantime, its ancestors have all disappeared with the frost. It hatches out and repeats absolutely the same process.

Upon first observation, you would think it had a great deal of intelligence, but the French naturalist proved that it had no intelligence and that its apparent wonderful work was purely that of instinct.

As a wasp arrives at its nest it always puts some sand in the hole of the nest, or the door, before it leaves on its conquest. When it returns

its first act is to dig out the sand that closes the door, to go in, make an observation of the nest, then come back and take the cricket in. The naturalist removed the sand as the wasp approached. It could not take the cricket in because the first thing it had to do was to dig sand. There was no sand to dig and that cricket could not be taken into the nest until the fellow had closed up the hole and the wasp dug the sand.

I have found, in my experience with human nature, that we all started some place back along the line with the same hereditary instincts as the wasp, but the Lord endowed our particular animal organism with a thing called intelligence, and for these long years that civilization has battled it has been trying to fight the normal instincts of the normal animal with a thing we call intelligence. Therefore, any safety measure which you put into effect, it doesn't matter what it is, that presupposes intelligence is a failure. You may be the most intelligent human being in the world playing a slide trombone and the greatest wasp in the world walking across the street, and therefore if I were to give one admoniation from a scientific standpoint, it is to forget that you are working with intelligence, because intelligence is too specific to be general.

I take it that all of us more or less drive automobiles. As long as a man knows he is driving an automobile he is a fairly safe individual, but when he is doing something else; when he is day dreaming, as the doctor mentioned, his intelligence is entirely off guard and that fellow is going to respond absolutely to his natural animal instincts when an emergency arises.

No Accident Was Ever Planned

The next very important thing that safety engineers should get into their minds is that no accident has ever been planned. They happen spontaneously, and the amount of damage which is done in any accident depends upon the rate of rapidity with which we ordinary, instinctive mortals are able to assemble our intelligence.

Education, as has been mentioned here twice today, is the final solution. We start that in our schools. We say to Jimmy and Mary, "What would you do if such-and-such a thing would happen?" If you catch them off guard they would do just exactly what their instincts would make them do. But you try to get them to call to intelligence what is the sensible thing to do in the emergency.

In order to sustain this growth of population we have had to have some important mechanical developments; transportation and such have come along, also automatic and semi-automatic machinery. You hire an operator and you teach him how to run a job. You put him under a foreman. I have developed a great many automatic machines and the history of them is exactly the same. You take one of the men who perhaps helped to develop this job, and you put him in as your first operator, you put him under a foreman. The foreman knows all about this machine. Everything goes along fine. Maybe the fellow gets a better job. The foreman thinks he knows all about it, and he gives this fellow a certain amount of superficial instruction, not the same instruc-

tion that the first fellow had, because the first fellow had a lot that was not given to him; he had gotten it by contact with the apparatus. In about the third generation of operators he hasn't got any instruction at all. Something happens. The fellow's instinct reacts and you have an accident, and then the foreman will say, "If the damned fool had done so-and-so he wouldn't have had an accident." It wasn't the fellow who had the accident who was wrong; it was the fact that the foreman presupposed that every operator working on that machine had the same degree of intelligence and the same knowledge that he or the first operator had.

Remember that instructions do not propagate but degenerate, and remember that you have got to keep eternally teaching and talking and telling, and when you forget that, then you are preparing for an accident.

The man tells the first three people he instructs enthusiastically about a job, and then he gets tired. In other words, most people are very poor actors. They don't like to do their stuff over. But remember to a man who has not heard your story it is just as funny, no matter if you have told it a thousand times. Remember, if you are telling something for his safety and his benefit, it is just as important to him as if it was the first time you told it. So tell it over again and keep on telling it. Tell it a different way so the fellow will think it is something new.

Industrial Education

The question of industrial education is a question of keeping eternally at it. When you put any new thing out you approach it in a certain way. After you have had it a while you see a new exemplification of it. You have to revamp your instructions, but all the time keep talking, keep instructing.

I have seen a lot of these safety signs around through the factory, and just between you and me I think they are a joke, because a safety sign does all the work it is ever going to do in the first 10 minutes it is up; then get it down. If there is anything that is any more disagreeable to me than anything else it is a danger sign with four tacks in it originally and two of them out; that is the greatest hazard you ever put into a factory. Put it up and let them read it and get it out. I would rather have the bulletin boards in a factory absolutely bare than with a couple of old yellow bulletins up there. You are not fulfilling your duty when you do that. The thing you are after is results, and the thing to do is to get the message to the fellow in the shortest possible way that you can, and have it stick.

This railway sign that we have got up this year is pretty good—"Wait! You might lose." A fellow put that up to me a good many years ago, and it stuck pretty well. He said, "Young man, here are the fundamentals of every chance. Be sure that what you gain if you make this chance is worth more than you lose if you don't make it." But if the bird that you give that to hasn't anything to think with, it is a total loss.

The next great mistake with us is that we suppose that what we understand and appreciate everybody else understands. That is not so. Most people can't understand why everybody doesn't take a bath, especially if you take a bath yourself. I don't know the statistics in the City of Louisville, but I would suppose that 28 per cent of the houses in Louisville have got bathtubs. I suppose that around 35 per cent of them have electric lights. Maybe that is putting it pretty high, and yet we will get up and talk as though everybody had a bathtub and electric lights. We don't back down far enough in a lot of our stuff; it is too highbrow. You are writing it for yourself; that is the trouble with most magazine writers, they write it on the basis of their own intelligence. Don't think that the thing you understand is universally understood. Back up to the point that anybody will understand.

I don't want you to think for a minute that when I say that I am saying that the intellectual level of the average fellow is low. It may be low in your particular phase, just the same as you are low in some other particular phase. We don't happen to be universally intellectual. The great trouble with most adults is that they are afraid to ask questions because they are ashamed to expose their ignorance. Well, Lord, everybody knows it whether you expose it or not. If you spar around a little bit the other fellow soon catches on that you don't know anything about it. Just say, "I don't know anything about it. Tell me about it." That is all we need to do on this safety question.

The Problem of the Automobile

The automobile has come into our existence. We have 15,000,000 of them on our roads. A lot of people only got an automobile last year. It is a wonderful little thing for that fellow. He feels egotistic, he feels proud to think that he owns an automobile; he isn't thinking about anybody else on the road. He is perfectly normal. Don't criticize the bird. Go back and think when you got your first automobile and started down the road with a cigar in your mouth; you were the same kind of a guy that he is. In other words, if you took a great net like these butterfly catchers have, and you reached out into New York and caught up one hundred fellows, and you went out into Illinois and caught another hundred fellows, and into Louisiana and caught another hundred, and in Kentucky another hundred, and you dumped those fellows down here and examined them, you would have all the same general kind of folks. We have gone in our civilization very fast, and perhaps a little faster than the normal mind can comprehend, but we react exactly the same way under those same environments. Our instinct is still functioning. There is a certain per cent of wasp in us all.

The thing I am asking for in all of this safety stuff is to go back to as near fundamentals as we can and to analyze it. The world and people in general hate everything new; they hate it today and praise it tomorrow. That is the trouble with a great many people; they haven't any

imagination, they haven't any ability to see what is coming or what is going to happen, and the great trouble with the world today is that it wants to stop, it is finished, to most people. It isn't finished at all; it hasn't got started yet.

We say radio is a wonderful thing. People say we don't understand it. "It is perfectly marvelous," they say.

Why, there is nothing wonderful about that at all. The most remarkable thing about intelligence transportation is that you can talk over a wire. They did it the hard way first. It is very much harder to talk over a wire than it is without one. Having done it the hard way first, never having been able to talk any place without having a wire, they say it is impossible to talk without a wire.

The fellow that gave the definition for science is finding out what things really are as they are.

In the development of all of our wonderful industries, we have come to meet a certain demand, and in meeting that demand our industries have been built up and we have done certain things. We tried them and they didn't work; we tried something else and it did work, and the thing that didn't work was thrown off into the scrap-heap. It might have been the right thing. When you begin to study the thing scientifically and to measure it and to find out the whole story about it, you begin to present that thing a second time. Everybody knows it doesn't work, and they turn it down. You demonstrate the thing and still they know it is not possible; they will argue with you about it. Facts do not change with opinion, and that is the great trouble in any research development today--you have to fight opinion. Nobody's opinion is worth a nickel. If a person knows something I am perfectly willing to pay him a lot for that, but to get his opinion about something means absolutely nothing.

Research Hampered By Too Much "Opinion"

When we have worked in these human elements they have not been so easily measured, because every man wants to measure human experience through himself. You are only one of 112,000,000 people, according to statistics, and your experience has been different from every one of those other people, but you will measure from an opinion standpoint everything by virtue of your own experience. Therefore, in a real scientific research laboratory we try to organize the measurement of those things so that nobody's experience gets mixed into it. It wants to be an inanimate measurement; otherwise, it will be colored by your experience.

There are a lot of things which are contributory to this accident proposition which have been discussed here by Dr. Jacoby to which I would just like to add a few things.

The chicken is a very good thing to observe in connection with accidents. Our weather department should give out, in addition to whether

the weather is fair or changeable, "This is an accident day." Changing barometers always produce dullness. There are more chickens killed on a changing barometer than either on a high or low barometer. You know that yourself. When you go out and your speedometer shows 25 miles an hour and you think you are going 45 miles an hour, you look at the barometer and you find it is changing.

What did you eat? The liver is responsible for a lot of accidents. Torpid liver, auto-intoxication, and all sorts of things like that are fundamentals.

In the old days we used to have more accidents by noon on Monday than we had all the rest of the week. We have got records of that.

You are never going to get this accident thing settled until you can get the men to understand that they change and that they react differently under different conditions.

We are working with a complex thing. We can't stop this development of civilization, but we can start today as you are starting here, and I think that these safety congresses are the most fundamental things in the future industrial development of our country.

As I said, the world is not finished. We know nothing about anything. We haven't touched anything scientifically yet. We have got a few little things, electric lights, telephones, radios, railway trains, etc., but we have not touched anything at all. We know nothing about organic chemistry; we know nothing about foods. The only foods we are eating today are the foods that naturally occurred to us.

Mr. Ford had an article in the paper not long ago in which he said that he thought getting milk from a cow was kind of old-fashioned. Why, so do I. The only reason we drink milk is because we can get it so easily.

The matter of our clothing has changed just in proportion as we have scientifically studied the situation. We have been creatures of our instincts. We need to study ourselves, how we react, not intellectually react, but from the standpoint of our instinct. We go ahead presupposing a great many things are so just without question.

Here is history, literature, music, art, geography, government, sociology, which have nothing to do with the material at all; they are purely the sciences of people. Therefore, every time you find out something about material that introduces a new thing, a new building block, in civilization, you affect all of the things that men have done. Every time you introduce any new thing into the advance of the comfort of the human life, you introduce new problems into the question of safety, of education, and so forth.

You men are starting; you are only 13 years old. No science develops to its base rules much under 20 years. The science of chemistry ran something like 60 years before we began to get the fundamental threads of it. Physics, mathematics, were longer than that before the fundamental elements became apparent.

But remember that you are working on the subject of safety, you are working on the great problem of the eternal battle between instinct and intelligence, and that your reaction on an unplanned accident is 99 per cent instinct.

BUILDING MEN FOR SAFETY

"Jamie" Heron, Chicago, Ill.

I look upon the National Safety Council as a great clearing house for ideas for the building of men, ideas for building knowledge and understanding the relationship of the two great forces in industry, management and men, and a cementing force for binding those two groups harmoniously together permanently, to do away with all strikes, lockouts and dissension. Your particular job is to take home these ideas generated here in this Council to those whom you are leading in your different industries.

In building men for safety we have been building material things faster than we have been building men to man the material things. Man is not born; it is the child that is born. Man is built upon the base of character through understanding, organization and application. When man is built in that manner, he is a gentleman in tune with life, which makes for safety.

In building the man I do not mean the physical man, but the man within the physical man.

"There's a man inside of the man that you are,
And he's bigger than you, yes, bigger by far;
And he's checking you up in every way,
And for each transgression he makes you pay;
And for each good deed he will pay to you
A reward far beyond the price that is due.
So be good to him and respect this man,
Believe in his judgment, nor fear his ban.

"There's a man inside of the man that you are;
If you listen to him you will travel far;
So listen and heed; don't be a fool,
And do what you do by the Golden Rule,
And build the man as you would a ship,
Sturdy and true for life's service trip;
And trust him well, he's your compass and guide,
And ever respond to the man inside."

The physical man is controlled by the man within, and the man within is controlled by the motive power of the man, the brain, and the brain is controlled by the life impulse, the will to live. Therefore, as the brain grows, so grows the man. Men grow in understanding and in worth. Understanding of what? Understanding of life and how to live. Did

you ever consider that all life is one? Did you ever take a look at a tree and just for a moment con, reason, think, and look upon that tree?

"I love to look upon a tree
Because it seems to live eternally.
It doesn't ask for any care,
But just a place to grow somewhere.

"There's something about a tree that's divine—
The lordly oak, the redwood and the pine
All lift their heads above this earthly show
And anchor deeper with the winds that blow.

"Trees bridge the future, the present, and the past,
The only living things that seem to last.
The centuries come, the centuries go,
But God's own trees just grow and grow.

"All other life upon the earth gives way
To trees, for they somehow do longer stay.
Oh forest kings, majestic, noble sages,
Live on, God's sentinels of the ages.

"Of all the things that I might wish to be
I think that I would rather be a tree,
To live with arms outstretched to heaven above,
And grow in understanding and in love."

We know not what life is, yet we all desire to live. The most important thing to every one is to keep on living. What is life? For ages men have been asking that question, and countless beliefs, myths, theories and ideas have been advanced, but none has answered that question. Even if we believe that life is a gift from the Creator, that does not answer the question, nor can we answer the question of what makes the brain think, the heart to beat, the myriads of cells in our bodies to function and our nervous system contacting and vitalizing the whole. If we could answer these questions, we would know how to live, and knowing how to live we would know how to preserve life, to prevent accidents, to be free from sickness and to know how to be safe.

The question arises in my mind, then, if we do not know these things and cannot answer them, is it right that we should know them? Can we ever fully understand? It seems the more we know the more we know that we don't know, unless we use our instinct.

Are We Meant to Be Safe?

Then the question arises, are we meant to be safe? If we were immune from all sickness, all danger, all temptation, what would we be like? Would we or could we be happy? I think not. Back of all the socialistic, communistic and union labor movements is the desire for safety, safety

from want, safety from oppression, safety from poverty, safety from struggle. It was never meant that we should be safe from anything like these things, especially struggle. Men are built by overcoming, and they must continually strive to overcome, to win, to be safe. It was never meant that humans were just to exist or just to make a living. Listen.

"Are you living in this great age,
Or only passing through?
Have you turned to a clean new page
To write your life anew?

"Do you know that the past has fled
With all of its hate and strife,
And that you might as well be dead
As live in that past life?

"Do you know that to live means work
And ultimate happiness,
And that failure and death both lurk
In constant idle idleness?

"Do you know that success is sure
If you want it hard enough;
And prosperity will endure
If you've the proper stuff?

"Do you know that it's up to you
To work, succeed, and live?
But first you must be true,
And learn to give, and give, and give!"

Every one of us is here for a purpose, and that purpose is to build a life, a good life, not merely just to make a living. We all expected to build a man—a gentleman. God in His infinite wisdom has given us abundance of time, energy and material with which to build a man and to build a life, but He has given us only one way in which to do the building, and that is by serving others.

"It matters not where I may go,
To grammar school or college;
It matters not how much I know,
If I but use that knowledge
For others.

"It matters not what I may do
In business or profession;
I only know I must be true
To make a true impression
On others.

"It matters not what I may think
At work, at play, or rest;
It matters not, if I but sink
All selfish thoughts and think the best
Of others.

"It matters not what men may say;
It matters not what men may give;
'Tis my resolve that, day by day,
I'll do my best to give and live
For others."

If it was never meant for us to be safe, then why this Safety Movement, why this Congress? It is because we are beginning to realize the true value of human life. We may never know what life is, but we do know that life has value, that men have value.

The Value of a Man

What is the value of a man? The sum total of the value of a man is determined by his production minus his consumption. If his production is greater than his consumption, he is an economic success; he is an asset to society. But if his consumption is greater than his production, he is a liability to society, he is nothing more than a parasite, and we have got too many of them today. That is why we are so vigorous in our Safety Movement.

In the early history of the human race when the pyramids were built, man-power was cheap and plentiful. Men were bartered as merchandise. No thought was given, in those days, to the comfort or the protection of the workers. When a man dropped, he was quickly replaced by another. How different the workmen were treated in the building of the most stupendous undertaking of modern time, the Panama Canal. The workers were housed and well fed and well paid. When it was found that insect pests annoyed the workers and made them sick, war was declared on the insects and they were exterminated at a tremendous cost, and from a fever-infested, dangerous district it became one of the healthiest zones in the whole world. The protecting of the workmen during the digging of the Panama Canal was probably one of the first outstanding examples of this great Safety Movement.

Yes, we are beginning to learn the value of human life, and we are beginning to learn that it pays big dividends to protect and to preserve and to build humans.

Scientific research has found out a great deal about the physical man, but very little is known about the man who controls the physical man. You have learned something of that this afternoon—that we are using our instinct instead of our intelligence. All we know is that the brain controls and is the motive power, and that intelligence is the generated force which connects the man within with the man without. Therefore,

the more perfect we can build the man within the more perfect will the physical man become, and only by so building can the human race progress toward safety.

How are we going to build the man within? By ideas, food of the brain. Ideas increase the motive power, they build the intellect, the capacity to think and thus stimulate the will to do, the will to serve, and the will to live. If you stimulate that will to serve and will to live enough, and if you provide yourself with a hobby, you will likely live as old as this old fellow that was reported in the Louisville paper today. He is 107 years of age and is still working at his hobby, trying to find perpetual motion. He has made many machines, and he says this one may fail, and if it does he is going to start and work on another. If you fail in one idea, don't think the world is finished and give up. Start on another idea and work it out. You will find that you will be building all the time and that your desire to live will be increasing, and as you desire to live you will desire that others shall live, too.

How are we going to build that man? Education, you say, will take care of the building. I agree with you, and we must keep on educating humans, increasing their desire to serve, and to give instead of letting so many drift into the ways of selfishness with a desire only to get all they can and give as little as they can.

But when is a man educated? When he can take the findings of science as the basis of his thinking and put his ideas into action fearlessly. You must not only think; you must not only take science for the basis of your findings; but you must put those findings into action fearlessly, as fearlessly as Roosevelt, the acme of fearlessness.

The Value of Education

A man to be educated must not only have knowledge, but he must be able to demonstrate knowledge; he must not only know, but he must know how to use what he knows. If he uses what he knows intelligently (and does not depend on his instinct) for others, to serve others, he gathers power and builds the man within, he attracts harmony and love, and grows in understanding. On the other hand, if he uses what he knows for his own selfish interests and ends at the expense of others, he destroys power and attracts adverse thoughts which in turn create an inharmonious atmosphere which is unsafe.

"Leaders of men, where have you been?
Why are ye not leading your men?
Why are ye not forging ahead?
Know ye not that men want to be led?
Why persist in driving behind
When men if led will follow blind?

STANDARDIZATION OF SAFETY CODES

A. W. Whitney, Chairman, American Engineering Standards Committee; Associate General Manager and Actuary, National Bureau of Casualty and Surety Underwriters, New York City

There are two distinct sides to the Safety Movement. One is the arousing and development of the public conscience and intelligence, a work of education, interpretation and inspiration, and second the supplying of hard, concrete, practical fundamentals upon which a safer industrial and social order can be built. Both are equally necessary. There must be the vision and the crusading spirit, but there must be with this the painstaking, meticulous work of following the vision and carrying on the crusade.

In the development of this second phase of the problem, standardization plays an important part. It is not only important to discover the best possible way of doing the task that is before you, but it is equally important to bring all interests into agreement so that the practice that is developed may be given an extended usage. In fact, in a majority of cases an agreement on a standard as such is more important than the securing of the best possible standard.

In the industrial field, for instance, where not only the particular plant but the industry as a whole, the insurance company and the state itself have all come to recognize an interest in the detailed solution of the safety problem, it is essential, unless there is to be confusion and inefficiency, that some agreement on safety standards shall be reached.

If this is not had, there will be conflicting requirements.

A similar situation is coming into view in the public safety field, where the state, the municipality, the insurance company, the automobile interests, the driver and the public are all concerned with the problem not only of finding the best way of handling traffic, but of securing a uniform treatment of the problem upon which all interests can agree. Here uniformity itself is of the essence of the problem.

To be concrete I may mention such a subject as colors for traffic signals—a project already far along toward standardization, in which uniformity is manifestly an important factor of safety.

This problem of securing uniformity in safety codes was first approached in a public way in a large conference of interested organizations which was held at the Bureau of Standards Offices in Washington in 1919, and the outcome of this and other subsequent conferences was an agreement first to use as a clearing house for such standardization the American Engineering Standards Committee, an organization whose province is the whole field of engineering and industry, of which safety is a part; and second to set up a committee known as the Safety Code Correlating Committee, to act as a general steering committee for the work in this particular field.

It is significant that Mr. S. J. Williams, engineer of the National Safety Council, was recognized as fitted par excellence to act as chairman of this committee, and I believe that the National Safety Council can in no way more substantially advance the safety cause than by first making it possible for Mr. Williams to devote a liberal amount of time to this work, and second by definitely providing adequate staff assistance in carrying out the executive detail for this Committee.

In my capacity as chairman of the A. E. S. C., I am definitely urging the National Safety Council to look at this as a remarkable opportunity for constructive work of a most substantial nature.

I cannot on this occasion give more than the barest outline of the process by which these codes are produced. Suffice it to say that the American Engineering Standards Committee does not originate the work and does not do the work; it acts only as a clearing house. The work is done through so-called sectional committees which are so constituted as to be thoroughly representative of all interests. When, therefore, a consensus is obtained in such a committee—and such consensuses, had through the efforts of open-minded men working with the facts perpetually before them, are not compromises but genuine solutions—it may genuinely be said to present the best ideas of the nation on the particular subject, and it becomes worthy to be designated as an American standard.

Safety Code Projects

The American Engineering Standards Committee has at the present time 45 safety code projects before it that have an official status; some of these codes are completed and on others the work has been scarcely begun.

These safety codes cover: Building exits; construction work; lighting in factories, mills, and other work places; floor and wall openings, railings and toe-boards; identification of piping systems; ladders; elevators and escalators; walkway surfaces; lighting of school buildings; use, care and protection of abrasive wheels; protection of industrial workers in foundaries; mechanical refrigeration; power presses and foot and hand presses; machine tools; mechanical power transmission apparatus; compressed air machinery; conveyors and conveying machinery; mechanical power control; forging of hot metal stamping; plate and sheet metal working; rubber machinery; electric wiring and apparatus in relation to fire hazards; electrical safety; combined electrical fire and safety; electrical power control; protection against lightning; aeronautics; colors for traffic signals; automobile brakes and brake testing; explosives; gas; textiles; portable electric mine lamps; installing and using electrical equipment in coal mines; storage battery locomotives for use in gaseous mines; testing and use of permissible explosives; woodworking machinery; logging and sawmill machinery; paper and pulp mills; protection of head and eyes of industrial workers; tanneries; industrial sanitation; ventilation; laundries; exhaust systems.

There is one more phase of this matter in which we of the National Safety Council have a particular concern. I refer to the getting of these codes into actual use. The American Engineering Standards Committee has no machinery for making its standards mandatory, nor would it desire to use such machinery if it had it. Its standards must depend for their acceptance upon their intrinsic merit and upon the character of the organizations that have participated in their formulation.

In the case of the safety codes, it is particularly important, however, that they should be adopted into actual usage, not only in the individual factories and municipalities, but that they should be accepted by the states themselves, for unless this result can be secured the process has been ineffective and the result which was aimed at has not been secured.

The Safety Code Correlating Committee, in addition to being a steering committee for the initiation of codes, has also accepted the responsibility for furthering their use and adoption, and the committee has definite plans looking toward this end. In suggesting, then, that the National Safety Council undertake the necessary executive work of the Safety Code Correlating Committee, I had in mind the possbility of its doing a much more effective work than has yet been attempted in getting the codes into actual use. This, however, is not merely staff work, but something in which each individual in this audience can be of material assistance. Will you not as individuals assume a responsibility of helping to put these codes into effect as a substantial basis of uniform safe practice for this country?

One of the chief features of this afternoon's session will be the showing of the National Safety Council's new industrial film "Hindsight and Foresight." (Showing of the film.)

ADJOURNMENT

General Session
Education and Public Safety

September 30, 1924

J. P. BARNES, Chairman
President, Louisville Railway Company, Louisville, Ky.

CHAIRMAN BARNES: I feel it is first necessary to give a very humble and sincere apology for the fact that I am calling this meeting to order instead of our beloved Marcus Dow whom you all expected to see. It is most unfortunate that Mr. Dow couldn't be here, because there is no one who can put the fuse to the skyrocket on this particular proposition in the way Mark Dow can do it, and I know we all share a very sincere regret at his absence from this Congress.

SAFETY EDUCATION AND ITS RELATION TO TRAINING FOR CITIZENSHIP

Dr. Alfred F. Hall-Quest, University of Pittsburgh, Pittsburgh, Pa.

You are here today, members of this great National Safety Congress, because you are interested in one supreme thing; you are interested in the meaning of human life; you are interested in the meaning, and ways and means of expressing that meaning, of social life, and there is nothing, after all, that so captivates human interest as the study of the meaning of life.

We may be interested in plants, we may be interested in animals, we may be interested in stars and the products of the mines, but only because these are means whereby man may live more comfortably, more happily, more successfully, and therefore I am interpreting your deliberations as the clustering around this great question of what is life, what is the meaning of life and living on earth. Is it simply a baby born today and a body carried away tomorrow? Is it simply a faithful round of human birth and human death ever rolling on and on and on? Or is there back of all this a tremendous purpose that you and I blindly, with here and there a flicker of understanding, are seeking to understand?

I am persuaded that this whole program of safety education and providing ways and means whereby people in a community may live together more safely is essentially a moral question. It is far more than devising ways and means of safely crossing the street, much deeper than finding

ways and means of working safely in industry. It is a moral question, because it deals with human relations, and whenever you are seeking to find the ways and means of human relations, you are essentially concerned with moral education, for to me moral education is not merely giving the individual or groups certain inhibitions that they shall not do this and not do that; if that is all we mean by moral education, I, for one, have no sympathy with it, but moral education deals with the ways and means, with the laws underlying group life, and the word "moral," as you well know, comes from the Latin "moris," which refers to the customs and methods that control pepole when they live together in groups.

This whole question of safety education is a question of finding ways and means whereby human relation shall be better protected, so that because people live together in groups society may be conserved and society may become a means to finer human development.

What makes it right to kill one branch of the animal family and what makes it wrong to kill another branch of the animal family? In other words, what is the essential difference between a brute and a man?

Need of Respect for Other Fellow

In a nutshell, this is the essential difference between an animal and a man. An animal cannot profit by its experience. There is in the animal no potential contribution to the welfare of the world. Man can profit by experience. A man essentially is a potential contributor to a better life. The heart and meat of the whole question of moral education is respect for personality, respect for the other fellow. When we have lost our respect for human life and human life seems to us on the same plane as the brute life, society's foundation begins to totter, and the only way by which we can conserve society is to recognize the deep-going cleavage between the animal kingdom here and the man kingdom there. If we as members of society are going to ignore human slaughter, if we as members of society are going to let pass these varieties of acts, these various kinds of carelessness that so lightly do away with human life, we are ignoring the very basis on which society rests.

Many of you are interested in the practical phases of this whole question. You are interested in devices, you are interested in various formulae, various prescriptions, various codes, and that large range of programs by means of which safety may be promoted. I plead ignorance along those lines, but I say in all respect to what you are doing that if your considerations do not go beyond those formulae, those prescriptions and those programs and codes, you have not caught the meaning of this great Safety Movement. It goes much deeper than devices: it strikes at the very root of our respect for human personality. It is because of that truth and because my conviction lies along those lines that I see a very close connection between safety education and the training for citizenship. All too frequently, we define citizenship in terms of obedience to governmental laws. The old-time civics as taught

in the public schools was simply a study of the anatomy of government, how the president is elected, how his hands are upheld by the branches of Congress and by the various agencies of the government. We no longer teach civics in that way. We now look upon civics as a study of the institutions, the organized means of human uplift and human protection, and civics is very closely allied with moral education. Training for citizenship means much more than establishing in the citizen respect for government, important as that is. Training for citizenship means also respect for the other fellow.

I present to you this proposition, that if we do not have respect one for another, government is useless. We may have the most elaborate governmental machinery that civilization provides, but it will be worthless if in you and me there is not the attitude of respect for the other fellow; that is basic in the social order.

Problem is Fundamentally Scientific

There are three things I would like to say in regard to this training for citizenship and the hand-made moral education. The first is that this is essentially a scientific problem. We can't approach this by any means of propaganda; we can't approach it by the emotional method; we can't preach people into this thing. We must make a study and increasingly make a study of what safety means, so that the child in the school and the adult on the street and the parent in the home and the teacher in the classroom all may understand the factors involved in safety.

We have an illustration of that in the attempts of the railroad sign—"Stop, Look, Listen." There you have a graphic, almost dramatic analysis of a safety situation. If we are going to get this across to our children, we must take all of these safety situations and analyze them in their minutest component parts, for we have made serious mistakes in education in dealing with too big units, units that are too large for the child's comprehension. We must give the child the analysis if he is to understand how to move and how to live safely.

This is an analytical age. You business men are constantly engaged in analyses. You are analyzing the machinery of your industry, of your concern; you are analyzing the machinery of government; you are analyzing the machinery of a Congress such as this. It is the great method of modern civilization, a method of analysis and increasingly must be the method of safety education.

We must have an array, a catalog, if you please, a list, of all the kinds of safety situations that the child will be part of in the community every day, in the home, on the streets, in the schools, in the stores, in the theater, on vehicles, wherever he may be. Each of these needs to be analyzed so the child knows exactly what is safe and what is not safe in this particular situation.

I could speak at length on that question, but I have something else that I wish to refer to.

Secondly, it seems to me that this is also a question of vocabulary, a question of importance in that respect. We do not find the dictionary very thrilling. I don't suppose very many of you, if any of you, would sit down of an evening and read the dictionary, and yet the dictionary is a fascinating book. There are some very important words in the dictionary that we use lightly every day, and it seems to me one means whereby this whole question of safety education can be crystalized is to have the child study the dictionary again, but not as he does customarily.

Careful Study of Words

We are going to select from the dictionary certain words that contain the thought, the concept of safety and its opposites. In other words, we are going to teach the child the definitions and the meaning of these definitions as they pertain to his own safety and the safety of his neighbors.

There is one word that is used very thoughtlessly and very lightly. We don't stop to analyze it. It is a word we find in many of our posters. It is that word "carelessness". I wonder whether we sufficiently understand what carelessness means.

I visited the Metropolitan Museum in New York City, a few years ago, and there was then on exhibition one of the most dramatic canvases that the Metropolitan had ever shown. As I recall, it was on the wall to one's right as one entered the gallery. It was wonderfully placed and lighted. One came upon it very suddenly, and as one faced it, one halted. for there, coming toward the individual, was a far-reaching line of the conquerors, Cyrus, Alexander, Caesar, Frederick the Great, Darius, Charlemagne, the great world conquerors on their mighty steeds with the wonderful war paraphernalia, coming in a silent mass toward you as though they were stepping out of the picture, and you felt moved to get out of the way as these great conquerors came haughtily on the mighty steeds directly toward you.

Then your eyes fell to the bottom of the picture and your blood almost froze within your veins as you saw the point of the picture, for these world conquerors from the far remote past down to the then present were moving toward you on an avenue of human bodies as far as the eye could see, left to right; they were moving down the avenue of time paved with human bodies. That is war.

I dare say that some artist with imagination and sympathy might hang on that wall a companion canvas, and we might see the great conquerors of industry, the great conquerors of civilization today moving forward on an avenue paved with human forms. Civilization, how thou hast demanded a price! We are a careless people.

We should teach our boys and girls the meaning of some of these words that indicate social relations, not carelessness, not caring at all, but carefulness—full of care.

We Must Evolve Certain Attitudes

This whole question means that in our public schools and in our agencies of education we must evolve certain attitudes. That is where education has fallen down. That is where education today is weakest. Somehow or other we don't know how to build up attitudes. We don't know how to evolve appreciation. We have over-intellectualized our schools. Now we are trying to cope with the whole program of moral education, which is an education through which we shall establish certain attitudes, the attitude of respect for personality, the attitude of regard for another's comfort, the attitude of regard for another's comfort, the attitude of regard for another person's safety, the attitude of regard for another person's happiness, the attitude of regard for our contribution to the social order. These are things that are fundamental in education. No society can live on the basis of the head, alone. Unless we can devise some ways and means whereby the heart interests will be conserved and dveolped, our educational system will simply go to naught.

We have our chaurches, but they do not seem to have brought it about. We have our moral programs of intensive sort; they do not seem to have brought it about. Men still are selfish. Men still are emphasizing their own individuality.

I am asking you business men, you industrial leaders, interested in this great moral question, how in the name of progress and civilization are we going to construct a program whereby we shall establish in the child and adolescent, certain attitudes of respect for the other fellow? That is the big question of moral education.

There was a saying, many centuries ago, which I think is just as true now as it ever was, and well might it blazon all of our horizons, well might it ornament all of our schools, offices and factories. "No man liveth unto himself alone." We are our brother's keeper. That is the attitude that runs all through your safety program.

I say in closing that the whole question of training for citizenship is linked up with your program of safety education, for training in citizenship means training in respect for the other person's life, and when we have taught the meaning of life and know that a human life is potential with contributions for the next generation, we have also caught the meaning of moral education, and this respect for personality, this respect for human life, includes, of course, the body, it includes the welfare, moral and spiritual and physical, it includes the entire being.

THE AUTOMOBILE AGE

George H. Pride, Autocar Company, Ardmore, Pa.

Unquestionably the study of highway traffic must largely be dependent on information derived from statistics. Therefore, we are very strongly in favor of any movement which will tend ot develop true, honest, comprehensive statistics. Practical conclusions reached by such investigation can be best utilized by the voluntary and intelligent acquiescence of the motorists and pedestrians of the country.

To most strongly appeal to this huge number of independent individuals, these conclusions must be presented in a non-technical and palatable form, if possible.

Have you ever paused to consider for a moment what an abundance of blessings the automobile has brought to mankind?

True, there have been accompanying tragedies, but let us consider both in turn.

In this day and generation marvels rapidly become commonplace. The youngster of fifteen today subconsciously regardes telephones, automobiles airplanes, wireless, and so forth, as having always been current in ordinary life. So do many of us grown-ups until we stop to think back a little while.

Let me cite a few facts. In 1900 there were about 13,000 automobiles registered in this country. In 1923 there were over 15,000,000 registered. It is conservative to assume that an automobile averages 5,000 miles a year; therefore, in 1923 the automobile mileage must have exceded 75,000,000,000 miles on the highways.

The automobile has enabled millions of people to live in the country and in suburbs while the men of these families pursued their vocations in the city. It has enabled multitudes of city people to become acquainted with the country to an extent that never previously could have happened. These two uses of the automobile alone undoubtedly had a tremendously uplifting influence on the general health of the country.

The use of the automobile by the doctor is only equaled in value by his use of the telephone. The motor fire engine, the motor ambulance, and so forth, are typical of the many direct benefits of the automobile.

Within the last decade the tendency of the population of the country to increasingly withdraw from the country, concentrate in the city, has been gradually minimized through the use of the automobile.

Progress Takes Life Toll

Every new agent of humanity as it becomes developed takes its toll of human life. Gentlemen, you can't progress, you can't do anything in the way of human endeavor that you don't pay for, and when you have a general development in human life the toll is death. With the development of the steam engine there started deaths from fly-wheel exposures or accidents and boiler explosions. Before there were any railroads there weren't any railroad accidents. Even the X-ray, beneficent as it is, brought its trail of fatalities.

We in the automobile industry realize that the toll of automobile fatalities has been increasing. The automobile industry has no control over the vehicle after it has passed into the hands of the purchaser. Nevertheless, we feel it is our duty to aid and cooperate to the best of our ability in minimizing preventable accidents.

We feel that many fatalities can be prevented; we believe that in order to develop corrective measures it is necessary to know the cause of the fatalities. We can't reiterate that too frequently.

Upon investigation we found that only eight states, Connecticut, Rhode Island, Vermont, Massachusetts, Virginia, Indiana and Wisconsin kept an adequate record of highway traffic accidents. To amplify this in a rather modest way, our own traffic and safety committee, operating through the National Automobile Chamber of Commerce, has striven to collate statistics, with the help of 236 American newspapers. This help has been entirely voluntary on their part. These reports are filed with the National Automobile Chamber of Commerce, which has them analyzed and sends out a monthly bulletin, showing not only the totals of deaths and the causes, but also remedial suggestions.

It is hoped that if this plan develops it will make the newspapers of the country a vast clearing house of the valuable highway traffic suggestions.

That concrete suggestions can be made from statistics collected on traffic accidents is plainly indicated in the very able bulletins issued by Commissioner Stoeckel which I have read recently with great interest. Chief MacDonald, of the Bureau of Public Roads of the Department of Agriculture, is doing excellent work along this line, and doubtless similar work is in progress in many other states with which I am unfamiliar. At any rate, we should use every possible effort in every form of civic activity to stimulate the possibility of such collation of information.

Problem of Instruction

As this data is developed, corrective measures will occur. The problem then becomes one of distributing information and instructing the individual. It seems to me perfectly patent that, in meeting a situation of this kind, the first thing we must know is what causes the trouble. The second thing is what should we do to eliminate that trouble? The third thing is how shall we make the man who is the recipient of the accidents and the causes of them benefit by this information? In other words, how shall we make him use it? I believe that the success of this form of safety movement is dependent in a large measure on the universal understanding of highway use. For instance, good-will and cooperation are almost inevitably dependent on mutual understanding. Have you ever taken your car one morning when you felt in rather bad temper and started to drive down town, and have you blown your horn and looked with irritation at a pedestrian who didn't move quickly enough for you, and have you heard him curse at you? Another morning when everything was nice and you went out feeling very benevolent, but with equal haste, you tooted your horn sharply and the man turned around with an incipient scowl on his face, and you had a pleasant smile, not a derisive grin. Have you noticed how frequently that scowl stopped and he smiled back?

I had occasion some years ago to supervise the activities of quite a number of commercial chauffeurs. I had that experience myself, and so I tried it out on these men, told them what it was, and asked them if they would try it. They did, and our accident ratio dropped immediately.

You get pretty nearly what you give in this world, and it doesn't hurt you to give a little bit more than you get. You don't know when you are going to get it back.

We believe that every agency of instruction and publicity should be utilized in such measure as will produce the greatest results. In other words, we are strong for the education of people on highway traffic safety through every possible agency that can reach them. I think this rather generically covers it: first, newspaper and magazine publicity; second, posters on automobile windshields and in windows; third, motion picture and lantern slides; fourth, radio talks; fifth, safety programs and addresses of various organizations with particular reference to women's clubs; (there is one of the most powerful influences that we have got, and I don't believe it has ever been used to the extent that it can function); sixth, reaching parents through school children, which implies all the campaigns in schools of every description; seventh, special campaigns conducted like safety week.

One thing that we are particularly anxious to emphasize is that attitude of good-will, of mercy on the other fellow's nerves. Do you realize that a car going twenty miles an hour is going thirty feet a second? It isn't wise to think in miles, because that is not so easy. Think in feet per second. The pedestrian who is a good walker averages five feet a second. Protect yourself by your own actions. Don't expect the other fellow to value your safety more than you do your own. That is not fair or reasonable, and don't let the other chap outdo you in consideration.

Car Travels Four Million Miles Per Accident

We talk about automobile accidents; they are bad, but let's see how bad they are. Last year, a car had to go 4,500,000 miles, somewhat in excess of that, before it killed a man. When you figure those things it seems well nigh incredible, and when you remember the respect and admiration as a youngster that you had for the locomotive engineer who piloted a train forty or fifty miles an hour, and also remember how that roadbed is carefully controlled and kept to his use solely, you wonder why it is that the automobile accidents are not many times what they are, and yet we are firmly convinced that they can be very heavily minimized, and this is no longer a question of conviction on your part; we *know* it. We know that as the number of automobiles have increased, the percentage of accidents has materially dropped.

Think of the enormous increase in congestion in the urban population. There are now over 24,000,000 more people living in cities than there were in 1900. To bring it quite locally, Louisville has approximately 40,000 automobiles and motor trucks. A horse and carriage takes at least one and a half times as much space as an automobile, and the latter travels three times as rapidly, on an average. It would take 120,000 horse-drawn vehicles to do the same work, and each vehicle would take up fifty per cent more space. What would the streets of Louisville be like if they were jammed with 180,000 motor vehicles in

addition to what we have now? I just cite that to bring to your mind the magnitude of the problem.

The human family always contains the fellow who rocks the boat and the fool who didn't know it was loaded, and these people are always with us, but fortunately this type of man is rapidly being made conspicuous by the automobile, and the law enforcement officers should be encouraged and aided in suppressing him.

Enforcement of Traffic Regulations

The automobile industry believes in the rigid enforcement of all traffic regulations. We unqualifiedly state that as our position. We believe that no mercy should be shown to the intoxicated driver; he is a menace. We have offered a very drastic suggestion; we recommend when after due process of law a driver is proved responsible for a serious accident or death, in addition to all the penalties now imposed he should forfeit possession of his automobile for a period to be determined according to the seriousness of the offense. That recommendation has been attacked in a great many ways, and I say to you that after employing as good legal talent as we believe available in this country, we know it is not impractical, it is not unconstitutional, it can be made effective, it can be made a law in every state, and if the people of the country don't enact such legislation it is not because we are not behind it.

This does not mean that there would be any political feature attached to it which might be detrimental. It does not mean establishing a public garage for that purpose. It means impounding that vehicle either in the owner's garage with a police seal attached, or kept in some public garage where the owner must pay his rental just as he would if he had the use of it, but he cannot use that vehicle until the time of that impounding has ceased.

I want to bring out the fact that a few years ago there were two classes of highway users, the pedestrian and the motorist. I think I can say to you now without fear of contradiction that there is only one class. Everybody rides sometimes and everybody walks sometimes. The pedestrian of this morning may be the motorist of this afternoon. He does not have to own and operate the vehicle he drives, but he rides on motor busses; he rides in somebody else's car. Everybody in this country now rides, and there should not be any classism, any opposition or antagonism between the two; there should be mutual understanding. If you know that the other fellow is up against and realize his difficulties, then give him consideration. It is amazing how the other chap will do the same thing to you. We can talk altruistically, we can talk selfishly, we can talk from every possible angle, but I am firmly convinced that to get the maximum value from traffic regulation and laws, the campaign should be so couched all the way along the line that the element of fair play and mutual consideration is emphasized, and that in a practical rather than a mawkish way.

MOTORISTS AND PEDESTRIANS

Ernest N. Smith, General Manager, American Automobile Association. Washington, D. C.

Twenty-two years ago when the American Automobile Association was born, there were only 30,000 automobiles in the entire United States, and we have at the present time four clubs in our organization any one of which has over 30,000 members within its own organization. Those 30,000 automobiles have grown in twenty-two years to 15,000,000 automobiles, and the organization which I have the honor to represent has grown until it contains between five and six hundred clubs with a membership of over 600,000 motorists in the United States.

There are accidents on streets, there are accidents on the highways, and there is congestion in the cities. The autoist and the pedestrian are the same. One might almost say that the situation constituted a case of Dr. Jekyll and Mr. Hyde, with the pedestrian as the complacent Mr. Hyde and the wandering automobile driver who drives at top speed as the Dr. Jekyll.

One of our editors not long ago said that he thought the American public ought to be tired by now of experimenting and that they ought to accept the fact that a combination of gin and gasoline makes a wonderful embalming fluid without trying to prove it themselves.

As we see it, there are two problems in safety so far as they concern the automobilist, one being the question of regulating speed on the open highway; the other the question of regulating speed on the city streets, and with that goes the handling and separating of through traffic and local traffic. Many of the problems that are confronting some of the large cities today are concerned with a combination of the local traffic and the through traffic, and only in recent years, and since the development of the great transcontinental arterial highways, have cities been confronted with a tremendous through traffic which mounts up sometimes to fifteen and twenty thousand people passing a given point upon the great American highways.

All through New York, Ohio and Illinois, and even farther west along the Lincoln Highway, and now in increasing measure upon the southern roads, through traffic has increased to such an extent that it is an absolute nuisance when it is encountered by the various cities.

I can remember but a few years ago when money was raised by Lincoln Highway officials and others from various towns which insisted before they put up the money that the various highways must go through their own cities down through their main streets, and one crossing the continent a few years ago had a zig-zag journey. Now the idea of even the smallest cities is to keep the through traffic away and eliminate thousands of motorists from the center of the city, where they only cause congestion and grief and trouble to the residents of the city who are entitled to use their streets primarily for their own particular purposes and convenience.

Rerouting Through Traffic

One of the things we have in mind is the rerouting of through traffic all over the United States as one measure of safety in order to protect the pedestrian as well as to save time for the motorist. We want to see local traffic segregated from through traffic, and fortunately the merchants of the country in towns of all sizes are agreeing with us that this is a very possible thing to do.

It has always seemed an amazing thing to me that when safety experts and engineers were discussing how they were going to handle the traffic in various cities, more attention has not been given to the fact that our streets in many cities are congested to an impossible point from eight o'clock in the morning until six o'clock at night, yet those same streets lie practically deserted from six o'clock at night until eight o'clock the next morning. I venture the personal opinion that the time is coming, and not far distant, when most of the commercial houses in communities will move at night their freight to stations in outlying districts for redistribution. There is no reason why automobiles should not move at night the same as railroad passenger and freight trains move at night.

I had the pleasure of working out some of those problems during the war, in which we had to use several hundred trucks upon certain work, and they never appeared upon the streets until after eight or nine o'clock at night and ran during the entire night in the commercial part of the city where they interfered with no one, where they were able to run at higher speed and for a longer time than would have been possible in the daytime. As a result of that we removed from the city streets of this large city during the daytime approximately 1,000 trucks.

I believe that there are going to be great arterial highways developed over this country, and I think the time is coming when these arterial highways will be running from New York to Cleveland to Detroit to Cincinnati, Chicago, and possibly to Louisville. Such a type of highway is being developed on an experimental basis between Detroit and Pontiac, Mich., at the present time. I am speaking now rather of the eventual things that are going to take place in the handling of traffic and in the elimination of hazards. I recognize that there are immediate things to be done. The safety councils and the motor clubs of the country have immediate things to do in order to educate the public, but I am just for the moment trying to draw a picture of the future city, because I believe that there are going to be great changes in American municipalities.

Experimental Highway in Michigan

Picture, if you will, an actual road which is being constructed from Detroit to Pontiac today, 206 feet wide, with the street cars running down the center, without a single crossing in the twenty-five or thirty miles of that road. When you get off the street car at any point that you may wish to leave the car, you go down underneath this great highway and out into the street. Automobiles which will travel on the outer

edge from the very center of Detroit out toward Pontiac will be permitted to go fifty or sixty miles an hour if that is necessary, until they reach a point where they wish to leave this great highway, and they will proceed to an inner lane where the traffic is slowed down to twenty or thirty miles an hour, and so into a ramp and down into the streets of the community where they wish to stop.

That is not an impossible situation to have developed all over the country; it is no more impossible than the bringing of the great railroad lines into the center of the big cities today. We feel that possibly blocks of buildings may have to be removed in some cities to provide great avenues of egress and ingress for the motorists who are traveling great distances over this country.

I think the time is coming in the handling of traffic when there will be certain great street arteries designated in cities, such as Louisville, so that motorists must go to Fourth Street, for an example, and there they will have a right of way to go twenty or thirty or forty miles an hour, and it is well understood by everybody that this is a speed street used for a particular purpose and amply protected; on other streets it will be absolutely essential that these drivers go at ten, fifteen or twenty miles an hour.

I believe there will be a development of new types of parking space in this country. I see the time when there will be underground parking spaces. I think there will be a great deal of overhead parking in overhead streets that will have to be developed in certain parts of the United States.

I have tried to draw a very brief picture of the situation as I think it will exist in this country fifteen or twenty years from now. But there are things of immediate consideration to which we must give recognition, and the American Automobile Association with its 600 clubs in this country is embarking on a campaign of education and a campaign of definite accomplishment. I see no reason in the world why the National Safety Council and the American Automobile Association should not cooperate in increasing measure and with increasing results in the type of campaigns for safety which each of us wishes to carry on.

Among the things that we need I think might be mentioned a driving code, so that the people of this country might understand that the driving code is the same in Seattle, Washington, as it is in Jacksonville, Fla.

Conflict in Driving Codes

Our investigation shows that a great number of accidents happen because of a conflict in driving codes. One of my own associates in Washington not long ago ran into a man; I will go even further and say that a director of the Hoover Safety Conference Committee was telling me of his experience in following a man out Connecticut Avenue in Washington. The man reached out of the car and motioned his hand in a rotary fashion. The following motorist thought it was a motion to come on. He shot on the power, when the man turned fairly

across his path, after which he learned that the rotary motion is a signal used in California for turning to the left.

In Chicago in coming along Michigan Boulevard—to illustrate again the confusion which motorists must encounter in various parts of the country—you are supposed to draw up close to the center of the street in turning to the left, and await the signal of the officer to direct you across the face of the traffic. Having that in mind I was driving through Philadelphia; wishing to do precisely the same thing, I turned to draw up alongside the semaphore, and the first thing I knew a Ford whizzed by; the policeman jumped for his life, the semaphore went over, and the man in the Ford turned around and glared at me and disappeared down the street. The policeman arose and dusted himself off and announced that he would accompany me to the police station. I said, "For what?"

"For violating the traffic rules."

"What traffic rule?"

"You should have gone over to the curb and waited until you got the signal to cross the face of the traffic."

I explained to him the situation. He said, "That is not my business. I am only enforcing the rules in Philadelphia." Afterwards he let me off, but he said, "That is a trouble we have in trying to expedite traffic and teach people who come from other cities what to do when they are in Philadelphia."

I believe that there have got to be licensed drivers in this country, and I believe there has got to be a revocation of licenses. I can't personally go quite so far as the previous speaker in saying that cars should be confiscated, because I am wondering what will be done with the man who has two or three cars. I am wondering what the man will do who has a family and whose young son goes out some night and uses the car in a way he should not and is responsible for the damage that is done. Will they take the car away from the father because the boy did something? If a man has another car, what are we going to do about that? If you take one car as a punishment have you the right to take a second at the same time.

We are in favor of the strictest enforcement of traffic laws and I favor the revocation of licenses so the individual himself cannot possibly use a car for a period of six months or a year as a punishment for repeated offenses.

In addition to universal signals. I believe that eventually there must be adopted a system of universal speeds, so that in certain parts of the open country one may know that thirty or thirty-five miles or even forty miles an hour are allowed, but in congested districts they have to slow down to varying speeds.

Problem of Good Roads

The question of more good roads in this country is very essential, not because the motorists want to see more of the country necessarily, but because last year for instance there were only approximately twelve feet

of new road built for the cars that are existent in this country today. With the development of highways out of all cities it is going to mean that the cities are going to spread, and that in itself is going to lessen the congestion that we have in many parts of the country. Thousands of miles of new road are needed then to improve living conditions.

There is to be considered the question of the inability of the individual to drive, even the question of inability to read the signs on the road. Our association has to handle the issuing of licenses in several states, and we discover that there is no law which prevents the issuing of a license to man who has to sign a cross instead of his name. Today almost wholly inexperienced drivers are allowed to take cars and go out upon the highways. No electric railway company would ever permit a man to take a street car out under any such condition. No railroad would ever permit an engineer to take a train out, but in so many places in America today a man simply can pay down $50 or $100, or even less, and take possession of a car of 20, 30, 40 or 50 horsepower and go out upon the public highways. I say that it is unreasonable to have that condition obtain, and it is going to cause trouble and eventually I feel must be changed.

The problem confronting the American motorist today is a serious one, and we recognize it. We know that there have got to be strict rules and regulations, because American cities have not been built to handle the automobilists of today. We know that the 15,000,000 automobiles in this country today are going to increase to 20,000,000 automobiles within probably the next five years, and I think any manufacturer of automobiles or any student of statistics will agree with that. We know that there are very serious problems to be solved.

Cooperation Between Motor Clubs and Safety Councils

I believe that motor clubs and safety councils have a definite function to perform in seeing that highway rules are carried out at the present time, but I believe the big problem is for the engineers, and I believe American municipalities have got to set up new departments and that motor clubs and safety councils have got to encourage the development of these departments. I don't think that any semi-voluntary or wholly voluntary organization such as the one that I represent or the one you represent is going to solve the problem of safety first in this country so far as it concerns the automobilists of the country. I believe we have got to have our safety engineers. Many of our traffic problems are technical matters which must be solved with the new development in cities, by the widening of streets, the opening up of new arteries, but meanwhile both of us must carry on an educational campaign that has absolutely no limit so far as the campaign concerns constructive efforts and expenditures of money, because 15,000,000 automobilists in this country mean that 60,000,000 ride out of the 110,000,000 in the country.

Until the time comes when we can get into the inner consciousness of these people that the automobile if wisely used can contribute more than

any other thing perhaps to the welfare and the culture of the public and if it is unwisely used can damage more than any other single instrument, and I don't even except guns, then I say that the National Safety Council and the American Automobile Association are well embarked upon a program which is of tremendous significance in the development of the United States.

WHO IS RESPONSIBLE FOR PUBLIC ACCIDENTS?

Judge Shepard Bryan, Atlanta, Ga.

I am not a traffic expert and I don't want you to get the idea that I am undertaking to appear before this great Congress made up very largely of experts in traffic and industrial safety matters as other than I am, a citizen interested deeply and vitally in the safety of the community in which I live.

The Atlanta Safety Council is a little over a year old, established by the National Safety Council to carry on in Atlanta the great humanitarian work of the National Safety Council.

Who is responsible for these public accidents is largely a question of opinion and information.

Atlanta has taken hold of this safety work and we are interesting the public schools in the Safety Movement. We are trying to rear a generation of boys and girls trained in habits of safety. That is a thing that most of us over 40 and 50 years of age, and even those younger, didn't get. When many of us were boys, the only dangerous thing in our town was old Dobbin pulling the grocery wagon. All the boys could get out of his way; they could swing on in front and swing on behind, and nobody got hurt.

I remember when I was a boy, the mothers used to tell their small boys about the dangers of fire engines pulled by men volunteer fire departments; they used to tell us about the boy who had been run over, and cautioned us not to get in the way of these dangerous things.

We older men and women have not been trained in the habits of safety and we have not cultivated and made a part of our nature those instinctive habits of safety that we are trying to create in our children. Another generation will be reared in these habits, will be accustomed to these dangers and will understand instinctively how to avoid them and how to protect themselves. We are doing a fine work there in the public schools and with the assistance of the public school authorities.

I would like to say again for Atlanta that in industrial safety we are making progress and that in safety in the home and in all the branches of safety we are making some progress. We are discouraged at times, it is true, but we are gradually moving forward and moving upward.

As a concrete illustration of what we believe we are doing, I will mention the fact that the homicide record from automobiles in Atlanta during the first nine months of this year of 1924 has been largely decreased, and

we believe that a great deal of credit for that is due to the work of the Atlanta Safety Council.

The record for the first nine months of 1923 was 37 deaths; 37 human beings in that one community died from automobile traffic accidents, most, if not all of them, preventable. For the corresponding period during the year 1924, the number was reduced to 22, and we hope that the record of injured persons in 1923 will at the end of 1924 continue to show a reduction.

I don't agree with the thoughtful gentlemen who believe that this is a necessary evil. I do not believe that it is necessary in the work of our complex civilization that the development and use of so wonderful a means of transportation as the automobile necessarily calls for a terrible human sacrifice.

Causes of Accidents

To illustrate what I am going to say, I offer a table made up by one of the great insurance companies, showing the causes of some 400 automobile accidents. Too much speed caused 131; careelss operation, 64; drunken operators, 40; children darting in front of cars, 40; cutting in ahead of traffic, 30; insufficient lights, 12; defective brakes, 9; dazzling lights, 7.

The point that I am trying to develop is that a great intelligent people like the people of the Unites States, with the greatest engineers, with the greatest skill and scientific knowledge perhaps of any people in the history of the world, should find a means of overcoming and solving this question of accidents and causes which almost without exception are preventable.

Did you ever stop to think that if these 15,000 dead men, women and little children who represent the yearly toll taken by the automobile from our homes, from our firesides, from our friends, from our communities, were put in graves stretching like a great tragic belt across this continent, the line of white crosses marking these graves would be distinctly visible from cross to cross from the Atlantic to the Pacific? Did you ever stop to think that this great belt of crosses, supplemented by the cots holding some 250,000 or 300,000 persons injured, crippled and maimed in automobile accidents, stretching in a similar line across the country, could be measured in a like manner because the groans would be distinctly audible from one to the other?

We sit down almost as fatalists, and while we work with great earnestness and with intelligence to minimize, to lessen, this slaughter and this crippling and this maiming, have you stopped to think that this country will be belted with a continuous line of these white crosses and these cots of suffering unless we do find some way out?

Engineers are at work upon many things that will lessen the danger that is confronting us. Perhaps the additions to cities and the cities of the future will have great, broad streets and the automobile traffic will be segregated. Perhaps the day will come when the pedestrian on an

elevated sidewalk or an elevated road or cross-over will be put beyond danger from the automobile. But my own notion is that the one great cause that we need now to consider while other remedies are being thought out and worked out is not the speeding up of traffic but the slowing-down of men who by their speed are slaughtering these men, women and little children.

I don't offer that except as the opinion of a plain citizen. I do know that in my experience at the bar I have defended a great many automobile damage suits and have always envied the confidence and the complacency of the plaintiff's lawyer and the close and intimate feeling that seemed to exist between him and the jury, which was afterwards reflected in the large verdict that the jury invariably gives his client in an automobile case.

We are living in an age, it seems to me, (and I don't want to be too old-fashioned) of too much hurry. I want the business of the country to go on, I want the pleasures of the country to go on, but I want the man who is hurrying at a tremendous rate of speed to get somewhere so that when he gets there he can hurry back, to be reached, and every community is full of such men.

Local Differences

I think another thing we have got to consider is the fact that a great many of the difficulties in the way of the solution of this problem grow out of local interests which really ought to yield to the public good. I imagine the experience in Atlanta has been the experience of other towns. When the safety council says to the city council, "These narrow streets of ours were not made for garages. Take these automobiles off the streets and let us use them for traffic," what happens? The automobile dealers come forward and say, "Gentlemen, you will ruin our business. We are helping support the town." The merchants come forward and say, "You will ruin our business. If the women folks can't stop in front of the stores and leave their cars we won't do any business. We are paying taxes. Here's our landlord standing right here by us. He won't get his rent."

We might get around those two sources, but here come the women, and when that third influence is added to the other two that have exerted themselves, and the members of our city council get to work, this parking ordinance doesn't know itself; if it were a child its own mother wouldn't know it when they get through with it.

I believe that whether we seem to be accomplishing anything or not in some communities we, in fact and in truth, are accomplishing something if we will continually keep dinning and thundering into the public ears this question of public safety. You are planting seed, which is not all falling on stony ground. Some of the seed is going to come up and bear fruit and is going to help your community and help in the solution of this problem of community safety.

A good many people say, "Let's make a law requiring this or a law requiring that." We all know when we sit down to think the thing over carefully that you can't make any people good by law. You have got to reach the heart and the conscience and the intellect of the man sitting at that steering wheel, and you have got to make him understand that it is a question of civic duty in the observance of law which includes the observance of the rights of other men more than of enforcement of the law.

What community could have policemen enough to enforce the law if most men were not law abiding? It is not conceivable that any community could or would, if it could, have a sufficiently large force of police traffic enforcement officers to see that every man who drives an automobile was forced to obey the law. We have got to get this thing into the heart and into the mind of the man at the wheel, and we have got to force upon him and upon all men the fact that after all if every man would stand by the Golden Rule, if every man would protect his friends and his neighbors earnestly and definitely as he tries to protect himself and his own safety, one tremendous step forward would have been made in the solution of this problem of safety.

ADJOURNMENT

General A B C Session

October 2, 1924

ARTHUR T. MOREY, Chairman
General Manager, Commonwealth Steel Company, Granite City, Ill.
Past President, National Safety Council

CHAIRMAN MOREY: It is very inspiring and most gratifying to those who were in Milwaukee twelve years ago to see this splendid convention in Louisville. In those early days the safety man was thought of as more or less of a crank. I was told in our plant that I was going to cause more accidents than we ever had before, but now we can see the results that have come because certain men had the vision to know that what was wrong did not have to be. While we have these felicitations of what has been accomplished, it can give us renewed confidence of what can be done in the years to come. The Safety Movement is one of the greatest movements in history. Do you realize that it was the spirit of the Safety Movement that ushered in this new day of industrial relations? In those early days when we used to get together with the workmen, put our feet under the same table, work out common problems, a wedge was entered that has led to a very different condition in industry today over what it was twelve years ago. That principle of safety and the spirit of the movement is something that we want to be so zealous to guard in our work.

There was a spirit of service in the safety movement. Your early predecessors on the Board of Directors and the Executive Committee used to come from all parts of the United States, pay their own expenses (or their companies would) and gather around the conference table to save the Council money. It was a spirit of unselfishness that injected something wonderful into the safety movement. That spirit is going to carry this movement forward as one of the greatest movements that has ever come among men.

ACCIDENT RECORDS AND HOW TO KEEP THEM

C. B. Auel, Westinghouse Electric and Manufacturing Company, E. Pittsburgh, Pa.

Statistics in general hold only casual interest for the average reader. He admits their value when he has occasion to refer to them, yet gives but scant thought to the work which may have been involved in their compilation.

Without them, however, little progress in any line of endeavor would be made; for it is only by a regular recording and compilation of our performances, in different lines, that we are given a constant incentive to strive to better them. Every one of us can recite not one but numerous instances when we have been absolutely positive in our statements as to this, that or the other thing until confronted by actual statistics, when our opposition ceases and we admit that figures don't lie.

Even recognizing the value of statistics, it is sometimes a difficult matter to determine what records to keep and in what form to keep them in order to get the best interpretation; and this has been the situation until recently with respect to accident records. Furthermore, in the average industrial concern every record must justify itself or out it goes at the first sign of the approach of dull times so that this has constituted another reason, on the part of industry, for hesitating to introduce records that have not already been thoroughly tried out.

In the keeping of accident records, it is absolutely essential to have all facts connected with each accident from the causes leading up to it until the case may be considered closed. In the event of a serious accident, it is highly advisable to secure the facts from a number of sources, as the differing points of view may, at times, prove exceedingly valuable. Photographs of the scene of the accident and X-rays of the injured part also are recommended.

Notwithstanding the fact that the majority of accidents occurring in a plant may be of a minor or non-disabling character, like cuts which require nothing more than a bandaging, the medical department should keep a daily record of all cases reported to them, including calls for redressings. This record should embrace the employee's name, check, part injured, notation as to whether or not employee was instructed to continue at work or to call again, etc.

First Aid Cabinets

In our principal works, which cover an extensive area, we have, in addition to our main medical department, several outlying first-aid stations, notwithstanding which we still find it necessary to make use of first-aid cabinets though we disapprove of them. This disapproval is based on their mis-use and abuse, the tendency always being to overwork such cabinets when placed too conveniently and to do so at the expense of the regular medical department. In order, however, to minimize the possible danger from them, these cabinets are all kept locked, the key being in the possession of the nearest foreman and a notice to this effect posted on the outside of the cover. On the inside of the cover is a holder containing cards, one of which must be filled out every time the cabinet is used and forwarded to the medical department. At short and regular intervals, these cabinets are inspected by a surgeon who renews contents and cards as occasion requires. In this way, objection to the use of the first-aid cabinet is largely overcome.

As nearly all of the states now have compensation laws and require fairly comprehensive reports of accidents involving disability over a given short period, such accident reports may be taken as the accident record is being amplified if desired for one's own records, as already indicated.

While no set rules for the building up of accident statistics can be formulated which will apply equally well to any and all plants, there are, however, several records at least which must be maintained, if an intelligent study is to be made of accidents, their causes and prevention. These are:

A. Number of accidents.
B. Accident frequency.
C. Accident severity.
D. Causes of accidents.

The first of these is a record simply of the number of accidents occurring day by day, week by week, month by month, or year by year, which involve lost time to any extent beyond the day or the shift. These can, of course, be sub-divided in a number of ways as to men, women and minors, by departments, shifts, etc.

But the number of accidents will not of itself be of very much use unless there is kept at the same time a record of the total hours worked by all employees in the plant, not alone so-called production workers but expense workers as well, and in fact all workers, including foremen, clerks, etc., subject to accident hazard. This total is called man-hours or hours of exposure, the last meaning exposure to accident hazard. Of course, if the accidents are separated as to men and women, or by departments, etc., the total hours worked must be similarly separated.

Computing Hours Worked

With these two records, namely, the number of accidents occurring in any given length of time and the total hours worked by all employees during the same period, a computation readily can be made of the number of accidents per hour worked, simply by dividing the number of accidents by the total hours worked. This, however, would make an extremely small decimal to deal with, so it is multiplied by 1,000,000 and the result is the number of accidents per 1,000,000 hours worked or per 1,000,000 hours exposure, or more briefly, if not more simply, the accident frequency, this being the second necessary record.

If the accident frequency increases, for example, in the subsequent, corresponding period, that is, if the number of accidents per 1,000,000 hours worked increases, the accident prevention work may be considered as retrograding and vice versa.

But there is still another record which must be kept to round out the preceding, and that is the amount of time lost due to accidents per hour worked, or the equivalent. It is easily found by dividing the total days lost due to accidents in any given period by the total hours worked by

all employees during the same period. But as this would make, as in the case of *accident frequency,* rather too small a decimal, it is multiplied by 1,000 and the result is the number of days lost per 1,000 hours worked, or per 1,000 hours exposure, or again more briefly, if not so simply, the accident severity, this being the third necessary record.

These methods have been adopted by the International Association of Industrial Accident Boards and Commissions, by the National Safety Council and by statisticians generally, and when it is desired to compare one industry with another, or one works with another or to compute accident ratings, they meet the needs admirably. However, there is an objection to their use inside a plant in that these terms are not easily understood by the average worker. How many of us in this room today gather very much of an idea as to the comparative records of two plants, whose accident frequencies are said to be 5.65 and 6.10? Even when the further explanation is made that this means the number of accidents per 1,000,000 hours worked, it does not convey a whole lot more to us. In our own works, therefore, we have felt it better to use, instead, the total hours worked *per accident;* and if we tell the story that in a certain department there has been one accident per month for every 21,600 hours worked, or, since the full-time man averages 206 working hours per month, that we have one man out of approximately every 100 who gets hurt each month, it is something they can grasp. Similarly, with respect to the accident severity, we use the average actual hours lost per accident as a measure, and it is quite evident the workers will the more readily understand you when you say the fellows hurt last year were "knocked out" for 72 hours each or on average of a week and a half, than they will if you tell them their severity rate is .27 as compared with .29 last year.

Total and Partial Disability

Nothing has been said as yet as to how fatal accidents or permanent total or partial disabilities are to be taken into account when figuring accident severity rates; for example, if in your plant you had among the accidents one fatality, how would you take it into account in estimating the severity? Or if an accident resulted in permanent total or permanent partial disability, how would it be included? A careful study of these matters by the International Association of Industrial Accident Boards and Commissions has led them to establish a scale of time losses or disability weightings varying with the degree of disability, death or permanent disability, representing a time loss of 6,000 days. Accordingly if, in figuring your accident severity rate for any given period. you had 20 non-fatal accidents with a total loss in time of 100 days and, in addition, one fatal accident, you would have to consider your accidents as 21 with a total loss of 6,100 days. Similarly, if instead of one accident being fatal, it resulted in permanent total disability, the loss would be the same in amount. Still further, if an accident produced permanent partial disability, as the dismemberment of an

arm above the elbow, or the permanent disability of any one finger, the losses would be 4,500 or 300 days respectively.

As with the methods for determining accident frequency and accident severity, these disability weightings or time losses are quite all right for comparative purposes and in any event nothing else can be substituted for certain of them like the losses set for death and permanent total disability.

For use in one's own plant, however, it does not seem to me necessary to use any figures other than the time actually lost by the employee before returning to his job; for example, instead of using a weighting or loss of 300 days because of an accident resulting in the permanent disability of a finger, we would use more nearly 60 days if such were the time actually lost by the injured employe before returning to his job.

Comparison of one industry with another on the basis of accident frequency and accident severity, or even of one works with another in the same industry, seems to me of very little value for other than rating purposes, as already stated, unless it serves as a point from which to start or as a goal toward which to strive when commencing the study in a plant of accident prevention on a systematic basis. The simple reason for this is that in no two plants are conditions the same throughout and therefore, the accident hazard will vary; for example, one plant may employ only male workers, another only female workers while a third may employ both, or one plant may largely build heavy machinery and another may confine itself almost entirely to light construction.

In our own works, we do not, therefore, even compare one department with another; but we do compare each department's present performance with its past and in this way all controversy with departmental heads is avoided.

In each department we maintain a rather complete chart showing not only the number of accidents each month of the year for a period of five years, but the average number of accidents per month for each year. There are also shown the sections of the department in which these occur. Additionally, there are tabulated the total number of accidents, the accident frequency and the accident severity for each year, these last two being set forth as the average hours worked and the average hours lost per accident respectively.

In our safety meetings held in each department and attended by the superintendent and his aids, general foremen and foremen, the reports of accidents, as submitted to the state, form among other items the subject of discussion.

Causes of Accidents

The fourth essential record, causes of accidents, shows by grouping all accidents into their proper classes what the hazards are in a plant and thns enables attention to be concentrated where it will do the most good. This grouping is no easy task either in first deciding on the

proper classification or arrangement or in subsequently placing each accident, as it occurs, in its right class. Frequently, an accident may result from more than one cause; but in such case it should generally be assigned to the immediate cause though this does not always hold. Quoting now from the National Safety Council Safe Practices No. 21 on "Accident Records", "a workman passing through an aisle which is insufficiently lighted stumbles upon a defective floor and throws his hand into an open gear which crushes off two of his fingers. Under this ruling, the accident is charged to the gear and not to stumbling or insufficient lighting, for had the gear been properly guarded, the workman would not have suffered the injury which he did, the loss of two fingers—though he might have been otherwise injured by the fall." For details as to classifications of causes of accidents, those interested are referred to Bulletin No. 201 of the U. S. Bureau of Labor Statistics, where this matter is gone into at considerable length.

These four records which have been briefly described are considered the absolute minimum which should be maintained in intelligent accident prevention work though there are others which can be kept also to good advantage; but while these will not be gone into, there is just one other we can recommend and in lieu of a better name, it may be called a calendar of things to be done regularly in accident prevention work. It is simply a list of safety meeting dates and dates of inspection of various items throughout a plant which must be kept up if accidents are to be avoided. Such a calendar would include specifically:

Period	*Items*
6 months	Hand trucks.
6 months	Ladders—portable and stationary.
6 months	Window cleaners' belts and window eyes.
6 months	Stretcher Cabinets.
Weekly	First-Aid Cabinets.
Daily	Cranes, hooks and chains.
12 Months	Crane Operators, Food Handlers } Physical examination.
6 months	Hand tools including pneumatic tools.
Daily	Elevators.
12 Months	Hydraulic elevator trucks.
6 months	Electrical hazards.
3 Months	Machine tool guards.
3 Months	Safety meetings.

DISCUSSION

CHAIRMAN MOREY: Statistics are the very basis of our safety education work. In the beginning it is the tabulation of causes and the proceeding to their elimination which is the big thing to do. The study of causes and their elimination without statistics would not mean much, because we could not visualize these things to ourselves or to the men.

MR. W. L. ANDREWS (Dayton Power & Light Co., Dayton, Ohio.): I would like to ask Mr. Auel regarding the fatal accidents charging 6,000 hours, I believe he said, and just over what period that is distributed.

MR. AUEL: That would go down in a month and it would be worse than 6,000 hours, it would be 6,000 days loss per death. We run monthly statements.

MR. JOHN W. NEWTON (Eastman Kodak Co., Rochester, N. Y.: I would like to ask Mr. Auel how he charts his severity rate, for instance, where there is no lost time. Under the compensation in New York the employee would get 46 weeks for this finger, yet at the same time he might not lose any time.

MR. AUEL: If we were submitting our statistics to the National Safety Council, in order that the rest of the companies might compare theirs with ours, we would have to take that loss of time into account, but it is utterly absurd, to my way of thinking, to include 60 days against yourself when your medical department has reduced the lost time to nothing. We would still have to pay that man whatever the compensation law required in the way of money for the loss of that finger, but we do not charge ourselves with it.

MR. NEWTON: When we arrive at our severity rate we always include the time the injured employee has been awarded by the state commission. We have to pay a man for that length of time, and it is included in the severity rate.

MR. AUEL: You are quite right in making your outside statistics, but you are damning your own medical department, when you get a man back on the job without loss of time, and yet do not credit your medical department with that improvement in performance.

MR. W. F. STERNE (American Radiator Co., Buffalo): I believe that there is a great value in comparison. After all, we are striving to arrive at a point of zero in accidents. I believe that it is up to us to have specific hazards reduced where heavy materials are handled to the point where a steel mill or a mine will be just as safe as a silk mill.

DR. LUCIEN CHENEY (Washington, D. C.): When I began collecting the statistics of the iron and steel industry in 1910, the average loss was 14 days. It is now 21 days.

I will explain why it is that you get that increase in loss per accident. The effort to reduce accidents is primarily effective upon the minor injuries. The iron and steel industry has cut out a great body of minor injuries, so that its average loss per case is now 21 days, and the fact that it has increased from 14 to 21 days is evidence of successful effort in the cutting down of minor injuries.

SAFETY COMMITTEES WILL STARVE UNLESS FED

Frank E. Morris, Liberty Mutual Insurance Company, Boston, Mass.

(In the absence of Mr. Morris, his paper was read by Mr. David Beyer.)

The average plant (shop or factory) in my state has 168 workers but it isn't reasonable to suppose that the average plant represented in this

session has that few employees, for there are not many plants of that size that employ a full time safety man. So let's say that you represent a plant employing around 500 hands.

Your management must be "sold" on the idea that accidents can be prevented or else you wouldn't be here. It is fair to assume then that some safeguarding has been done and that you have a general committee to pass on safety matters, and also a workers' committee, with whom safety ideas are supposed to originate. It is evident that the workers' committee feeds the general committee, so if the workers' committee be kept alive the general committee will function properly. This general committee, by the way, is appointed by the manager and the members of it represent the manager. Presumably they will accept no wildcat suggestions from the workers' committee and it is their job also to carry out the ideas that are adopted with the least possible expense.

The workers' safety committee bill of fare is our worry at the present moment. This committee, we'll say, is made up of two men and one woman and they are anxious to prevent every needless accident in this plant of 500 employees. These members have been selected by the general committee at your suggestion. One has served three months, one two months and one only one month. This committee meets every month and it is presumed that the new member will have new safety ideas.

The safety engineer in this plant does not act as chairman of the committee lest he take away their initiative, rather he merely sits at the table to see that the committee gets proper nourishment.

When this workers' committee was started two years ago there was a great deal of guarding to be done and they nearly swamped the general committee with suggestions for a guard here, a guard there, guards everywhere. For a few months the general manager was ready to believe that his chief product was guards and he began to wonder why more of his workers hadn't been seriously injured in the past. So he was obliged to advise his general committee that he could not rebuild the entire plant for safety's sake and the workers committee consequently saw their most radical suggestions shoved into the discard. So we come down to the month of October, 1924, for the 25th meeting of our workers' safety committee and we all wonder what they will have to suggest, if anything.

We must bear in mind that a meeting of this sort costs the time of three important workers and we may be sure that their absence will more or less impair the routine work of the factory. Therefore, we should have a live committee or else none at all. A dead, paper organization, has a deterrent effect on the safety proposition, the employees know it is dead, and the scoffers are the more inclined to sneer at the safety idea.

How Not to Function

The workmen's safety committee of this average factory employing about 500 hands is now in session. The chairman takes a pencil and

writes the date "Oct. 2, 1924" at the top of the record sheet and wonders what he will write on the rest of the page. The woman member is sitting in for the first time. She reported that one of her girls was away from work on account of a sprained ankle due to a fall on the stairs probably caused by high heels, but of course "that's her privilege to wear high heels if she chooses." The other man member of the committee reports "everything O.K. so far's I know," and after a discussion about the general safety committee turning down suggestions, the workers' committee adjourns.

That committee is almost dead from starvation. In the first place they do not know what their job is because they do not know what accidents to attempt to prevent. The guarding of machines, the installation of handrails, the placing of warning signs—all of this work has been done and the committee imagines that there is nothing much else to be done, and in any such plant more than three-quarters of the work is yet to be done.

If you have such a condition existing in your plant, let me make the following suggestions:

Have a talk with the big boss as soon as you get back on the job. If you haven't the proper intestinal qualifications to talk to the big boss about your safety troubles then write him a brief note—a very brief note consisting of two words and let those two words be "I quit" for, lacking the implied and very necessary qualification just referred to, you will never make a safety engineer and the sooner you stop messing around in this all important business the better off we will all be. All right—you will see the big boss when you get home. Your expense account to this Congress is going to run up into money and, of course, he expects you to bring back his money's worth in ideas.

Tell your general manager that he can help you by dropping in on the next workmen's safety committee meeting (which will be held November 4) for just a few minutes to tell the committee members how much he appreciates their work. Then see to it that there is posted a notice signed by the chairman of the general safety committee announcing who the personnel of the October workers' committee is with a brief sentence saying something about passing safety suggestions in to these members.

Next, I would get the accident reports that are on file in the office and prepare an analysis of all lost time accidents for a year past, having them divided into mechanical and non-mechanical, and I would give each member of the committee a copy to study previous to the November meeting. Right there is where they will discover that three-quarters of the work yet remains to be done for a study of any such analysis reveals that more than seven out of ten accidents would not have been prevented by a machine guard, a hand rail or a danger sign, and the big job ahead of the workers' committee is to prevent a repetition of the accidents recorded in your list.

Not long ago I was driving along a street in the tenement district and I "honked" at a boy who was playing ball in the street a hundred yards away. Boys must play and the street was his only play ground. His back was toward me and no sooner did the honk reach his ears than did his leg muscles jump him to the curb. Only then did he turn to see who it was that was holding up his game. The job of the safety man is to get the worker to react toward danger as quickly as did that boy whose subconscious mind told his leg muscles to get busy and take the boy out of the danger zone.

Some of the "dumb doras" on the pay roll haven't any subconscious, or conscious minds either, apparently, (the fellows who get hurt with no reasonable excuse whatever) and I expect it will take quite a while to get rid of them all.

What to Feed the Committee

You have now given your workers' safety committee some standing in the estimation of their fellows and you have provided them with the list of casualties. The next move is to supply each one of them with a recent issue of the *National Safety News*. Talk about feeding a safety committee! The *National Safety News* is a good bill of fare!

Let the safety committee examine the bulletins in the back (here exhibit the bulletins) and let them decide what bulletins should be obtained for posting in the plant.

Encourage the safety committee to try to excel the safety records being made by other plants in your line of industry. Give them figures on accidents in other plants in your town.

When a lost time accident happens, have the workers' safety committee visit the scene of the accident if possible and make a recommendation to prevent its happening again. Employees working in the same room should be consulted—they will welcome the chance to make their room safer.

The safety committee might visit the injured man at home or at the hospital and the interest thus expressed by them would soon be known all over the shop and safety would have a new meaning.

It seems to me that a safety committeeman should be given a safety committee button—a good gold button that he can wear on his coat lapel. These are prized more than we can appreciate, and they are good advertising.

One hundred and one other stunts that safety committees can undertake will all be found in the *National Safety News*, copies of which will hereafter go to the members of our workers' safety committee.

When a committeeman has served his term see that he gets a personal note of thanks from the general manager and you'll have added a safety booster to your staff.

The committee about which we have been talking has had 24 meetings, 21 men and women have served their time and the safety man of that plant should now have 21 minds actively co-operating with him to prevent accidents—plus the three that are now on the committee. Remember that you, the safety engineer, are looked upon by the workers as a white collar man; they assume that you have a selfish interest in keeping them from injury while a trio of their fellow workers cannot be so accused. Therefore, you are overlooking your best bet if you do not keep your workers' safety committee very much alive.

By all means give credit for results achieved to your helpers. Some of these so-called safety engineers come to a gathering of this kind and boast about what "I" did while if the truth be known he wouldn't have gotten to first base if his safety committee hadn't been boosting his game during the past year.

There is glory enough for all. We don't know what hapless fellows we keep out of harm's way nor do we care to know; all we need to know down deep in our hearts is that we've done our level best.

To keep a safety committee from starving to death first give it dignity, then give it a job, and then provide the tools with which to do the work.

Following is an accident report form developed by the Walworth Manufacturing Company. The main features of this report are:

1. The foreman is obliged to enter thereon his suggestion for preventing a recurrence of the accident.

2. The general manager is obliged to read and sign the report—after the foreman has affixed his signature.

Suppose you were a foreman in that plant and an accident happened—one that the average foreman would have sidetracked. How would you like to fill out one of these forms knowing that the Big Boss would read every line of it? Guess you'd be a bit more keen on safety work in your department.

ACCIDENT REPORT

Date_____

Name of Employee_____ Check No._____ Dept. No._____

Age_____ Address_____

Date and Hour of Accident_____

Statement of Just How and Where Accident Occurred (By Injured *Employee*)

_____

_____

_____

Signature of Injured Employee_____

Statement of Just How and Where Accident Occurred (By *Foreman*)_____

_____

Signature of Foreman_____

How Can Such Accidents Be Prevented?_____

Signature of Injured Employee_____

How Can Such Accidents Be Prevented?_____

Signature of Foreman_____

Reported by	Signed by Foreman	Passed by Div. Supt.	Approved by Gen. Supt.	Recorded and Investigated by Personnel Mgr.

DISCUSSION

CHAIRMAN MOREY: What do you think of mixed committees?

MR. BEYER: That is a somewhat controversial subject, but my own feeling is that the workmen are likely to be more free in expressing themselves and you will really get their ideas in better shape if you separate the workmen and foremen.

MR. L. G. BENTLEY (Chesapeake & Ohio Railway): I hold exactly a different view. I think, meeting around the committee table, the foremen get the viewpoint of the workmen and the workmen get the viewpoint of the foremen, and I think it is more satisfactory than if the workmen's report comes to the foremen in writing.

MR. CHAPMAN (R. R. Donnelley & Sons Company, Chicago): Is there any value in having an annual meeting of all committee members and a get-together safety rally and things of that kind?

MR. BEYER: I think a general safety rally once in six months or a year is one of the very best things you can do. We all feel the inspiration of the crowd that is assembled here at the Annual Congress of the National Safety Council. There is a contagion in meeting and seeing other people who are interested in the same thing, and I think that contagion is best expressed by a good live general safety rally where everybody attends, particularly if you have the big chief there and he expresses interest and gets the idea across that he is back of the safety work in the plant.

MR. WALTERS (West Virginia Works, General Electric Company): Under our plan of representation we have a general joint committee on safety composed of three managing members and three employee

members. Each floor of each building has a safety inspector who reports any hazard first to his foreman; if his foreman does not apply the necessary remedies, the inspector reports it to the general committee on safety. The general committee on safety will not accept a report unless the inspector says he has taken it up with his foreman. When it is brought to the general committee on safety, they first take it up with the foreman and if they do not get immediate action, it goes directly to the superintendent or to the management.

We find this plan of community interest is bringing foremen and workmen closer together under the employees' plan, and we find that the work of the general committee is very much reduced.

MR. W. E. CLARK (St. Louis Coke & Iron Company, Kansas City): We have a general foremen's meeting weekly, and then we have the foremen's meeting with their men weekly. The man takes his recommendation to his own foreman, the foreman in turn brings it to the general foremen's meeting. There it is discussed, after which the answer is carried right back to the man himself.

We make out weekly accident reports, giving the injured's name, the foreman under whom he is working, the date of the accident, the kind of accident and the cause, and these reports are discussed in every foreman's department throughout the plant. The accident is discussed and the method of prevention of recurrences is discussed.

CHAIRMAN MOREY: In our plant the safety engineer and the foreman and the chairman of the safety committee confer together on the matter of appointment of workmen to the committee. Then the safety committees elect their own chairmen.

MR. SYDNEY W. ASHE (General Electric Company, Pittsfield, Mass.): At Pittsfield we work the double committee system. We have the general safety committee which is appointed by the manager, and then we have rotating committees. The foreman every two months appoints a new man on the committee. In that way a group of three men serve for two months and they go about the department and make regular inspections on the company's time and make definite recommendations. Then there is a sheet prepared so that their recommendations are given on one side and on the other side is expressed how the foreman disposes of those recommendations. Those sheets go direct to the safety committee and in that way the men in the shop feel that they have some authority and some power in the matter. We have found that the foremen co-operate very well in that work, and we get results in that way.

CHAIRMAN MOREY: We make it a practice of seeing that a suggestion is executed just as quickly as possible. If it is not a good suggestion, we tell the man or the committee who made it why. So when a man makes a suggestion he sees something is done. If he sees nothing done he gets discouraged.

HOW TO ADVERTISE THE SAFETY IDEA

R. T. Solensten, Bulletin Editor, National Safety Council, Chicago, Ill.

Let us start out with this proposition: every industrial establishment should have a bulletin board. Why? To convey ideas, suggestions, information, and instructions to the employees collectively. In every properly conducted industrial establishment, the management has or should have something to say to the personnel more or less regularly with a view towards developing good plant spirit, stimulating interest in production, and promoting the health and Safety of its employees. The manager who is alive to his opportunities will make his bulletin boards a positive influence along these lines.

In the present discussion, we are interested primarily in the use of the plant bulletin board as a medium for advertising Safety. I take it to be unnecessary before this audience to attempt any argument to prove that there is a real need for advertising the Safety idea. You all know that there are certain types of accidents that can be prevented by safeguarding, by safety devices, and by improvements in processes and equipment. You also know there are certain other classes of accidents—the majority, perhaps, in most industries—that can be prevented only by care and caution on the part of the workers themselves. It is obvious that if we are to attain the highest degree of success in our Safety work, we must not stop at safeguarding or engineering revision, but we must also give proper attention to the prevention of accidents due to the human element.

If we analyze the causes of most of the accidents which are due to the so-called human element, we shall find that these causes are largely mental. Thoughtlessness, ignorance, inattention, forgetfulness, indifference, carelessness, and recklessness, as well as their opposites, are conditions or states of the mind. To combat the mental causes of accidents, we must develop the mental causes of Safety, i.e., we must try to re-enforce the mental qualities of the workers which will enable them to work safely. We must carry on a program of accident prevention which aims at influencing the minds of the workers. We must teach them the A B C's of Safety and train them in the safe ways to do their work. That's Safety education. That is accomplished by individual instructions, Safety meetings, talks and lectures, plant magazine articles, motion pictures and to some extent by Safety bulletins. But we must go further. We must help the workers to realize the importance of Accident Prevention to their own welfare and happiness, we must win their good will and earnest co-operation in every detail of our Safety activities, and by constant reminders, admonitions, suggestions, and encouragement, we must help them to keep the idea of Safety uppermost in their minds. That's safety advertising. And that is the kind of Safety advertising for which the bulletin board is especially well adapted.

Bulletin Board Is Indispensable Medium of Safety Publicity

The bulletin board is so economical to maintain and so effective in its influence when properly posted that it has come to be regarded as an

absolutely indispensable medium of safety publicity. Ask any successful safety engineer, and he will tell you that an executive trying to conduct Safety work in his plant without a bulletin board is like a seven-year old boy trying to sing bass—he hasn't got the voice. The bulletin board is the voice of the management warning, reminding, instructing, encouraging the employees and inspiring them to put forth greater and more sincere effort to avoid accidents. Your bulletin board thereby becomes a forceful influence—not merely a piece of equipment—and the scope and character of that influence will depend only upon how you talk to your employees and what you say to them. In other words, it will depend upon what you put on the bulletin boards.

The experience of the Safety Movement has proved conclusively that illustrated safety bulletins and posters constitute the best material upon which the safety engineer should rely for his principal form of bulletin board communications. The bulletins which are published by the National Safety Council and by several of the larger insurance companies are prepared in accordance with correct advertising principles. They attract attention, they hold the interest, they put over the message and they get the reaction desired.

Generally speaking, safety bulletins have three functions. If a bulletin does not perform one or more of them, it is not worth posting. The first function of a safety bulletin is to stimulate Safety thinking. If you can put up a poster that will make a man think of the truth behind that bulletin, so that he will take the lesson to heart and apply it in his work, you are doing good safety advertising. If you can, day-after-day, remind him that you are aiming not merely at production, but at safe production, and if you can day-after-day give him some new thought which will arouse his imagination and help him to apply safety principles, you will go far towards developing in him mental habits which become his automatic guide for safe work. And when a man works safely from habit, he is a safe worker.

The second function of a safety bulletin is to create good will for the Accident Prevention work you are doing. In almost every industrial plant there are some men who are prejudiced against your efforts, and others who are indifferent or merely lukewarm, men who are not actively opposing your efforts, but who are maintaining an attitude of passive resistance, who have yet to be sold on the Safety idea. I think it is fair to say that the constant influence of safety bulletins will tend to break down this passive resistance, because they will point out to the worker how easily accidents may occur, they will remind him that no one is immune, they will make him think of the consequences to him and his family should he be injured, they will describe how other workmen worthy of his respect have saved themselves from injuries, and they will convince him that Safety work is not a fad, but that it is a universally accepted principle of efficient industrial management.

The third function of a safety bulletin is to instruct workers in safe practices and to warn them against the hazards of unsafe practices.

Ordinarily, only such instructions as can be presented pictorially with brief, concise, explanatory text should be given in the form of a safety bulletin. A poster is not a book of instructions, nor can it take the place of a dissertation suitable for publication in a plant magazine. We have learned from experience that the best results are obtained when bulletins are brief and to the point, so that the idea is quickly absorbed by the reader. All that should be expected of a Safety bulletin is that it put over one idea, fix one impression in the reader's mind and do it at a glance.

Location of Board

So much for the functions and influence of safety bulletins. Now let us consider briefly five essentials of good bulletin board practice. The first is to place your bulletin board in a conspicuous location where the workers will not fail to see it. The advertiser demands preferred space in magazines and newspapers. Why should not the safety engineer insist upon preferred locations for his advertising medium? In every plant there are many appropriate places for a bulletin board, but it is difficult to make any positive statement as to which is the best location because local conditions, customs, and practices are not the same in all establishments. For instance, a drinking fountain might prove a highly acceptable location in one plant, whereas in another it might not be at all satisfactory. The desirable locations are those which not merely make it convenient for the employees to see the bulletin board, but which make it practically impossible for them to avoid seeing it.

The places most frequently selected are points in the work-rooms where men are obliged to pass during the day, places adjoining the time-clock, in the dresing-rooms, in club rooms or smoking rooms, in the plant hospital waiting room, in lunch rooms and plant restaurants and at any other place where men congregate to spend a few moments of their leisure time during the lunch period. Plant entrances and exists are excellent locations for the poster type of bulletins which conveys the idea at a glance and which can be read on the run. Men are usually in a hurry to get in or out of the plant, and bulletins which require them to stop even for a few moments to get the message might better be posted at other locotions. As a general rule, such bulletins as require a great deal of text to make the message clear and complete should preferably be posted in dressing rooms, lunch-rooms, or in places where the workmen will read them outside of actual working time.

The best type of bulletin board is a cabinet equipped with glass doors which can be locked. Good lighting is required whatever type of board you use. Of course, the most important thing in bulletin board publicity is not the board itself, but the material which you post on the board. Nevertheless, if you provide a good, substantial, attractive, self-illuminated bulletin board, it will attach greater dignity to your enterprise and make a better impression upon your workmen.

The second essential of good bulletin board practice is to use the best bulletins which you can obtain or prepare. There is not time in this short talk to discuss the numerous points which are involved in the creation of safety bulletins and posters. It is advisable, however, to dwell for a moment on the two most important qualifications. In the first place, to be effective a bulletin must have the power to attract attention. One must bear in mind that the reading of the safety bulletins is a voluntary act on the part of the employees. If your bulletin board does not attract attention, your messages will not be read, and if your safety bulletins are not read, your efforts are wasted. The elements that make for high attention values in a bulletin are color, illustration, decoration, typography, and layout. The proper use of these various elements is governed by well defined principles which must be followed in the preparation of the poster.

What Bulletin Must Contain

In the second place, the bulletin must be appropriate and worth while from the safety standpoint. It must have a safety message, and this message should be so presented that it can be understood quickly and clearly by the reader. Furthermore, it should be presented in such a way that it will register a permanent impression. That means putting into the message the quality which we ordinarily call "punch." Punch in a poster means that the portrayal is vivid and striking, that the illustration tells the same story as the text, that copy is written with clearness, coherence and emphasis, that unnecessary details have been omitted, and that all the elements of display and copy are properly related and co-ordinated to produce the one effect for which the poster was created.

Safety men have different ideas about the value of different types of safety bulletins. From the speakers who are to follow, you will, no doubt, hear a great deal about the negative and positive in safety advertising, the pros and cons of cartoon bulletins, of photographs and drawings as bulletin illustrations, of short and long texts, etc. This will all be very interesting and useful, but from the standpoint of getting actual results it is more important to take the bulletins that are available and post them on your bulletin boards than to worry about the emotional responses which will be made to the bulletins you select for posting. The psychological effect a bulletin will have on the reader is usually given very careful consideration by the publishers before it is printed. You can't go wrong if you post the bulletins secured from the National Safety Council or from your insurance company. As I see it, the big problem for the safety engineer is to devise ways and means to get the bulletins posted. If you want to get results from your bulletin board, you've got to make the bulletin board work for you. You can't catch fish unless you use bait!

The third essential of good bulletin board practice is to give your bulletins a chance to do their work. Post one or two at a time and

change them frequently. When a poster has served its purpose, take it down and put up another. If you do not have a suitable bulletin to take the place of the old one, leave the board blank for a time. It is better to do that than to leave the same old bulletins on display after they have performed their functions. This will also help to attract attention to the new poster when it is posted. Above all, don't crowd your bulletin board. A board that is plastered with bulletins and posters and clippings and notices of all kinds loses its effectiveness. There is nothing attractive about chaos, disorder and inefficiency. If the workmen look at such a board at all, they go away without reading or remembering anything that they saw there. Change the boards every day, if you can, and if you can't do that, change them as often as possible. The idea is to give your workmen something new, something interesting to look at every day.

Organizing Bulletin Board Work

The fourth essential is to organize your bulletin board work. Establish and maintain a definite system for posting the bulletins, and route them through the various departments according to a planned schedule. Select a competent man to take charge of this phase of your safety advertising and make him responsible for the boards being properly posted. Give him such assistance as he may require for the actual posting of the material to be displayed. In this connection, I might suggest that the use of bulletin boards with removable backs will be found especially convenient. These backs can be prepared in the office of the safety department and placed in the bulletin boards throughout the plant by the night watchman or by some other person assigned to the task.

The fifth essential and by far the most important principle in good bulletin board practice is to make your boards interesting. When all is said and done, that is the secret of successful safety advertising. One way to increase the interest is to get variety in your appeals. There are several different types of safety bulletins, such as emotional appeals, of which there are many kinds, slogans, comics, and instructive bulletins illustrating the safe or unsafe way to do a certain piece of work. When you remove a bulletin from the board, post in its place another of a different type. Changing the character of the appeal will help considerably to sustain interest in the bulletin boards. Safety bulletins in themselves are or can be made interesting, but it very often is desirable to supplement the safety bulletins with some home-made material which will help to add local color and thus intensify the interest. Such additional features can easily be prepared by the safety man himself. Action and story-telling pictures taken in the plant; photographs of employees with snappy statements attributed to them; news pictorials prepared from photographs supplied by news picture concern; human interest pictures, clipped from magazines and newspapers; clippings telling of accidents with appropriate comments added; original bulletins prepared by the drafting department or by employees who are handy with pen or brush;

cartoons; witty sayings and clever jokes; plant news and announcements; posting an object such as a hand tool that has caused an accident or a glove that has been caught in a machine—these are a few illustrations of the kind of material which can be utilized by any safety director to increase and sustain the employees' interest in the bulletin board service. Show the employees every day something that has personal interest for them, and you will have plenty of readers for your bulletins. That is the way to make your bulletin boards so interesting that your men will be eager to see every new posting. That is the way to get results from your bulletin boards. It will take time and thought and a lot of hard work; but the effort is well worth while and you will be repaid beyond all expectations, because it will keep your men constantly on the alert to prevent accidents and promote safety.

To plan and carry out a permanent campaign of educational publicity of this character calls for a man who has vision, who has a keen understanding of human nature, who knows news and advertising, who knows how to interest and appeal to working men, a man who is a good psychologist, a good safety engineer, and who is enthusiastic over the possibilities for the prevention of accidents through education. Anyone can tack up safety bulletins, but it takes brains to conduct effective safety advertising. Make your bulletin boards an influence for safety which will be felt throughout the entire personnel of your plant, use bulletins freely, make your advertising interesting, talk to your employees in such a way that they will know you have their interest at heart, keep it up, and you will get results in good will for your accident prevention work, more hearty co-operation, a better plant spirit, and a happier, more prosperous industrial family.

DISCUSSION

a. Comic Bulletins

MR. E. W. BECK (U. S. Rubber Company): The comic bulletin or the cartoon bulletin attracts attention. That is one of the secrets of advertising, and a good bulletin must advertise.

A good comic bulletin also gives action and action attracts attention. A comic bulletin lends itself to contraction. You can show the extremes, you can show the absurb, the sublime, the ridiculous sides.

Take the calendars that were distributed by the National Safety Council about four years ago. They were of the cartoon type. They showed a little panorama of different scenes. Some of the men in the factory say today they would like the cartoon type of calendar.

The comic bulletin is easy to look at. It is also suggestive and then there is the other human factor which we have heard expressed so nicely today; it allows the individual himself to draw his own conclusions and an individual likes to draw his own conclusions. He doesn't like to go to a bulletin and read a set of rules; he doesn't like to go to a bulletin board and see a pathetic picture; for that reason, the bulletin board does go over.

b. Negative Bulletins

MR. L. G. BENTLEY: We all know that when our children start out on life's journey, the positive method of instruction is valuable, but there comes a time in that child's life when he must be restrained from doing the wrong thing. Employees are no different from children. I will grant you that were it possible for us to secure the attention of every employee of industry on the first day that he engenders the idea of entering that industry, the positive method of instruction might prevail almost to the exclusion of the negative bulletin. But we have in our organizations in industry men who years ago, before they ever heard of organized safety effort, formed bad habits, habits that are dangerous, habits that are formed from acts they see each other perform every day without taking cognizance thereof, habits that they do not or did not even notice in their fellows. When you represent that dangerous and sometimes forbidden practice to them forcibly, it commands the attention of every man who has seen that practice engaged in. If it goes no further than that, it leaves a permanent impression on his mind, but it does go further than that because, as he goes out into the plant and sees his associates engaging in those unsafe practices, he is won't to use his influence to get others to desist from those practices.

CHAIRMAN MOREY: I don't believe in negatives. I don't think you get anywhere feeding a man negatives. It is thin nourishment. Fear is negative, a vacuum. You want safety to give the assurance, the confidence of how to keep safe and well and strong. We won't allow a negative bulletin in our plant and we have even taken the word "danger" out of our plant, using some better, more constructive positive thought where a danger sign would ordinarily be. We get the message and protect the condition, but we put it in a positive, constructive way to feed a man something of interest. I think it is a mistake to use negative bulletins.

c. Short vs. Long Text

MR. PAUL HODSON (E. St. Louis & Suburban Railway Company): In the first place, we Americans of today are always in a hurry. We want to read as we run. You see very many signs along the road as you drive, or signs on bulletin boards, but you will notice that most of them are short, snappy and to the point. That is what we must have in our plants. If your bulletins have too much wording they will not be read: they should have less wording and be in conspicuous places. It is just as easy to put a sign up saying "No smoking" as to say "Smoking in this plant will prejudice our insurance so please be governed accordingly." "No smoking" means the same thing. We have signs in our cars that say "Do not talk to the motorman." We could put that information out in letter form and hand it to the public but they would not read it.

We have executives on our properties whose business it is to think of big problems and work them out and give them to these men. If they have a bulletin to present or a written message or picture, they should study it out, boil it down and put it in as few words as possible so the men will grasp it. Make those words to the point, and they will be read.

MR. D. L. ROYER: Consider for a moment the fact that, if you deal with the very few ideas which can be put over successfully and forcefully with a very little bit of copy, you have limited your entire activities to a very few subjects. Watch out or your bulletin board will become a dismal repetition. Consider modern advertising. The Phillips stocking girl would sell anybody silk stockings, but that is all it would do.

Remember the Douglas Shoe advertisement with W. L. Douglas pegging shoes when he was three years old; that is a bit overdrawn. You have all seen that. The advertisement was crowded with copy. That ad has been the laughing stock of the advertising men of the country, yet it is one of the most effective ads ever put out. It sells shoes, and it sells shoes for two reasons: the pictures are human interest pictures, and the copy explains and sells the idea the whole way through.

When you put a bulletin up on the board it is worthless unless that bulletin sells the idea clearly and forcefully and leaves no question of a doubt as to what it means.

d. Photographs vs. Drawings

MR. W. F. STEBNE (Safety Engineer, American Radiator Company): We use positive cartoons as well as photographs, but we believe the photographic means of conveying the idea offers a greater realization and appreciation for the fact that it is in our shop illustrated as an actual condition.

I might say that it would be well for all of you to contribute something in the way of photographic material to the National Safety Council, because sooner or later it is going to come back to roost in your own plant and your employees will be delighted to see themselves on the board.

MR. S. H. SLAYMAKER (Safety Department, Fairbanks, Morse & Company): Some subjects cannot be illustrated properly or advantageously by photographs.

You get cleaner delineation with drawings. I have a couple of bulletins here that show the difference. You see a man in the photograph; you don't know what he is doing. You can get better advertising value (I guess any advertising man will admit it) in pictures, posters especially; you get bolder lines and heavier masses. There is a wider range of treatment in pictures than there is in photographs. Your comics are almost impossible to make with photographs.

EDUCATING THE WORKER

J. O. Houze, Manager of Personnel, National Malleable and Steel Castings Company, Cleveland, Ohio.

Descartes, the French philosopher, says "I think, therefore, I am." By this he meant the power of thought was the determining factor of his manhood. Correct thinking is essential to a complete understanding. Most of our economic problems and a great deal of the misunderstanding between employer and employees may be cured by an understanding of some very simple truths.

The strength or weakness of an industrial organization depends upon the standard of intelligence and moral stamina that supports the superstructure. The personnel of an organization is the firm's greatest asset or its weakest link. It is always a source of great concern. Our employees must be taught to think—to think right and to think with their employer and not apart from him, as their interests are one and inseparable.

The foreman is the real leader in industry today. He is interested in his company's policies as regards labor, sales, production, costs, etc., and he should not only be interested in these but he should be familiar with them so that he can intelligently discuss them with his fellow workers or those who come under his immediate supervision. He is the point of contact between the management and the men, and if we are to eliminate this misunderstanding between employer and employee, he must be able to correctly interpret company policies and be in a position to refute arguments put forth by the radical element. The foreman can, if he so desires, be a potential force for good. The good foreman knows his men better than anyone in the organization. He knows their attitude of mind, he is their confidant, their adviser, their teacher, their leader and their trusted friend. On the other hand, he is the loyal representative of the management. He can promote good feeling or he can sow the seed of discontent. By his own attitude he can profoundly affect the morale of the men under him. The foreman, in the eyes of the worker, is the company. The foreman's job is that of an executive, requiring tact, patience, honesty, fair dealing and leadership. He has an important influence on the future of those who come under his supervision. Approximately 35 per cent of the worker's time is spent in the factory. Take the boy or girl leaving school and entering industry—they spend more time each week in the factory than is spent in the school room—they spend more time in the factory than they spend in the company of their parents. Think for a moment of the possibilities this affords the foreman—also the responsibility. He may, by precept, example and leadership, start a young employee on the road to success, or, on the other hand, by the lack of leadership and moral stamina, start the young employee on the road to absolute failure. The attitude of the foreman is reflected in the attitude of his men. Take in your safety campaign—if your foreman is sold 100 per cent on safety,

go into his department, you will find his men thinking, acting and working safely. On the other hand, if the foreman is lukewarm as regards the Safety Movement, you will find the men in his department indifferent to safety.

As I stated before, the majority of our industrial problems are due to misunderstandings. The first thing to do is to educate our foreman to the correct point of view. Take him into our confidence, have him understand and appreciate the importance of his job and the responsibilities that are incumbent upon him. Let us have more foremen's meetings, place our cards face upon the table and frankly discuss company's policies, costs, industrial problems, economic conditions, etc., so that he can discharge his duties with credit to himself and assume the responsibility of real leadership. The foreman of today is not the foreman of yesterday, nor will the foreman of today be the foreman of tomorrow unless he progresses with the times.

We are living in a progressive age. The old system of driving men has been relegated to the past and the foreman of the future must be a real leader, a builder of men, a man who can teach workers to think correctly which is essential to a complete understanding.

I have as yet to find a single case where personnel work has been abandoned when founded on sound principles and the right type of man in charge. The tendency at the present time is to discard unsound theories and practices and substitute in their place a practical, workable scheme that has been tried out and found to be successful.

They say coming events cast their shadows before them. Editorials and articles in current magazines and trade journals during the past year have been stressing the importance of the human element in industry. Manufacturers are realizing more and more the importance and necessity of a sound industrial relations program. There was a time when we thought of production in terms merely mechanical, but today, when we speak of production, we think of it being produced by the worker by the sweat of his brow. There was a time when we thought of our factories as a mere aggregation of machines, but today we think of them as a big human family consisting of Jims, Johns and Marys working at their benches and machines happy and contented and we have the satisfaction of knowing that in many instances they have come to look upon our factories as something more than a mere place to work. Industry is realizing today as never before, that back of all machines, back of all plans, there is that human element with its variations in temperament, character and ability, and it is this human element we have to deal with and endeavor to place the round pegs in the round holes and the square pegs in the square holes and when this is done we shall have more correct thinking which is essential for a complete understanding.

I shall briefly outline an industrial relation program that his been successful. In doing this do not think for a moment that the plan is

recommended as a criterion for you to go by, nor is it held up as a panacea or a cure-all for industrial ills, but we do know that it has worked successfully in our industry. We employ in each of our eight shops from 800 to 1300 people, consisting chiefly of Americans, Austrians, Hungarians, Lithuanians, Poles, Armenians, Turks, Greeks, Italians, and a great many negroes.

Generally speaking, steel mill and foundry work is hot, heavy, laborious, dirty work. Upon entering our shops you are greeted by the rumble of mechinery. You will see large electrical cranes traveling to and fro over head conveying ladles containing tons of molten metal, see the iron splashing and sparks flying and through the smoke and heat you will find the employees hurrying to and fro handling the hot material. I mention this to you that you may visualize and paint a mental picture of our shop working conditions. We built our industrial relation program around the square deal. We believed then, as we do now, that any labor policy to be successful must have the undivided and loyal support of the foremen, realizing that the foreman stands head and shoulders in influence, importance and power above employer and employee and if we could only get him to exert his influence in the proper channels it would do much to solve our industrial problems. He is the point of contact between management and men. We could have the best labor policy human mind could conceive, yet, if it was not transmitted from the management down through the foremen to the workers it would go for naught. Taking into consideration these facts our industrial relation program was outlined so that the employment manager and foreman would have to, at all times, work in close co-operation.

We believe the worker to be interested primarily in three things:

Good working conditions. This includes heat, light, ventilation, wash room, shower room, locker room, cafeteria and lunch room, safety first and general shop working conditions.

Fair treatment. The worker not only expects but demands fair treatment and if this is to be assured there should be some place provided in the organization of easy access to the worker where he can go when he feels he is not treated fairly or has a grievance and he can go there with full assurance that he will receive a hearing, that the matter will be adjusted fairly, and that justice will be meted out to all. Our definition of justice is that standard of boundary or right which enables us to give to everyone his just due without distinction. It matters not as to his nationality, his religious belief or his fraternal affiliation. When he comes to our employment office, is interviewed and placed by the foreman on the job, it is the duty of everyone in our organization to see that he is treated fairly and squarely and that he is given a chance to advance insofar as his ability will permit him to advance.

Fair wage. By fair wage we have in mind a wage that is consistent with surounding living conditions, a wage that is fair to employer

and employee and one that the employer can go to the employee and insist that he give a fair day's work in return. Wages should at all times represent work done, ever bearing in mind the avoidance of paternalism, for if there is any one thing any employee dislikes it is the paternalistic attitude on the part of the employer.

With these four points in mind—good working conditions, fair treatment, fair wage and the avoidance of paternalism we outline our industrial relation program and placed the work under the direction of the employment manager who would be directly under and responsible to the general manager of the plant. The duties of the employment department were outlined as follows:

First—To find and recommend for employment by the foreman an adequately supply of help.

Second—To keep accurate records of the performance of every man.

Third—To investigate, consider and bring up for adjustment all cases of inefficiency, discontent and discord.

Fourth—To be informed as to working and living conditions in this industrial district.

Fifth—To regulate causes and manner of discharge.

Sixth—To have supervision of personnel service work, foreman and apprenticeship training, safety first, first aid, accident compensation, group life insurance, mutual benefit association, employees' savings, time study, rate setting, athletic activities and general shop working conditions; in fact, any activities that directly or indirectly affecting the worker's progress in the plant, come under the supervision of the employment department which acts at all times as a service department to the foremen in assisting him to put these activities in successful operation.

The employment department should decide whether or not the applicant is the type of man to employ. It should explain the job and the rate of pay. If he has never worked in a foundry or steel mill before, he should be taken down to the department and shown the job, also the various shop features should be explained, such as, group life insurance, mutual benefit association, employees savings, locker room facilities, etc., after which if the applicant desires to accept the job he should be told frankly that so far as the employment department is concerned we would be glad to have him become a member of our industrial family, however, before going to work you should meet your foreman and we know that he will be pleased to meet you. We will call him to the employment office and after the interview if there is mutual understanding and you wish to go to work we will gladly sign you up. The foreman should have the right to accept or reject any applicant that goes into his department.

The problem of discharge is handled in several different ways throughout the country, some firms leaving it entirely to the executive force, others for a joint committee of workers and executives, others to the shop council, and still others to the labor unions. Personally, I believe the question of discipline should finally rest with the foreman, but there should be such safeguards erected that will insure the worker a fair deal, not that the foreman under ordinary circumstances would not give the worker a square deal, but the occasion arises when, under the heat of passion, he would discharge an employee which he would not have done had he had time to calmly review the circumstances. I cannot conceive of an industrial relations program working out successfully where the Employment Manager hires the help and the foreman fires him. In both instances it should be a co-operative arrangement between the foreman and the employment office. With us if the foreman wishes to discharge or lay off a worker he goes to the employment office and makes out a written report in detail why the employee's services should be dispensed with. After this he and the employment manager go over the details of the case and between them they arrive at decision as to whether or not the employee should be discharged or laid off. In the event the employee is discharged the foreman signs the report and is given the authority to notfy the employee that his connections with the company have been severed. The foreman's written report relating the reason why the employee was discharged is placed in the General Manager's desk. I have briefly stressed the importance of hiring and firing. Whether or not w ewin the worker's confidence and the co-operation of the foreman depends largely how these two problems are handled.

The employment department is a real service department for the foreman and if our personnel work has been a success, and we have every reason to believe it has, it is due to the foremen in our various plants.

We are firmly convinced the way to reach the worker's mind and heart is by giving him a square deal. Men are square and the vast majority of workers want to do right and will respond quickly to a square deal. We know from experience that when our industrial relations department is functioning as it should we have a more staple, better contented and more loyal work force, which gives us reduced turnover, increased production and reduced costs. Last, but not least, better contented workers make happier homes and better citizens.

PERSONAL EXPERIENCES WITH THE PRONE PRESSURE METHOD OF RESUSCITATION

Sydney W. Ashe, General Electric Company, Pittsfield, Mass.

How many of you have ever had the privilege of using the prone pressure method of resuscitation to bring someone back to life? I have trained many in the use of the method, have had those whom we have

trained resuscitate others, have been present when patients have "come to" and have had the privilege of resuscitating them myself.

Everyone should understand the prone pressure method of resuscitation, should practice it and be ready, when the emergency arises, to use it. Many of you go to the seashore or lakes for your vacation. Some of you will be near next summer when someone is drowned. Will you know, when this time comes, what to do? Just suppose some morning you should wake up, smell the odor of gas and find some member of the family overcome. What would you do? The prone pressure method of resuscitation is very easy to learn and can be used by a sturdy 10 year old boy or girl to resuscitate a full grown person.

A few months ago I was talking with a college boy who had been resuscitated after receiving 60,000 volts of electricity and I asked him to describe his experiences while regaining consciousness. He said: "When I first started to regain consciousness, I realized someone was working on me. I could not breathe, my lungs were absolutely paralyzed and as they worked on me and kept pushing the air out of my lungs with regular sequence, I wondered, after each breath, whether I was ever going to get the next breath and I was afraid they would stop before I could regain my power to breathe. After a time I was able to breathe alone a little and was then able to tell them to stop as they were hurting me when they pressed in hard on my floating ribs."

The Theory of Resuscitation

Why is the prone pressure method so successful? Because of its simplicity. When we breathe we think we are sucking the air into our lungs. Instead we are drawing down an arch-shaped muscle known as the diaphragm which separates the abdominal and chest cavities. Then nature, under an atmospheric pressure of 15 pounds to the square inch, fills the lungs.

With the prone pressure method, if we take the unconscious person, place him first on his stomach, arms stretched over head, head turned to one side, straddle him and with palms of both hands press in on the ends of the floating ribs, we press the air out of the lungs. When we relax, nature fills the lungs and thus, by repetition 16 times a minute, just as you breathe, we can produce artificial respiration in an unconscious person better than you and I normally breathe, for we seldom fill the lungs. We simply breathe with part of our lungs. We must take care not to press in on the hip bones or the back bone and hand must be pretty well out. If we practice on a friend we will soon learn to place our hands in the right position and when an opportunity occurs, even though we have never practiced it, we should not wait but try, for even though we are only partially successful, it will help.

It should be remembered that after a person becomes unconscious, time is precious. We must not lose our head and must save seconds. The first few moments are worth hours afterwards, as most cases recover

in the first 15 minutes, although we never stop under one and one-half hours and some cases are on record where patients were resuscitated after three hours of work. It was only a few months ago that our nurse and myself worked on a man overcome with gas, for 45 minutes before he regained consciousness. When the man was first discovered, he had been breathing illuminating gas for about 20 minutes. His pulse was gone, he was limp, respiration had stopped. Our nurse, who was the first to arrive on the scene, promptly had the man removed to fresh air, gave a heart stimulant by means of a hypodermic and started resuscitation herself. She was promptly relieved and we used the prone pressure method on this man for 35 minutes before he gave any indication of regaining consciousness. He then slowly moved an eyelid. Two minutes later he slowly moved a finger. His pulse then started to pick up. He then took a long breath, but would not breathe again. At the end of 45 minutes he took several short breaths and it was important to adapt quickly the prone pressure method strokes to his short quick respiration. Care had to be taken not to push the air out of him when he was trying to breathe it in. His pulse became stronger and after about 50 minutes we tickled him while we were using the method and he then raised his head and wondered what it was all about. All the while we were using the prone pressure method, our nurse administered oxygen to this man. We carry a small tank of oxygen in our ambulance. Oxygen is especially valuable in gas cases.

We have mentioned previously the function of the floating ribs in this method. What are the floating ribs? There are twelve ribs on each side and only ten of them connect with the backbone and breastbone. The two lower ribs start with the backbone, but go only part way round. It is on the ends of these ribs that we place the palms of the hands. When we press with our hands by throwing our weight forward on these ribs they act like a pump handle, press the lower organs up against the diaphragm and force the air from the lungs. When we relax, the ribs spring back.

Increasing Lung Capacity

Someone may ask why we stretch the arms over the head. By so doing we increase the capacity of the lungs about 30 per cent. It is possible to get 30 per cent more air into the lungs this way than when arms are by the side. This is perhaps why some of us like to put our arms over our head while we sleep at night, although some doctors claim that sleeping this way is a strain on the heart.

We should bear in mind, particularly with electrical cases, that when the person is revived, many times he will be delirious. In one case I know of it required six strong men besides myself to hold a big heavy man down on a stretcher, until he could be sent to the hospital. In other cases they wanted to fight their rescuer.

It is also quite important to have the second person who arrives on the scene open the patient's mouth, draw the tongue forward and remove

any objects that may be in the mouth and which might clog the throat—false teeth, chewing gum, buttons, etc. The body should be kept warm with blankets, and the feet and arms massaged. When using the prone pressure method, we must not allow anyone to interfere and substitute resuscitation devices such as pulmotors. Time is precious and while there are cases on record of the successful use of resuscitation apparatus it is much better to have a thorough knowledge of the prone pressure method and know how to use it quickly in emergency than to rely on some device which will require time to locate.

Let me cite an unfortunate experience which illustrates this point. Several years ago a young apprentice boy whom I had trained in the use of the prone pressure method was sleeping rather late one morning in a tent on the shore of a nearby lake during his vacation. He heard people shouting that a man was drowned. This boy was an excellent swimmer so he swam out near the spot where the man went down, saw the man on the bottom, entangled in the weeds, dived down and brought the body to the surface, placing it in a nearby row boat. He started to use the prone pressure method on the man in the boat. The man who was drowned had eaten a hearty meal a short time before and the prone pressure method started to clear the lungs of water and the stomach of food. After the boy had given a few strokes of the method, some men in a launch came up near the boat. They took the body from the boy and carried it about half a mile across the lake to a dock. Then they re-crossed the lake and telephoned for a pulmotor. It was fully an hour before the pulmotor was secured and applied to the man who was drowned. By this time it was impossible to bring the man to. We do not know whether he could have been resuscitated had the boy kept up the use of the prone pressure method but it is certain that the boy was doing a good job and if there had been the slightest chance for recovery he would have brought the man back to consciousness, for he was an alert lad and was well trained in the use of the prone pressure method of resuscitation.

Value of Training Workmen

In the fall of 1913 I had the pleasure of training about 400 foremen and assistants in a large industry in the use of the prone pressure method. These men were selected from every department, irrespective of the hazards in that department. A few months later three people were shocked in places where one would hardly expect them to receive a shock and each of these persons was resuscitated by our trained men who, prior to that time were absolutely unfamiliar with the method. Seven others have been resuscitated by this same group since that time.

Last fall I had the pleasure of speaking before 300 foremen in the Central High School, Springfield, Mass., on "The Prone Pressure Method of Resuscitation." This lecture was given under the auspices of the Springfield Safety Council. On March 7th, I received the following letter.

THE FISK RUBBER COMPANY
Chicopee Falls, Mass.

March 6, 1924.

Mr. Sydney W. Ashe,
Pittsfield, Mass.

Dear Mr. Ashe:

I am writing you today in connection with an accident at our plant, March 5th.

You will be pleased to know that your lecture given in Springfield on the evening of March 4th aided materially in preventing what might have been a fatality.

One of our workmen was assigned the task of emptying a large tank car of naphtha. He removed cap from drain pipe underneath car. Due to faulty operation of valve, the naphtha came out with a rush; man tried to replace cap by hand, but found it physically impossible. During this operation clothing of the man became thoroughly saturated. Several fellow-employees gave their assistance and cap was replaced. Due to rapid evaporation of the naphtha, the man became alarmingly chilled. He was helped back to the factory and brought indoors where men removed soaked garments. Nevertheless, he was suddenly overcome by the fumes and collapsed.

The shift foreman who attended lecture of the previous night immediately applied the prone pressure method of resuscitation reviving man, after which he was sent to the plant hospital and later removed to his home.

Sincerely yours,

Arthur M. Partridge.

Mr. Scagliarini, the shift foreman who rescued the worker, says:

"In mind, I was thinking of administration of the prone pressure method of resuscitation of which I had seen bulletins and pictures, but had never seen demonstrated until the night of March 4th. At that time I attended a meeting of the Foremen's Safety School where a lecture on this subject was given by S. W. Ashe. I told fellow workmen to stretch arm out full length, folded the other arm under man's head, noticed he was not breathing, felt of pulse, no response; listened for heart beat, no response. Mouth was open, tongue was in good position. Straddled man and started pressure method. Did not count at first; noticed that man felt very cold. Worked on man about five minutes, noticed him breathe for first time. One minute later, he breathed the third time. Then breathed 10 or 12 times very fast and gradually began to breathe regularly. Tried to press

on man to keep time with his breathing. Worked on man in all about 20 minutes. When nurse arrived, man was conscious, but weak and very cold. He was then taken to plant hospital on stretcher.

Presentation of Medals

The following statement was made by James Finn, the man who was resuscitated: "My clothing was saturated with naphtha and I felt terribly cold and returned to pipe shop with fellow workman. The general foreman met me and told me to remove saturated clothing. I remember taking off my overalls and nothing more until I became conscious of lying on the floor with somebody holding me, pushing against my back. I tried to speak, but could not. I thought of my family. I had severe chills. I was glad when I arrived at hospital and felt warmth from blankets and hot water bottles. I had hard work to breathe.

On July 17, 1924, Mr. David S. Beyer, President of the Liberty Mutual Insurance Company, awarded to Miss Ina MacInnes, nurse in charge of the Emergency Hospital at the Pittsfield Works of the General Electric Company a gold medal in appreciation of her prompt service which was responsible for the resuscitation of Tony Mininsky in January of that year. When Miss MacInnes arrived on the scene, Tony was in an enclosure filled with illuminating gas under the foundry floor where he had been for the previous 20 minutes. His fellow workers were afraid to touch him thinking he was dead. She made them get a ladder and carry Tony to the atmosphere. The enclosure caught fire when they were removing him. It was at noon and only a few people of foreign birth were near, so Miss MacInnes started resuscitating him herself. Tony was stiff, no pulse, no respiration. We relieved Miss MacInnes in about two minutes and worked on Tony for 45 minutes, as previously stated, before he regained consciousness. In awarding this medal it will be our practice to give it to the first person that helps in saving the life. In this way it will encourage prompt application of the prone pressure method in time of emergency.

DISCUSSION

MR. E. S. CHAPIN (Pennsylvania R. R., Philadelphia): To locate the floating rib take the width of your hand above the hip bone and you have it.

MR. BARROWS: How do you administer the oxygen?

MR. ASHE: There is a little thing we put in the end of the tube, and on the side of the tank we have a little gas receptacle with water so the oxygen will bubble through it, and you see the rate at which it is going. Then we stick it to the nostril.

QUESTION: Do you give any artificial stimulants?

MR. ASHE: We always give a hypodermic. You don't have to. That helps a little. The artificial respiration is 95 per cent. All these other things probably help you a little.

QUESTION: Suppose you began with the prone pressure method and somebody brought up a pulmotor.

MR. ASHE: Anybody who starts working on a man must be left alone. We have had several cases where they have brought a pulmotor in and made the fellow get off and the man has not come to life. We don't want any mechanical apparatus used, because we are sure of this method, and while there is no doubt that some of the apparatus has done good work in the hands of skilled people, we feel that our system has been a success and we don't want to change it.

QUESTION: Is it better for the man who starts working to continue?

MR. ASHE: Have somebody stand along side of him so he can pick up the stroke. In a bad case it is better to have two or three people that are unusually well skilled in the method.

ADJOURNMENT

Annual Banquet

October 2, 1924

Right Rev. Dr. Charles E. Woodcock, Toastmaster
Bishop of the Episcopal Diocese of Kentucky, Louisville, Ky.

PRESIDENT LEWIS A. DeBLOIS: The National Safety Council has perfected a wonderful piece of machinery for drawing new persons into the Safety Movement, but its mechanism for getting rid of the old ones is singularly defective, and for that reason, because our machinery works so slowly, you are yet to hear, I am sorry to say, considerable more discourse from the retiring president tonight.

First of all, I think our respects are due to the women of the City of Louisville, who have been our gracious hostesses during this week, and to express to them the appreciation of the Council we hand to Mrs. George R. Newman, the general chairman of the women's committee, this little bouquet.

MRS. GEORGE R. NEWMAN: I can't say anything that would be in the least fitting on such an occasion as this. I am almost overcome. What little I have been able to do to make you welcome in Louisville has been just an expression from all the other women who worked with me and all the people in Louisville. We are so glad to have had you and to have helped to entertain you. In my heart and the hearts of all of us I am sure we have tried to make you welcome.

I certainly thank you for this beautiful appreciation of our feeble efforts.

PRESENTATION OF COMMUNITY COUNCIL ATTENDANCE CUP

PRESIDENT DEBLOIS: The next item is this cup offered by the Council to the local safety council having the best attendance at the Congress. The attendance is based on the number of persons representing the Council in question and the distance traveled. I will read to you the five highest scores. A score of 58.2 points to the Beloit, Wis., Council. A score of 58.7 points to the Pittsburgh local. A score of 60 points to the Nashville Council. A score of 64.3 points to Springfield, and a score of 71.4 points to the Battle Creek, Mich., Council.

ANNOUNCEMENT OF ELECTION

The next item of business is for the retiring president to announce the result of the election.

The following were unanimously elected members of the executive committee at large to serve until the annual meeting of members in1925:

C. B. Auel, Westinghouse Electric and Manufacturing Company.

Charles B. Scott, Bureau of Safety, Chicago.

Walter G. King, American Optical Company, New York.

George T. Fonda, Fonda-Tolsted, Inc., New York.

C. E. Pettibone, American Mutual Liability Insurance Company, Boston.

Lew R. Palmer, Equitable Life Assurance Society, New York.

Major H. A. Reninger, Lehigh Portland Cement Co., Bethlehem, Pa.

Homer E. Niesz, Commonwealth Edison Company, Chicago.

Harry M. Webber, Illinois Bell Telephone Company, Chicago.

A. L. Watson, Hooker Electrochemical Company, Niagara Falls, N. Y.

E. W. Beck, United States Rubber Company, New York.

Harry A. Adams, Union Pacific R. R., Omaha, Neb.

James P. Barnes, Louisville Street Railway Company.

Dr. Otto P. Geier, Cincinnati Milling Machine Company.

Also the following representing sections of the National Safety Council:

Charles E. Hill, Steam Railroad Section.

George E. Sanford, Woodworking Section.

Thomas H. McKenney, Metals Section.

David Van Schaack, Public Safety Section.

Dr. A. D. Risteen, American Society of Safety Engineers, Engineering Section.

A. W. Whitney, Education Section.

W. F. Austin, Construction Section.

In addition to these there will be seven members of the executive committee delegated to service on the following local Safety Councils: Springfield, Syracuse, Wilmington, Del., Memphis, Cleveland, Grand Rapids, Kansas City.

Those 28 members, together with the two immediate past presidents, make up the executive committee of 30 members.

I spoke to you a moment ago of the inadequate machinery of the National Safety Council for getting rid of old warhorses. We have no glue factory. You realize this when you have heard the results of the election of officers, because all the old stand-bys that we can't get rid of are with us yet, and until we develop the right type of machinery I think we will always have them. That, between ourselves, accounts for the strength of the National Safety Council, even if I do say it.

Strange to say, your new executive committee elected as secretary and general manager, Mr. W. H. Cameron. Please realize that last year he

was a mere managing director. Now he is secretary and managing director.

We have with us the following vice-presidents in certain departments:

Major H. A. Reninger, vice-president in charge of industrial safety.

Lew R. Palmer, vice-president in charge of public relations.

George T. Fonda, vice-president in charge of local safety councils.

David Van Schaack, vice-president in charge of public safety.

C. B. Scott, vice-president in charge of finance, and treasurer.

Lewis A. DeBlois, vice-president in charge of general activities.

I have reserved for the last, of course, the greatest of the announcements, and your executive committee has selected this year a man who I know, from long yars of association with him, will care for the Council as zealously as any man could. This past year he has not missed a single executive committee meeting, and the past president is ashamed to say that he cannot make any such claims.

The executive committee has selected a man for you who holds the National Safety Council close to his heart. He is able and well fitted to perform the duties that a President should perform. He has had years of experience on the executive committee and he has had years of experience in the industrial safety field of a great corporation.

So it is with great pleasure that I announce to you the unanimous election by your executive committee for the office of president, Mr. C. B. Auel.

RESPONSE OF PRESIDENT-ELECT

MR. C. B. AUEL: Mr. DeBlois, Ladies, Gentlemen, and may I go further and call you friends: I shall not attempt to express my appreciation of the signal honor conferred upon me in my recent election to the presidency of the National Safety Council.

I can, however, and do pledge you my best efforts to maintain the Council at its already high level and, if possible, to raise it. In these efforts I have been promised the heartiest support of those with whom I have been intimately associated in the work of the Council during the past several years, and of the Council's most competent staff.

Yet I want something more. I want your cooperation and the cooperation of those whom you represent. You have been so fine in the giving of your time and experience, one here, another there, serving on committees, helping us on our safety bulletins and on our safe practices pamphlets, speaking at safety meetings, and assisting us in various other ways, that I have no hesitancy in asking, on behalf of the Council and on my own behalf, for your continued support.

In recompense you will have the eminent satisfaction of knowing that you are pioneers, the vanguard of the movement now forming, than which there can never be anything higher, having for its object the lessening of human misery through the conservation of life and limb.

It takes no prophetic foresight to state that this movement is designed to sweep the world, and at no distant date, and answer, in so doing, that age-old query, "Am I my brother's keeper?" in the only way an all-wise Creator would have it answered.

For and in this cause, good friends, one and all, I ask your continued support knowing I shall not have asked in vain.

PRESIDENT DEBLOIS: At the session on Monday morning a resolution was adopted by the Congress which I desire to read to the meeting tonight, because it will serve me better to introduce one of our guests of honor.

"Among the evidences of an awakening national consciousness, there is one which in its far-reaching significance stands out pre-eminently. It is generally known that the Secretary of Commerce, becoming convinced that the street and highway traffic hazard has assumed proportions that constitute a national menace, is preparing to call in December a national conference at which carefully prepared reports that represent the work of months on the part of competent and representative committees will be presented as a basis for discussion and constructive action.

"The National Safety Council has deemed it a privilege to have taken its part in the furtherance of this undertaking, and it is of the opinion that this conference called under such auspices, with the cooperation of all interests, may well prove to be the occasion for the most significant advance that has been made in the field of street and highway accident prevention.

"Therefore, I move that the National Safety Council express to Secretary Hoover its grateful appreciation of the step that he is taking and that it pledges its further support in every way in which it can be of help." Unanimously adopted.

For years the National Safety Council has been interested in public safety and in particular in the bringing about of a reduction in the number of traffic accidents, but it seems to us that what the concerted action of the Allies under General Foch was to the great cause in the World War, will be this effort originated at Washington under one of the cabinet officers of the President of the United States for the cause of traffic accident prevention.

We are very fortunate in having with us tonight the man who under Secretary Hoover directs the work of this conference and all the activities of its numerous representative and national committees. So I take great pleasure in introducing to you Col. A. B. Barber, director of the National Street and Highway Safety Conference of Washington.

CONFERENCE ON STREET AND HIGHWAY SAFETY

Col. A. B. Barber,
Director of the Conference, Washington, D. C.

I bring to you the greetings of the Secretary of Commerce who asked me to advise you of his regret that it was impossible for him to be with you this evening.

The National Safety Council is one of the associations which have participated in the organizing and carrying on the Conference on Street and Highway Safety. It is, therefore, a particular pleasure to me as director of the Conference to report to you something of its progress.

I have heard it said that the Safety Movement is peculiar in that those who become interested in it inevitably become its permanent devotees. The splendid gathering which you have had here in Louisville during these days of your annual Congress is evidence of that enthusiasm.

The first point that I wish to bring to your attention regarding the Conference on Highway Safety is that while it hopes to stimulate the safety idea and produce an additional supply of permanent devotees to the Safety Movement, the Conference itself, is purely an ephemeral gathering. Secretary Hoover has defined as its purpose to lay down a broad platform of the best existing knowledge of the important problems in its field upon which all concerned can agree and thus prepare the way for much needed advances in this direction. It is not a conference designed to engage in elaborate researches, or long continued studies. It is to bring together and put in usable form the knowledge which already is in existence and available in the minds of men. Its aims are to secure agreement upon the great bulk of matters of importance, without waiting to attain perfection in every detail; to eliminate lost motion and waste of effort; to arouse and direct the great volume of public opinion in support of the Safety Movement.

Such a program obviously requires the cooperation of all those who are particularly interested in traffic safety, national and local associations and civic bodies as well as those groups of public officials who are responsible for traffic management in the various states and communities. The leadership of the federal government evidently was necessary and when, last April, Secretary Hoover, deeply impressed with the growing accident toll invited representatives of a number of the most interested associations to meet with him and discuss the situation, it was natural that they should turn to him to head a national movement in which all concerned could join. It was equally natural that, as he began to organize the work, cordial responses should come from those called upon to participate including, besides your own organization, the American Automobile Association, the National Automobile Chamber of Commerce, the Chamber of Commerce of the United States, the American Railway Association, the American Electric Railway Association, the National Bureau of Casualty and Surety Underwriters, The American Mutual Alliance, the

American Engineering Council, the National Association of Taxicab Owners, the American Federation of Labor, the Railway Labor Brotherhoods, the General Federation of Women's Clubs, the Parent-Teachers' Association and other organizations. The official groups participating include the Bureau of Public Roads, The Interstate Commerce Commission, The Bureau of The Census, beside other branches of the Department of Commerce, state highway officials, motor vehicle commissioners and the International Association of Chiefs of Police.

Preparation for Conference

The Conference itself will be called for an early date in the winter, probably in December. In preparation for it, eight committees appointed by Secretary Hoover and including many representatives of your Council, as well as of the other participating organizations are preparing reports and recommendations. It has been my privilege from time to time to meet with all of these committees and thus to get a closer understanding of the problems in their several fields. There are among them a few problems which offer technical difficulties or doubts as to the best solution. I am, however, chiefly impressed by the amount of knowledge that is available and the great and crying need that exists for bringing this knowledge to practical application without delay in the prevention of traffic accidents.

These committees are very earnest in their work. Their members have given extensively of their time and money to carry it on. Each committee seems convinced that its own work is the most important and fundamental of all.

The statistics committee, for example, properly feels that knowledge of what has happened is essential both to arousing public opinion and to determining remedies for the deplorable conditions which exist at many points. It will make important recommendations as to procedure in future accident reporting, spot maps, etc., and in this it will benefit from the admirable work which your own committee has been doing on this subject. The committee on traffic control also, rightly, feels that it has a task of fundamental importance, this being to outline the best methods for keeping reckless and incompetent drivers off our streets and highways and to develop the best uniform rules to govern those who are permitted to drive. The engineering and construction committee finds no less important contributions to make to Safety through widespread application of measures which have been developed in the more progressive states and cities. Standardization of street and highway signs and markings is one of the most necessary of these measures.

City planning and zoning is the field of another committee which recognizes that the relations of traffic needs, congestion and hazards to the design and layout of streets and highways is a fundamental subject, the treatment of which is still in its infancy.

Insurance and education go hand in hand with accident prevention through influence upon the individual and upon the public. Surely, in the last analysis, this is one of the greatest needs.

The equipment and servicing of the motor vehicle is being dealt with by a committee of specialists who will bring to the attention of the driver and the public those points regarding the vehicle, its equipment and maintenance which are of importance to traffic safety. Finally, there is a committee on public relations which will report on two subjects; first, the organization for proper control of traffic and traffic safety which the various states and municipalities should adopt to meet the heavy responsibility which rests upon them, and second, the part which the cooperative organizations and associations can play in developing public opinion and promoting the adoption of the measures which will be recommended by the conference. These committees have now been working several months and their reports are in a well advanced state. They will, as I have said, be submitted to and considered by the general conference when it meets early in the winter.

It is a special pleasure, addressing you here in Louisville, to make acknowledgment on the part of the Conference for the valuable part which has been played in the initiation and conduct of this work by two of Louisville's distinguished citizens—Mr. Barnes and Mr. Hitchcock. Their deep interest and sound judgment on the problems presented to the committees has been of constant helpfulness.

I should also like to make my personal acknowledgments to you and your officers for the assistance in the staff work of the conference which we have had from the director of your Public Safety Division, Mr. Sidney Williams. This staff work is, in the main, being carried on by personnel loaned by the various participating organizations. The experience and ability in public safety work which Mr. Williams has brought to this impromptu staff has been of particular value.

I have been struck by a remark which I hear occasionally that, considering the number of opportunities for accidents, the number of motor vehicles surging along our crowded streets and highways, the accident record is not so bad. Statistics are brought up to show the reduction in number of accidents in proportion to the registration of automobiles.

Likens Traffic Accidents to Old Time Railroad Mishaps

I have little patience with such consideration in the light of all the facts and the need and opportunity for great improvement. Years ago, when railway accidents were common, the argument might have been made that in proportion to the number of opportunities for accident the actual number might be considered small. Fortunately, such ideas were not allowed to prevail and persistent hammering and proper organization has produced a distinguished record perhaps unequalled in the world for decrease of accidents in our train service. There is crying need for an equally effective campaign on our streets and highways.

The outstanding impression which I have as a result of all the consideration of these problems which has come to my attention during the past months is that the traffic problem is primarily one of organization, organization of the official agencies in the states and communities, organization in the sense of uniformity and standardization of practices, organization of education, organization of traffic and traffic safety as specialties calling for expert treatment.

The results of this work can only be brought to fruition through practical application by the authorities and cooperative agencies in the different states and communities. It is for this reason that one of the most essential features of the conference program is the campaign which the public relations committee will outline for carrying the program through to all communities and states. This movement will have its importance not only in the large cities but also in the smaller communities, and many different local organizations must participate. It is confidently expected that there will be close cooperation of safety councils where they have been organized, safety committees of chambers of commerce, motor clubs, local labor organizations, women's clubs, luncheon clubs, and other agencies interested.

The movement, as you will see, is in accord with the purposes of your organization which for so long has been so distinguished a leader in developing and maintaining the ideal of Safety. It is the hope of those who are directing the Conference on Street and Highway Safety that its work may be of real weight in bringing home to the country the need for a solution of the traffic problem and an outline of the direction which it should take. There is already abundant evidence of an aroused nation-wide interest. I am convinced that you will find in it support in the work you have in hand.

ADDRESS OF TOASTMASTER

Rt. Rev. Charles E. Woodcock,
Bishop of Episcopal Diocese of Kentucky

There are some things that you can account for and regard. A poet is born, not made; a fisherman is half born and half made; and a toastmaster ought to be neither born nor made. The one should be distinguished, the second should be distructed and the third should be entirely disregarded.

It is the province of the toastmaster to steal the time of the speakers, to anticipate what they are saying and to spoil all their points, but even with a toasmaster on the program, if you only have patience there may be such a thing as satisfaction.

Do you know, there is always a bright side to everything if you only have the intelligence to discern it. While I had a lot of stories, this is the only one I am going to tell you. One man met another on the street

and said, "Hello, Bill. Where you been? I ain't seen you in ten years."

"Why, I saved up $1,000, and I yearned for them Colorado lands, and I went out there and bought some of those lands."

"Oh my, that's good."

"No, it ain't so good. When I bought them, along came a hot wind and burned up the crops I had."

"My, that's bad."

"No, it ain't so bad, because even if it did burn up my crops, I met a girl that I married."

"Oh, that was good."

"No, it wasn't so good either, because after I married her I found she had the toppinest temper of anybody I ever saw."

"Oh, that's bad."

"No, it ain't so bad because even if she did have a bad temper she had a lot of money."

"My, that's good."

"No, it ain't so good because after we built a house it burned down and we didn't have a bit of insurance on it."

"Oh my, that's bad."

"No, it ain't so bad, because even if that house did burn down it burned up that dinged old woman."

I am very nervous in this position. I feel like that bridegroom after he was asked about 40 questions. I want to say to the ladies that every man I ever married was ten times more nervous than the bride. This fellow had asked about 40 questions, and just as the bride was coming up he said, "Just one more question. Is it kistomary to cuss the bride?"

I have said these things to get you in a good humor. You look a little solemn. A toastmaster is like an ice that is given in the middle of a dinner. It is to arrest the digestion so that you can appreciate what you did have, and give you time to anticipate what is to come. I am the ice.

Before introducing the first speaker I want to warn the speakers that tonight I shall enforce an Egyptian rule. In the ancient days in Egypt when the speakers at a feast spoke to the audience, just before they spoke an hour glass was set before them. (The hour glass I am setting there has got about fifteen minutes in it.) A soldier was stationed behind the speaker with a drawn sword. The soldier watched the glass. He paid no attention to the speaker. The moment the sand expired, with a most powerful sweep of his arm he struck at the speaker's neck. If the speaker had the discretion to cease he lived to tell another tale; but if he lacked that discretion he proceeded to that place where the wicked cease from troubling and the weary are at rest.

A TRIBUTE TO INDUSTRY

Harry Collins Spillman,
Director of Education, Remington Typewriter Company, New York City

The great National Safety Council has grown out of a great changing tendency in life. That tendency has been a disposition to shift away from a concentration on horse-power to a concentration on man-power, and that is what I am interested in.

We are finding today that we must give less thought to mechanism and more thought to organism. We must give more time and attention to human beings and less perhaps to mechanics. We have today a machine that is capable of 27,000 horse-power, but what if that machine should turn upon us like Mrs. Shelley's Frankenstein and wipe out the semi-civilization that created it? Ah no, the greatest wealth in the world doesn't reside in horse-power, it resides in man-power, and all the wealth in the world is resident in man and not in things. So we are very much embarrassed when we find that we have made our things and conserved our things better than our man.

I think of every captain of industry as a great potter standing before the potter's wheel fashioning his forces out of human clay, and if you have saved 100,000 lives, I say that is a conservation record that is a world record, because the wealth of the world is in the man and not in the thing. So I commend you as you start on this great program of first making the body safer for industry or the body of industry safer for America.

The first duty I owe to America is to be a healthy, wholesome animal. Papini, in his "Life of Christ," said that he started out to write a melancholy story about a man who wanted to become God. After he got into that big subject he changed his point of view and began to write about God glorifying himself through a man.

We may know very little about the Creator, but we know that the finest manifestation we have had from the Creator thus far has been His manifestation in the flesh, so we must look first to the flesh, to the flesh power of industry.

When we look at an automobile and see what the automobile can do, then we look at a human machine. I never look at an automobile but what I am ashamed of my own machine, and yet no automobile ever manufactured was as fearfully and as wonderfully made as I am and as you are. But if I don't get the coordination of heart and mind and body corresponding to the coordination and concordance of the automobile. so I say first we want to make the body of industry safe for America.

Making the Mind of Industry Safer

In the second place we want to make the mind of industry safer for Amreica. All progress is mind progress, and I don't know how many times

I have heard that all accidents originate in the mind. I am not going to talk much about that. The high cost of accident and the high cost of living in America is due to this thing we call the mental operation; failure to think straight is the tragedy of the human race, not only in the shop but in the counting room and in the executive department. Ninety-five per cent of the thinking is done by five per cent of the people.

Then, there is something else besides the body and the mind of industry.

"What does it take to make man complete
From the crown of his head to the soles of his feet,
With naught to subtract and nothing to add,
Not a man too good nor a man too bad?
Is a man but an eye and a leg and a boot,
And a tongue and a nose and a cheek and a throat?
Is there no heart, no brain, no conscience, no soul?
Is there no heart, no brain, no conscience, no soul?
Is the hunch-back, the deaf, the mute and the blind
The only unfortunate the frail world can find?
Is there no petrified heart and no brain out of plumb,
No conscience deep-scarred and withered and dumb?
Is it miserable gristle in place of the spine,
And the shrunken ideal and the hope out of line,
The twisted desire and the wish-washy will?
Why are these no cause to suspect that the make up is ill?
Then give us the vision to look through the skin
And see the devoids that may lie within.
A crack on the inside when the outside is whole,
A warp in the heart and a limp in the soul."

Oh yes, we must make the heart of industry safer for America, and I say to you that we need, tragically, in America a surcease from the toil that brings no joy. We need that very badly. What could be better for a man than that he should eat and drink and make his soul joyful in good labor?

I sometimes wonder if Jesus Christ, the great Master Workman of all, as he went about his carpenter shop in Nazareth, wasn't comparatively unacquainted with accident because he was positively acquainted with the love of labor.

A man going along the right of way of one of our western railroads came to a turn and came upon a great drawbridge. He saw a man standing by with his face wreathed in smiles. He said to the laborer, "Why are you so happy?"

"I am just thinking I am the most successful man in the world."

"Why? How is that? Am I addressing the governor of this commonwealth or the owner of this right of way?"

"No, I am neither of those, and yet I am greater than both. See the drawbridge spanning this river? For 20 years I have been the keeper

of that drawbridge, and never in all the years and days and hours of my labor has a locomotive approached and found that drawbridge open. Whatever my hands have found to do I have done with diligence."

It is not the size of the job, it is not the money in the job, but it is the manner of doing the job that makes it great and makes it safer than it is. And the heart of industry must be safer for America.

Life Can't be Made Safe

You can't make industry safe because you can't make life safe. Life is a hazardous adventure. Life and danger are corollaries, and you can't escape with one without the other. I don't ask the Creator to make me safe, and I don't expect it. But oh how I wish the Creator would make me unafraid in order that I might be comparatively safer than I am through my courage in my job.

What are you going to do with this vast army of men and women who are handicapped by accident but not killed? I ask that question because during the war I happened to be connected with the United States Government in the great work of rehabilitation, and I saw 200,000 heroes come limping home from the battle places of Europe to lay upon the altar of our hospitals and our schools all they had left of what they had laid upon the altar of their country. I say to you that the rehabilitation of those men, the spiritual and material rehabilitation of those men, passed on and multiplied in the industry of America, will in a very short term of years pay the cost of a war in the salvation and re-creation of man-power.

We found out something very important about that. We found out that the proper way to evaluate a man is not in terms of his infirmity but by the measure of his capacity. That is the way to evaluate a man. Don't always think in terms of what he has lost. What about what he has left? That is what the government found out. It is a marvelous thing that a man is no longer the only machine we have not learned how to repair.

What are you going to do toward the repairing of your heroes? I don't know what you found out, but we find right along that the trouble in America was we had to rehabilitate the minds of the public with reference to handicap. They said, "Get these disabled men off to themselves. They belong in a category by themselves."

When you have a man come limping back to your office, a mere fragment of a man, there are three things that I wish you would tell him for me and for the United States Government. In the first place, I wish you would tell him he is not in a category by himself. I wish you would tell him that handicap is the common denominator of the race, and no man has escaped it. We have no perfect men in industry or out of industry. We never had but one example of perfect manhood, never but one; not in 2,000 years has a man come forward who was up

to specification. So you tell him to thank God every night he is not perfect, for if he were perfect no one would love him. If he were perfect he would be lonesome. If he were perfect he would be a man without a country, he couldn't function with society that is orderly only because it is imperfect.

The work is done by the blunderers of the country, by the inexpert, by men who are sick and weak and don't feel good. If it isn't so, how do you analyze Daniel Webster, Julius Cæsar and St. Paul, to mention none of the many others?

If you have an idea tonight that you are perfect or that you know anybody who thinks he is perfect, let him go up and take the scientific Bertillon test, and if he is within 70 per cent of normal let him take Dr. Thorndyke's psychology test. You probably will find out he deserves the sympathy of the entire community.

Economic Advantage in Handicap

In the second place, tell him there is an economic advantage sometimes in handicap. Dr. Blackford says that three out of every four men engaged in industry are working in the wrong job, and Harrington Emerson says that not one man in ten is working in the job he ought to have. If that is true, sometimes handicap may justify itself in the economic scheme, if it arrests a man in his conquest against nature and sets him in the work along lines of least resistance. Sometimes there is an economic advantage there.

In the last place, I wish you would tell him that sometimes there is a philosophic triumph about sorrow and handicap. You hear a woman say, "I feel better. I've just had a good cry." She doesn't understand the physiological arrangement back of that, but it is true. Only from the wounds and bruises of our nation have come its healing, only from its suffering its greatness, only from the dark chambers of our anguish have emerged our abiding comforts and our graces.

What is true of the nation and the state may be true of the individual That which is painful to my body may become profitable to my soul. Pope said, "My back is crooked, but my verses shall be straight," and Robert Louis Stevenson never drew a well breath through his body, but he lived to see the world made over after his own ideas.

What are you going to do with this great crowd of noble heroes that are coming in? That is the conservation side of industry.

This story and I am through. The Rainbow Division had charged at St. Mihiel. A hero, battle-scarred and lingering just in that sphere that separated the living from the dead, was wheeled back into a base hospital and out into a room of ominous witnesses and silence. They applied the anesthetic and went about the horrible task of the mutilation of his body. After it was over, one of those angels of mercy who made such

a great contribution to our war laid the linen back from his face and said, "Well, my hero, how is it?"

"Oh, I feel quite fine today. But by the way, what did you do to me?"

"Oh," she said, "not today. Next week or the week after. Wait a while."

"I am not afraid. Come, tell me. I wish to know. What have you done to me?"

She laid her hand gently upon his forehead, for she saw he would not be denied. "Well, my hero, if you must know, we had to take off both of your feet."

He smiled through his tears and said, "Isn't that wonderful? Isn't that remarkable! I offered you my life and you only took my feet."

Tragedy has no weapons against a hero like that. All power to you gentlemen in your noble industry of making tragedy less in industry, of eliminating as far as possible hazard, of making the body and the mind and the heart of industry safer for America.

But remember when you have done all you can do, there will still be accidents enough left. A thousand years from now humanity will be carrying its cross over the ruddy and crimson trial to Golgotha.

Tonight I pay tribute to those heroes who are going to bear that cross cheerfully, nobly, triumphantly, and I would like to say of them tonight, and for them and even for ourselves in the spirit of the invictus:

"Under the bludgeonings of chance
I shall not wince or cry aloud.
In the fell clutch of circumstance
My head is bloody but unbowed.
"It matters not how straight the gate,
How charged with punishment the scroll,
I am the master of my fate,
I am the captain of my soul."

THE SAFETY ENGINEER—HIS PRIVILEGES AND OPPORTUNITIES

H. W. Foster, Brown, Crosby & Company, Philadelphia, Pa.

I welcome every opportunity to emphasize the privilege one has in safety work to make a real man of oneself as well as to render worth while service. I am going to talk chiefly about the man-building aspects of work in the accident prevention field. I want our safety men to have a clearer picture of their privileges and opportunities. It is a condition precedent to getting into safety work, and particularly to remaining in it, that a man must be animated by a real desire to abate the wastage of life, limb, health, happiness, and efficiency that follow accidents of every kind. There must be crusader blood in the safety engineer or he

will never rise to great heights. But no one ever became a leader in any worth while cause just because his emotions were stirred. He had to study his subject, plan his campaign, go into action and stay in action no matter how hard the fight or discouraging the results, keep his courage, his faith, his humility. The fact that effective safety work requires these things of a man will never discourage a worthwhile worker in the cause. To make good in our field, a man must see the problem and difficulties before him, as well as the achievements and satisfactions that are obtainable.

The man who takes a new job, as well as the man already in a line of work, hopes, if he thinks clearly, for certain privileges: to be able to apply the experience he already has, to learn a lot about the new business, to do worthwhile work, not to be duly hampered in his work, to become widely aquainted with his fellow workers, to get along happily with them, to have his work known at headquarters, to secure promotion. Now let us see how nearly a job as safety engineer comes to meeting these specifications for virtually the ideal job.

There is no argument that almost everything a man knows about anything is useful in the accident prevention field. He needs engineering training and experience to cover building layout and construction, machines and machine operation, handling of materials, repair problems, and transportation questions. He needs medical knowledge to look after sanitation, hygiene, ventilation, physical examinations, and first-aid. He needs organizing ability and personality to handle properly safety organization, education of employees, and publicity. He needs to know his plant requirements in man-power to be able to assist in the selection of employees and their assignment to suitable work. He needs legal understanding to establish underlying accident causes, to handle compensation and liability law problems and claims. Other items could be added; my purpose has only been to point out how varying the requirements of the job may be. A safety engineering job calls then not only for the application of all a man already knows, but also for continuous hard work to secure the additional knowledge required to meet his opportunities. It builds him not only in a technical sense but also in a human one. He gets to understand the points of view and the natures of many types of men; he knows how to influence them in a worthy way, perhaps the greatest privilege a man can have.

Service is Safety Engineer's Goal

No man can grow in uselfish labor without benefit to himself, but in a real safety man service is the goal, not personal advantage. In what is commonly, and perhaps properly, termed a materialistic age, it is a delight to find literally thousands of men and women engaged in so altruistic a cause.

How fortunate a man is in accident prevention work; he is virtually forced to grow in store of knowledge, and he is in a profession where

just about the greatest joy any one worker has is to transmit what he has learned to someone else who can use it. As we know, this is not always the case in other fields of work. A man in the safety field finds that it is literally a case of "Seek and ye shall find, ask and it shall be given unto you." Professional jealousies are virtually unknown in safety work. There is more real honest-to-goodness brotherliness in the Safety Movement than in any other of which I know. No man need be suspicious of his neighbor or fear that he will do him harm.

The safety engineer needs specific knowledge. This can only be secured by digging. He is always up against hard headed men who even if friendly, raise every possible objection to his ideas. He has to prove his point. He can't get by with a bluff, like the one attempted by the Yale engineering student who had put in more time socially than scientifically. He was asked by a professor "what is mineral wool?" and he answered "it is the fleece of the hydraulic ram."

One experience that is very rapidly and very frequently brought home to the worker in the safety field is that no matter how much he may know about the subject, he must be careful not to over emphasize his particular specialty. It is painful but true that in the minds of the operating force, other things, certainly in the aggregate, assume greater importance than safety. It is furthermore true that undue emphasis always weakens the results which otherwise might have been secured.

Another experience which the safety engineer ultimately acquires is that it is not possible to talk a subject all the time, even if he holds himself down to moderation in statement. You can get excellent results often by saying nothing. Everybody knows you are boosting safety. I suppose there is nothing in the world that will make a safety engineer more solid with a foreman whose accident record has been going against him and who expects a "razzing" than to have the safety engineer pay him a visit and talk baseball, lodge initiations, fishing, and never for a moment speak of accident prevention.

The Fallacy of Egotism

In many instances, the safety engineer rises very rapidly. Having a subject in which the management is interested, with the entire plant open to his review, with the tremendous help which the experienced men in each department can give him, if they are properly approached, it is not surprising if we occasionally find an example of a man who has somewhat lost his balance because of the responsibility which he carries, the authority which he has, and the results which he has been able to achieve. Of course, we know that there is nothing more disliked than a case of "swelled head." A man is certainly riding for a fall and the cause which he represents is bound to suffer. A man should be grateful for his opportunities; not boastful of his successes. A man of ordinary calibre can never hope to get by on an egotism basis.

The relations of the safety engineer to the plant organization involves much of diplomacy. Many a man has found that the unguarded word is more dangerous than the unguarded gear. The safety engineer very quickly finds that he is judged by the results secured in the plant, and these results are far greater when a lot of people are helping him than when he is trying to carry the burden alone. He drops little suggestions; he asks leading questions; he becomes enthusiastic over ideas which show willingness of spirit rather than brilliance of intellect; he does everything he can to make the organization feel that the job and the credit are theirs; that he is the only medium through which some of the work can be accomplished.

One aspect of the safety engineer's work is to prove in a palatable manner how erroneous are certain opinions of men older and, frequently, more important than himself. It requires diplomacy and courtesy of no mean order to put things of this kind over and to leave no bad taste behind.

The poof of what I have been saying about the privileges and opportunities of the safety man is found in the results which have been secured by members of the National Safety Council. This record, of necessity, is not complete, but it is extensive, inspiring and it continues to improve. Let me cite a few examples:

The United States Steel Corporation, greatest of industrial corporations, dates its records from 1905, and uses the previous five years as a basis. Under the guidance of Charles L. Close, that stalwart friend of safety and of the National Safety Council, its record may be summarized as follows:

(a) An average during the past 17 years of over 200,000 employees.

(b) One hundred and thirty full-time safety men and thousands of safety committee members.

(c) Annual expenditures of, approximately, 1,000,000 per year.

(d) Prevention of serious injuries (35 days or more of lost time, dismemberments, and deaths) the past 17 years, 39,374.

(e) Prevention of disabling accidents the past 11 years, 244,588.

The corporation runs continuously monthly no-accident contests. In 1922, 844 no-accident months were rolled up by the plants; in 1923, 1,152; so far, 1924 is running at the rate of 1,400 per year. I know that this achievement in safety work is the proudest, happiest one in the history of that great corporation.

The duPont Company, whose safety work is headed by our president, Lewis A. DeBlois, in the years 1912-22, cut down its non-fatal accidents over 75 per cent and has, through organized safety, saved 864 lives.

In 1921, the H. H. Robertson Company, of Pittsburgh, headed by a man who in our early days in particular, did yoeman service for safety,

worked 285,000 man hours and had not a single accident that prevented a man from reporting for duty the next day.

The Louisville Railway Company, whose president puts behind safety his big frame and his enthusiastic spirit, bases its safety results on car miles run per accident. Everything where there is the remotest chance that men or equipment have been at fault is called an accident. When safety work was begun systematically three years ago, the car miles per accident averaged 1,800. Now they average 7,600 miles. One winning car house hung up a record for one month of 78,000 miles per accident.

Opportunities Are Unlimited

I could cite scores of other cases just as convincing, just as inspiring. It takes a combination of ideals, knowledge, money, and everlasting team work to get real results. The day has long since passed when anybody could blame a bad record on fate.

My first speech before the National Safety Council was made at Chicago, 10 years ago. In the closing paragraph I said "A profession that makes of a man so many requirements, and at the same time holds out to him such opportunities of acquiring detailed knowledge of almost every phase of industrial life, as well as business and engineering balance, is a profession in which a man never reaches his goal, and one in which the engineer need not worry about limited opportunities. The true measure of a work is its opportunity for constructive service, and by this standard accident prevention engineering is in the front rank of the professions. The man that gets results is appreciated, and a roll call at the fifteenth annual meeting of the National Safety Council will show that many of the safety engineers of today have become the big men in industry and transportation of that day.

One of the great privileges of my life has been the friendship of a considerable number of men who have been active leaders in the Safety Movement. It has been my privilege to know their jobs, their troubles, their joys, their standing, their income. It has been an unalloyed delight to see them grow in mental stature, in capacity to put over big things. Not all are in accident prevention work, but wherever they are, they back safety to the limit. Their earning power has kept pace with their capacity. I could name a score of men in this room whose incomes in the last 10 years have been multiplied three, five, yes 10 times, but if you were to ask them what gave them the most happiness, their answer would be not heavy responsibilities, not power, not large incomes, but command of a subject that they love, respect that comes from playing a clean game, warm friendships that have developed in their work, and the knowledge that through safety work they have conserved to many of their fellowmen the opportunity to pursue our American ideal of life, liberty, and happiness.

THE SPICE OF LIFE

Strickland Gillillan, Baltimore, Md.

There was an occasion a summer or so ago when William J. Bryan (you may have heard of him; he is a brother of Charlie) was out on a chautauqua circuit. Don't worry—he wasn't out much. That summer and the summer before he had been suffering from a serious obsession. He had taken up the habit of talking two hours on some subject on which he knew something, and then changing and talking about evolution. He absolved the monkeys of a heavy responsibility. He absolutely exonerated them from the serious charge of having had anything whatever to do with our ancestry. He must have taken a heavy load off of the simian chests and conscience by doing that.

On one occasion Mr. Bryan had to leave town at 8:45 at night to make his next engagement. They put on a local ambitious politician to introduce him. He introduced him until 8:30. That left Mr. Bryan 15 minutes to do his stuff and catch his train. He caught the train, and when the crowd was dispersing one member of the crowd said to another member of the crowd, "What did you think of Bryan's lecture?"

"It was all right. And that old bald-headed boy that spoke last wasn't so rotten either."

I am not going to give you any information tonight. Three rousing cheers! I have a good many reasons for not giving you information. One reason only will I mention—the underlying, basic reason of the whole business; that is I don't know anything to tell you, I don't know any more than you do. I said that with the hope of arousing your pity, not your mirth. If I didn't know anything to tell you I wouldn't do it, you wouldn't believe me. The only way to get along pleasantly with people is to tell them something they already know, and then they think you are smart because you know the same thing they know.

One of the reasons I don't give you information is that I am so leery about facts. Facts are hard to get at. It is mighty hard to get any fact nailed down so you know it will stay put.

The real humor of every generation is written by the scientists of precious generations. Our humor is ephemeral; their's is permanent and gets richer as time goes on. An eel that has just had a bath in some motor oil of peculiar viscosity is a non-skid proposition compared to a fact, so I don't attempt to handle them.

I am not sure I could remember facts. Do you know, we were brought up on the theory that we ought to swat the fly. The scientists now tell us, "Don't swat the fly; it scatters germs everywhere." Some of us remember when tomatoes were rank poison; everybody knew they were poison because everybody said so and everybody believed the scientists said so. If you ate one of them it would kill you. We know better than that now.

As I said, I don't know that I could remember a fact long enough to tell it to people and get it straight. Memory is a serious thing. I never took one of those memory courses at all. I looked over one of these Addison Sims of Seattle prospectuses of one once, and I saw if I could remember all the things I needed to remember to get that first lesson I didn't need the course.

A Case of Poor Memory

Even those memory systems go back on you; they play you false. I know a fellow who met another on the street one day and said to him, "My memory is shot; it's a total washout."

"Umm! Bad as that?"

"Worse than that. I can't remember a thing that I want to when I want to. To just show you how bad it is, I have been boarding at that one place ever since you have known me, and I can't remember the name of my landlady."

"That's worse than I thought it could be. But don't worry because if you worry you'll go crazy. You can run around loose a long time with a punk memory, but go crazy and see what they do with you! Besides that, you don't have to worry; they have memory systems. I belong to a memory class. They are all based on the association of ideas. You take the thing you want to remember and attach it firmly in your mind to something that is so intimate and familiar to you that you couldn't possibly forget it. To show you specifically, I know that lady. I boarded there a while. Her name is the Widow Drummock. There's a perfectly simple way to remember that. 'Mrs. Drummock fills my stomach.' You have been eating there 15 years or more. You couldn't forget your own stomach."

"That's right, I couldn't." He went home saying that over to himself.

"Mrs. Drummock fills my stomach, Mrs. Drummock fills my stomach," and went to sleep that night with that as a lullaby. He was as happy as could be; his burden was rolled away. The next morning he walked into the dining room very joyfully and said, "Good morning, Mrs. Kelly."

Here is a case in point of a man with a memory system that I defy you experts, psycho-analysts and engineering specialists to figure out. This fellow lived in Baltimore. He had been drinking something. I don't know what it was; he didn't either. It was something he had got from somebody, Japalac or Valspar or some other interior finish. He went into a drug store, and seeing in there a show-case which seemed uneasy and restless and moving about, he leaned up against it to steady it. When the druggist got through whatever he was doing he went around to this fellow and said, "Well, sir, what can I do for you?" He said, "It depends absolutely on what you have got."

"Well, I suppose we have almost everything here you would expect in a well-regulated, law-abiding pharmacy. We have a full line of toilet articles, medicines, perfumes, some stationery, smoking materials, and everything of that kind, and a little bit of confectionery."

"You haven't told me anything. I came in here, understand, for some specific article and I've forgot what it is. If you just name over everything you've got in your place, I'll tell you when you name it."

"Well, that would be all right, but I have so many things and so many little articles that I might overlook the very one that you want; that might not work. I would like to do it but I'm afraid it won't work."

"That's all right, I understand, your point is well taken, but if you can't do that, name the Great Lakes."

"Name the what?"

"Name the Great Lakes! You heard me the first time."

"Well, there's Superior, Huron, Michigan, Erie—"

"Stop! That's the one, Erie. That's a lake, all right. You're an educated man. What was the name of that guy on Lake Erie, that fighting guy, that the fellow said, 'He met the enemy and they were hissen'?"

"Oh, I guess you must mean—you must mean Commodore Perry."

"Give me ten cents worth of paregoric."

Getting Things Mixed

As I say, I am not sure I could remember facts and keep from getting them mixed. Sometimes we leave some facts peaceably nibbling in a corral and go away and then come back and don't know one from another. I know some terrible things that have happened through getting things mixed. A young man was invited out one evening for dinner at the home of a mutual friend with another young man. He was just at the onion age, beginning to go out with the girls, easily scared, bashful and self-conscious.

They took it for granted he had been taught to say grace, which he had not been taught, unfortunately. They called on him to ask the blessing. He was stampeded right. He was too scared to even say "Excuse me." He couldn't do anything but blunder. He rattled off some sort of formal grace that seemed to be trickling through his subconscious mind. After he was through he didn't know what he had said but he had a hunch it was the wrong thing because everybody looked funny. He didn't enjoy his dinner at all; he wanted to go home. As soon as he decently could he gulped his dessert and went home. He took his friend with him, and as they left, he said, "What did I say?"

"You said plenty. I'll tell the world."

"Well, what did I say?"

"You said, 'Lord, we thank Thee for our many sins, bless them to Thy use, and forgive this food for Christ's sake. Amen!' "

Another reason I don't attempt to instruct you is that I do not take myself seriously enough. Don't misunderstand me. I take the thing I attempt to accomplish as seriously as any human being on earth takes his work, but not myself. In that way lies madness.

When I used to work on the Los Angeles Herald a good many years ago, some wise sage had taken in his fist a hunk of blue chalk and written across the wall of the editorial room of that paper, "Blessed is he who taketh himself seriously for he shall create much amusement."

You know yourself as well as I know that the most ridiculous thing in this ridiculous world is the human who somehow or other has got it into his otherwise untenanted skull that he has an intrinsic value greater than that of the other people about him. No human has any intrinsic value outside of a soap fat. Intrinsic value is not the kind that accrues to humans. The human value is a relative value based upon the idea derived from the ideal that he represents. The human being who hasn't an ideal that seems to him infinitely larger than his own infinitesimal self amounts to at least thirty-three and a third per cent less than a cipher with the rim rubbed out.

Ideals are born way back yonder somewhere. For all we know they may be co-existent with eternity. Sometimes they bob up in a different and more tangible form just as your Safety Movement bobbed up in a form we could grasp and understand and make concrete.

Definition of Egotism

Now and then life pasted a few human labels on this ideal to help it along and accelerate it through one generation. Death wipes off those labels and life pastes on some finer and fresher and more legible labels, and away goes the ideal forever and forever, the ideal immortal. The greatest thing a human being can hope to be is a temporary label on a permanent ideal.

Egotism is the anesthetic nature gives to deaden the pain of being a damned fool.

To show you how fear and intelligence never work together in the same mind, one time a long-haired high-brow was standing up blatting away at a crowd, and he was giving them statistics. Think what a treat that must have been! Everybody loves to listen to statistics; they drink them in. When a fellow quits statisticking for a while, they say, "Oh, haven't you one more statistic?" They love them. The nicest thing about statistics from the standpoint of economy of human intelligence is you don't have to know anything and you don't have to have any

scene in order to give statistics until the cows come home. All you need to do is to know the nine figures flippantly and be able to arrange them rapidly and extemporaneously from nine to thirty-six in a clump, and by the time you have shot the second or third clump nobody will have any more idea of what you are talking about than you had before you started. If you detect some figure hound in the crowd, slip in a fraction and you will have him ditched for a week.

Statistics are the most impenetrable mask ignorance ever put on. This man was giving statistics. Among other things he told them in 250,000 years from now this world would be no more. One fellow jumped up with his eyes sticking out until you could sit on one and saw the other one off and asked him to repeat that statement.

He said, "I said that in 250,000 years this world will be no more."

"Oh! I thought at first you said 150,000."

Again to show you how fear and intelligence are never mates in any mind, not long ago one of these people with the foot and mouth disease (running around talking all the time) was making a speech to a poor little unprotected, defenseless cluster of school children over in northwestern Pennsylvania. Among other things he told those little tots was that the cliff the water pours over to make Niagara Falls is wearing away at the rate of one inch every nine years, three months and twenty-four days. Now just think of that! Think of that cataclysm, that debacle! Think of that insidious peril creeping upon us day and night.

One little boy commenced to bawl like a calf. Everything stopped while the teacher hurried back to see what was wrong with him. He said, "I've got an aunt living in Erie."

"The Whole World Stinks"

The sort of people who think the worst is here now and still worse is coming tomorrow, while the day after that is going to be a perfect lulu of concentrated horror, make me think of a poor fellow sitting one night in a rathskeller. He had been treated well and frequently. He was sitting on the back of his neck. His hat was pulled down over the end of his nose. The way he was sitting he looked like a capital Y with no M. C. A. to go with it. His under lip sagged like that of a motherless and forsaken colt. He had three or four days' growth of whiskers on his face. He was a mess.

A fellow was standing looking at him. He looked a while and a mean grin, a diabolical grin, spread over his features. He went over where some free lunch was displayed. He grabbed around among that junk until he found the thing he had been looking for, a little brick of limberger cheese wrapped in tinfoil. With his finger-nail he scraped the tinfoil off and then rubbed the cheese itself on the stiffest bristles right under the fellow's nose. Those of you who have smelled limberger cheese in the full flush of its manhood and have also smelled at another

time attar of roses never get the two confused in your memory. They are different. There isn't even a family resemblance between the two.

A change overspread the features of this man who was sitting down. A change came over the spirit of his wood alcohol dream. He commenced to fight off whatever this was that was attacking him. It wouldn't be fought off. It stayed right with him; it stuck closer than a brother.

He got one eye partly open and inquired of the surrounding atmosphere,

"Ain't it awful!" Nobody said anything; nobody paid any manner of attention to him. He didn't see how they could ignore a serious situation of that kind. Where was their civic pride? Where was their community spirit? He gave them another chance! he got the other eye partly open and inquired once more, "Ain't it awful!" Still nobody said anything. He simply was not going to stay around among people of that kind. He wasn't going to stay with people who had *no more regard for* what was going on than they did, so he turned his back on the heedless throng, he looked at the doorway threateningly for a long time, he looked at that doorway until he was sure he had it intimidated so it wouldn't dare hit him as he went by. He zig-zagged through the sawdust into the pitch-black night. He was gone a long time. After a while he came back. He swayed over the doorstep and said, "Oh, ain't it awful!"

Somebody said, "Ain't what awful? What are you talking about?"

"The whole world stinks."

That is not a cartoon, that is not just a funny picture. That is a life-sized enlarged photograph of a pessimist wherever you find him. He thinks everything is wrong, while if he would make the best he could of his own situation and use the intelligence the Lord had given him, he would be surprised to know how much better the world was than he had been thinking it was all the while.

The English Aren't The Only Ones

We talk as though all the people who couldn't see a joke were Englishmen and as if all the people who are English couldn't see a joke. Neither one of those statements has a particle of truth underneath it. There are American boneheads de luxe. We are just prejudiced. Prejudice is a lazy person's substitute for thinking. It was a 100 per cent American who went in a drug store and said, "I want a plain soda without flavor."

"Without what flavor?"

"Without chocolate."

"We haven't got chocolate. I'll have to give it to you without vanilla."

The purpose of what I have been doing is to cultivate optimism, and optimism is not what some people think it is. They think that thing that goes around grinning all the time like a Cheshire cat, saying every-

thing is all right, is an optimist. That is only a cheerful idiot. It takes intelligence of the finest faith and the most sublime sanity of the most profound and complete type to be a real optimist. It takes faith and intelligence to know that although there are heartaches today that hurt, and God knows here are heartaches that hurt us, the beautiful thought about them is that they are not permanent. The only truth about trouble is that it always goes away, and when it goes it is not a haphazard happen-so date; it is a definite date, contingent, but definite.

The moment you show signs of having intelligently digested and profited by the lesson that trouble brought you, that moment the trouble and the sorrow take wings and go away, and if it comes again it is an invitation affair every time. The purpose of optimism is to put a rainbow of confident and beautiful hope into every tear that comes into a human eye.

BISHOP WOODCOCK: Ladies and gentlemen, that finishes the program, with this reminder. When this Safety Council leaves this city after honoring it with its visit and its convention, then let's take up that gospel of safety. I believe there is nothing under God's Heaven that justifies your creation or your citizenship but this gospel, that the next greatest thing to creating a life is to save a life.

Automotive Section

September 30, October 1 and 2, 1924

L. E. AVERILL, Chairman
Safety Engineer, Oakland Motor Car Company, Pontiac, Mich.
E. H. COTCHER, Vice-Chairman
Manager, Chattanooga Safety Council, Chattanooga, Tenn.
R. F. THALNER, Secretary
Safety Engineer, Buick Motor Company, Flint, Mich.

TUESDAY MORNING SESSION

CHAIRMAN AVERILL: Following is a short digest of the activities of the Automotive Section:

G. A. KUECHENMEISTER, chairman of the exhibits committee, has sent out letters to different companies, asking for exhibits on guards, blue print drawings covering same and also photographs. Has made arrangements with several different companies for their permanent exhibit to be held at the Automotive Section Room, to cover entire Congress.

H. H. JONES, chairman, publicity committee, has done quite a lot of publicity work, publishing writeup in the Fort Worth Record, Fort Worth Texas, Birmingham Age-Herald, Birmingham, Alabama, Nashville, Tennessean, Nashville, Ten., Emporia Gazette, Emporia, Kan., St. Louis Globe-Democrat, St. Louis, Mo., Detroit Times, Detroit, Mich. He has also established conection with all of the foregoing papers and they will run our safety propaganda at any time.

MR. R. F. THALNER: secretary, reports as follows: "The officers of the section held their first meeting October 20, 1923 at which time chairmen of bulletin publicity and statistical committees were appointed. At that time the newspaper publicity for the section was discussed at length and Mr. Jones was asked to enlist the aid of the Newspaper Service Corporation, to the extent of giving our work as much publicity as possible.

The next meeting of the officers and committee men was held Saturday, December 5, 1923, in Detroit, and was called for the purpose of outlining the program for the Congress and also for approving the bulletin issue for the Automotive Section for the coming year.

The next meeting was held April 18, 1924 for the purpose of outlining specifically the program for the Automotive Section at Louisville. It was decided at that meeting that three half days, instead of the usual

two half days be utilized this year, in as much as the section was somewhat crowded at the 1923 meeting.

Another meeting was held on June 16, 1924 at Detroit, to discuss the possibility of filling one of the speaker's places, who has been transferred at the request of the National Safety Council to one of the general sessions. A new subject was suggested and assigned.

In the capacity of secretary of the section, I have during the year, sent letters to all of those companies accepting or cancelling their memberships. To each company who cancelled a membership I wrote a letter asking that they reconsider their cancellation and requesting exact information as to why it was necessary to drop out. I received replies from most of them, stating that, due to the business depression, it was necessary that they retrench on some of their expenses. I, thereby, learned that it was not due to the fact that they were dissatisfied with the Council's activities but simply that they were the smaller companies who had to cut down on every side. Another letter was written to those whose membership was renewed, congratulating them and telling them that any of their safety problems would gladly be given our early consideration if we could in any way help."

APPOINTMENT OF NOMINATING COMMITTEE

At this time I will make the announcement of the nominating committee, which is to get together and make a report tomorrow giving the names of the officers who are going to take charge of our section for the coming year: Mr. E. F. Blank, chairman, Mr. H. S. Putman and Mr. W. A. Carson.

ADDRESS OF CHAIRMAN

Our problem of the present, one of the foremost and a necessity, is to compete with the doctor and undertaker to lower their flourishing trade and the long lists of accident and death. That is the problem, but where is the answer. At first there may seem to be many, but they are all minor. The real answr is covered in safety. And the solution lies in the obeyance of its laws. But first let us take a look as to the cause.

We find that the cause is from two sources, one indirect and the other direct. The indirect cause results from the ever onward progress of man and the development of mechanical contrivance and labor-saving machinery. The direct cause results from the failure of man to understand and obey physical and mechanical laws.

Nowhere has there been such a development and rapid increase, due to science and invention, as in the automotive industry. The use of complicated and high-powered machinery has raised the chances of injury and accident a thousandfold. And because human nature persists in carelessness and violating the simple laws of mechanics, we find the long trouble-lists.

There is no place where man is absolutely free from injury. At any moment he is liable to accident. There are so many, even infinite number of ways and means for accidents. There are so many that it seems simply to be a case of the survival of the fittest. And this is not meant in the sense of physical or brute strength, but intelligence.

We well understand that if a heavy object falls upon the fingers, the weaker must give way to the stronger, and the hand is battered, bruised or crushed. Again, if one comes in contact with an electric current, the result is a shock or a burn. Yes, we are well aware of the simple ways by which we bring accidents upon our selves. But where the real danger lies is in the misunderstanding as to what the other fellow is going to do. These things being so variable, the solution of the problem seems more difficult. There is but one effective way in which it finally may be brought about.

Someone has said we are all creatures of habit. And therein lies the solution. We must educate ourselves to habit. And this education must bring about the best of habits. Too well do we understand the results of a useless or bad habit. Too many times have we seen or felt the result. A bad habit, or even the smallest habit in the way I am speaking of, whether carried to the extreme or not, may distract the mind for a moment, but—that moment may mean disaster. So our habits must be cultivated and formed for the purpose of ultimate good. Sefety must become a habit.

The roots of the habit of safety must be imbedded deeply. The practice of safety by one man alone in a whole community or factory can be of use only as to his own personal benefit, and, indirectly, as it happens to fall upon the other fellow. Constant use and practice by a few may decrease our enormous fatalities, but until the whole community, every assembly, the entire factory, or any person that comes in contact with another, dreams safety, breathes safety, is safety, can we reach the absolute standard of efficiency.

PUNCH PRESSES AND DIES: THEIR SAFE CONSTRUCTION AND OPERATION

George S. Thompson, Royal Indemnity Company, Detroit, Mich.

I wish to pay a tribute to our beloved Mr. Kaems', of the Simmonds Bed Company, for he is the first man to present this subject to the general public. That Mr. Kaems' efforts are bearing fruit goes without saying, and I feel that we all owe him a vote of deep gratitude.

A punch press is a very simple machine. It is a machine that delivers a downward compressing stroke. Why is it dangerous to operate? Because we have put teeth in its jaws and then feed these teeth with our fingers, and when it shuts its jaws down on our fingers, we howl. Does it not appear to you that in order to eliminate accidents to operators of punch presses, we must make it unnecessary to place the hands in the danger zone to feed the press or to remove the finished part?

How are we to accomplish this? We know that with automatic feeding mechanism there are no serious injuries; but these cost money. So do accidents. Automatic feeds often cost as much as the press itself. Some say they are only practical on long jobs because of the time to set them up and adjust them, but did you ever stop and consider the time consumed in feeding and removing the finished part from the die by hand methods? It takes twice as long for the operator to do this as it does for the ram to descend and return again to its up position. Don't you think this should secure some consideration? I do, and I find that if the speed of the press is 120 r.p.m. (which is considered slow) an eight-hour operator would produce not less than 50,000 pieces per day, allowing for 6,600 elapsed strokes.

Automatic Feed Increases Production

By feeding and discharging on every stroke and by keeping the press running, it is a fact that, if two-thirds of the time is consumed for hand feeding and one-third for actual operation, we will produce only 18,860 pieces per eight-hour day on a press operating at the same speed, and it would require a very skilled operator to produce this amount of work. Surely it is clear that hand feeding is the consumer of time and is dangerous—so we must eliminate the hand method.

I have talked about *production* first, because that is the first result asked by the management and all along the line down to the press-room foreman, and I want you to be in a position to combat the production argument when it is presented to you, as it surely will be when you present this subject to the management. Your job as a safety engineer in a plant is 95 per cent salesmanship because you must sell your idea to the other fellow. It does not necessarily follow that you must be a die maker or die designer to sell your idea to your management. Maximum production, minimum cost, is the goal of every concern.

There are but two types of presses, inclinable and non-inclinable. They may bear other names but they fit one of the two classes.

The inclined press presents a much simpler problem than does the stationary or arched press, as in the inclined press the part falls into place and, after forming, is easily disposed of by gravity or air. Here is a thought to keep in mind: on inclined presses make the punch or upper die remove the finished piece. This may mean the reversing of present dies in order to accomplish the desired result, but it will be found necessary in most cases. Now, to feed the die or to place the piece to be formed, etc., use slides for all jobs where the number of pieces desired is dependent on sales, or when a question arises as to the probable amount. and keep in mind this fact—that if a piece is longer than it is wide, feed it lengthwise and slide it to position. If, however, it must be fed sideways, then use a slide push feed, which is made by fitting a set of guides on the lower die, or die holder, and pushing the part to location by a forward motion. Stops can be made so that the operator is not compelled to call into play more than the average intelligence and

cannot go wrong, and all the operator is called upon to do is to lay the piece in front of the slide and push it into location. I suggest this method because it is so simple and the scope is so great. Also, it is what might be termed an expansive type of feed, in that, by the addition of a magazine, we have the first step towards an automatic feed then, by adding uprights and bell crank action we can make it fully automatic, as the demand may justify.

You are conversant with the methods exhibited by Mr. Kaems, of the Simmons Bed Company, Mr. Clark of the Ternstedt Manufacturing Co. and various other concerns of Pittsburgh, Worcester, Buffalo and all parts of the United States and Canada, and let us sum up what we find in their methods. First, there is no need to feed dies by hand. Second, production increase. Third, slight increase in die cost which is offset by production. Fourth, absolute safety in the operation of punch presses and entirely eliminate the possibility of accidents.

You must sell the idea of safe production to your plant managers, and if you do so the personal satisfaction of knowing that you have been instrumental in preserving the laborer in the workshop of the world from injuries that seriously handicap them for earning a livelihood and for which there is no legal reason, will more than recompense you for your efforts. Let us strive to keep ever in our thoughts and strive to obtain *all for safety and safety for all.*

THE NEW SPECIFICATIONS FOR GUARDS IN THE POWER PRESS CODE

C. B. Auel, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

The code itself is one of a number of safety codes issued under the auspices of the American Engineering Standards Committee and marks a step in the latest and best effort at standardization in this country.

Having had the honor of serving as chairman of this committee and of thus working with the individual members, I say it would be exceedingly difficult to gather together a more painstaking set of men or to find men with a more comprehensive knowledge of the subject. While the code has been tried fairly there will undoubtedly be some changes which will suggest themselves as the result of experience; in fact, several small ones have already been made since the last edition was printed. New Jersey is the first state, as far as I know, to adopt it, but I trust others will follow in due course.

The code is divided into two parts, "Standard Requirements" and "A Discussion of Press Hazards and Protective Methods and Devices."

The first requirement (par. 111) reads: "Presses shall be so located as to give: (a) enough clearance between machines so that the movement of one operator will not interfere with the work of another; (b) ample room for cleaning machines and handling the work, including

material and scrap; (c) aisles of sufficient width to permit the free movement of employees, bringing and removing material.

These are simple precautions and are obvious at first glance. While they are usually complied with in a new plant, they are not, however, always adhered to as the business grows, with the result that the hazard of accident from these sources increases. This form of hazard is by no means confined to punch presses for there is a general tendency in most industries, perhaps not so marked now as formerly, to crowd work into spaces too small, or to make the aisles too narrow. Typical of this situation, is the largely prevailing and dangerous custom of placing certain tools used in common by workers in a factory, like emery wheels, so that when using these, the workman usually has his back to the aisle and the making of the slightest contact with him by a passing workman is likely to cause a nasty accident. In some factories, the aisles are regularly marked in white and occasionally a foot board is used to minimize a hazard of this kind.

Light Sources

The second requirement (par. 112) reads: "Presses should be so located with respect to sources of both natural and artificial light, that light of sufficient intensity will fall on the work; direct or reflected glare and shadows, including moving shadows, should be avoided."

This is quite to the point and needs almost no comment further than to say that in addition to good general overhead lighting, punch presses perhaps more nearly than almost any other type of machine require individual lights, and it is certainly false economy to pay out large amounts of money for the installation of expensive machines and then fail to equip them with proper accessories, making it difficult for them to render maximum satisfaction. With respect to general lighting, I have noticed so many times that tables, recommended by illuminating engineers for various classes of work, specify that offices and drafting rooms should have, say, 10 to 20-foot candles, while factories need but 5 to 10-foot candles, whereas it has always seemed to me just as hard to read a machine vernier, a calipers or a blue print in the shop as it is to read a slide rule or a drawing in the drafting room or office.

The third requirement (par. 113) reads: "Every power press shall be provided with means for disconnecting all power from the press and from the pulley on the press. Acceptable methods are:

(a) Individual motor drive; if the switch or starter is so constructed and located that the motor may be accidentally started, provision shall be made to permit locking or latching in off position.

(b) Tight and loose pulleys on countershaft, with belt shifter which can be locked or latched in off position.

(c) Belt perch or idler pulleys to facilitate throwing belts off and on the drive pulley.

(d) Clutch on drive pulley, with clutch handle that can be locked or latched in off position.

These requirements seem reasonable enough to preclude any adverse comment. Unfortunately, when a die setter is at work setting up a new die in a press, such safe-guards can hardly be used and he, it seems now, is one of the men, besides the regular punch press hand, who is commencing to be in need of safe-guarding.

Belts, Pulleys, Gears and Shaft Guards

The fourth requirement (par. 120) pertains to belts, pulleys, gears and shaft guards, and states that these are to be provided for in accordance with the Safety Code for Mechanical Power Transmission Apparatus, while the 12th requirement (par. 132) of course refers to the National Electrical Safety Code.

A gratifying feature is that the punch press code, as published by the New Jersey Department of Labor, states that the Code for Mechanical Power Transmission Apparatus is to be followed, thus showing that New Jersey is strongly backing up the efforts now being made for standardization in safety codes.

The preceding requirements, briefly discussed, may be said to be general requirements, since they apply to practically all machine tools wherever found; while the following more especially concern punch presses.

The sixth requirement (pars. 130, 131, 132 and 133) specifies various safety devices with which presses shall be equipped and describes them in more or less detail. These include:

(a) Automatic or semi-automatic feeds and knock-outs.
(b) Enclosure of ram or travel limited to ⅜".
(c) Sweep guards.
(d) Two-hand tripping devices.
(e) Gate guards.
(f) Where the preceding methods cannot be employed, use may be made of special tools for holding the material.

These devices are excellent and, in fact, embrace all of the known methods of safe-guarding punch presses; like most other things they have their limitations and hence their range of application.

Personally, I prefer the type of guard in which the hands are never required to be placed within the danger zone; because with such guards, in the event of something going wrong with any part of the press, there is far less likelihood of serious consequences.

There are several other requirements, these having to do with non-repeat devices, treadles, latches on hand levers and protection against flying particles. Sound advice is given in connection with the making and setting of dies and their subsequent operation.

In the working out of punch press guards, it does not seem to be enough attention has been paid to the automatic or semi-automatic type designed along the lines so strongly advocated by Mr. A. L. Kaems of the Simmons

Company. While our company had already done quite a bit of work in developing automatic punch press devices, it was not until we saw what he had been able to accomplish, as indicated by his exhibits at one of these Congresses a few years ago, that we realized the possibilities. Since that time we have paid a great deal of attention to chutes, as some of our devices exhibited here this year will testify.

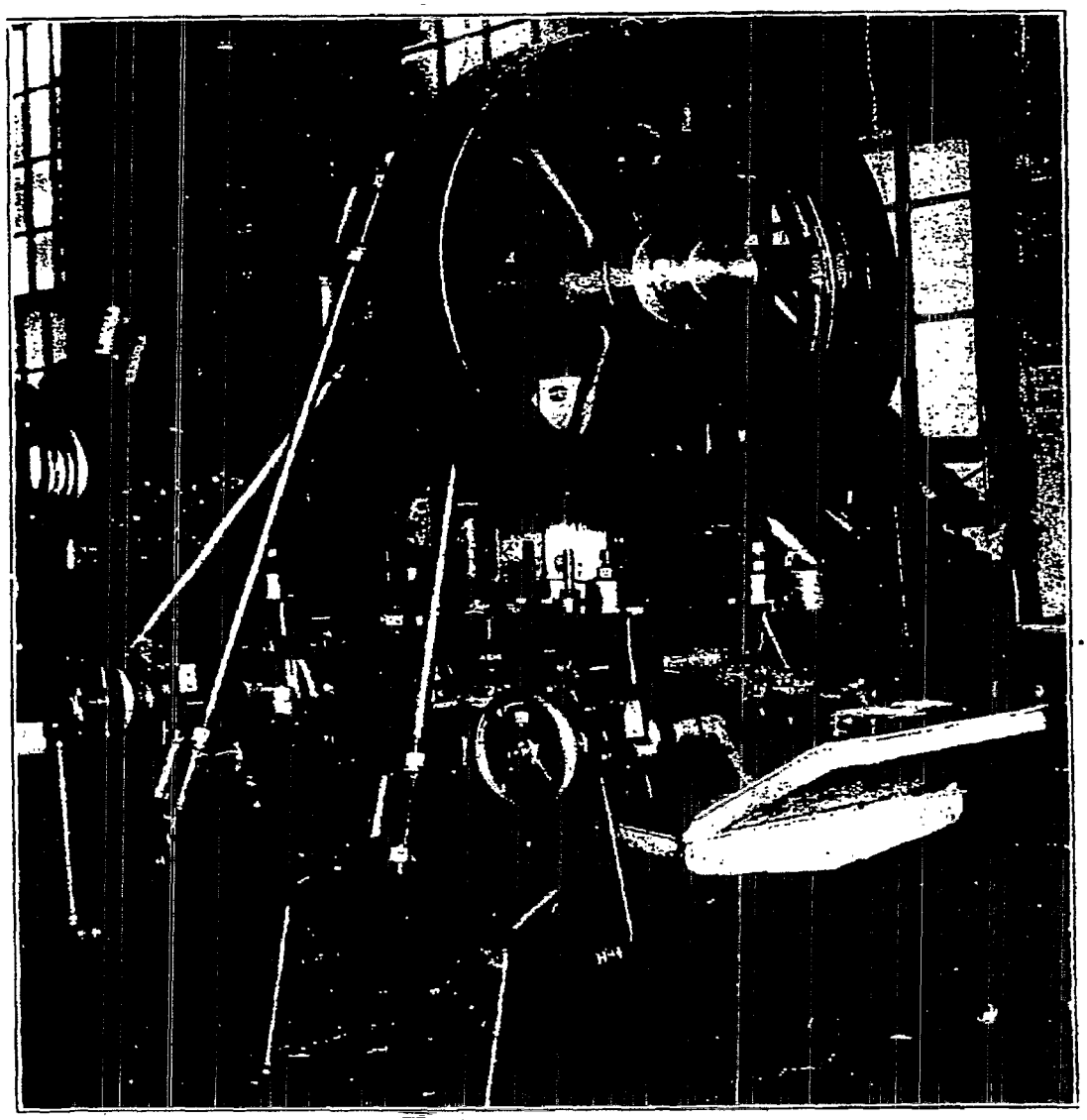


Figure I

Of course, practically all of these devices are warranted in quantity production; but where the quantity is small, or where endeavor is made to use up scrap, the problem of eliminating the accident hazard becomes more complicated.

The statement is heard at times that guarding slows down production, and while this is undoubtedly true in certain cases, it is not true as a general proposition. Following are a few instances of guarding and its effect on production, taken quite a random from our own records:

By the installation of roller feeds on some of our punch presses, production has been increased in some cases as much as 50 per cent, and the danger of the operator's finger getting under the punch has been eliminated. (See Fig. I.)

The use of large vacuum lifters in punching sheets dispensed with the services of helpers in the rear of the presses; since most of our accidents on this class of work occurred to helpers, the operators at the front of the presses, not now having these helpers on their minds, have gained confidence, thereby permitting them to increase production at least 10 per cent.

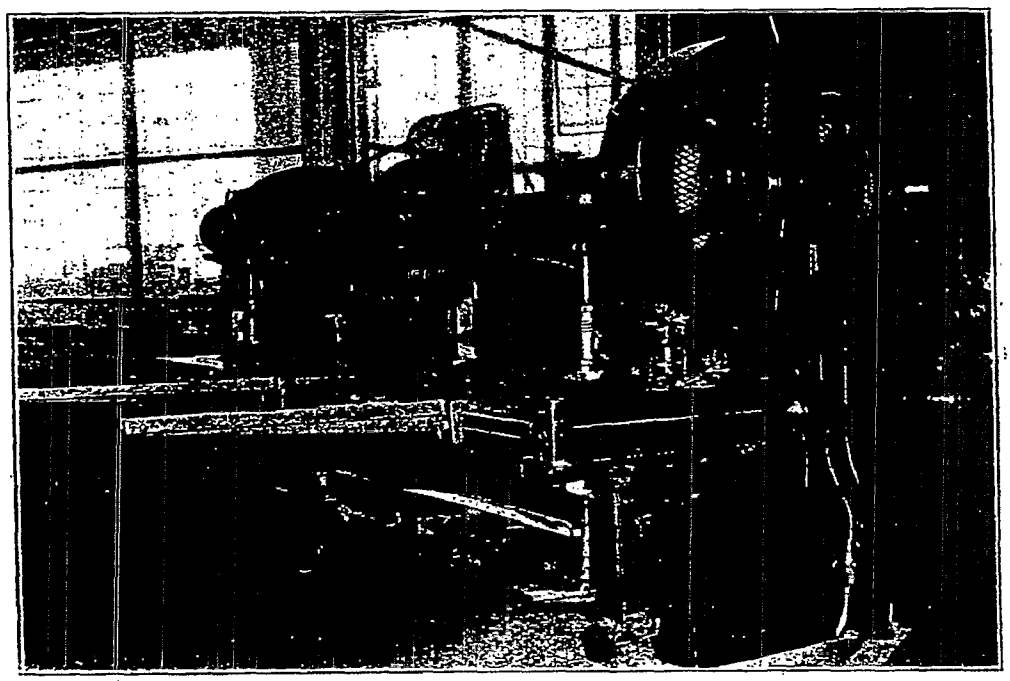


Figure 2

The use of rotating fixtures for one of the operations, namely bending, in making fingers for armature ventilating plates has eliminated the possible loss of fingers and increased production practically 100 per cent.

By using simple pickers or swabs on certain of our work, the hazard of lost fingers is almost entirely done away with and production increased approximately 50 per cent.

The placing of guards and roller feeds on our squaring shears and substituting such tools for rotary slitters, has not only increased production 100 per cent, but resulted in better jobs—this in addition to eliminating a helper on each machine. (See Fig. 2.)

Certain semi-automatic dies have doubled our production with far less effort, as well as wiping out the finger hazard.

The use of small vacuum lifters has, in many cases, increased production 10 to 15 per cent, as well as eliminated the finger hazard.

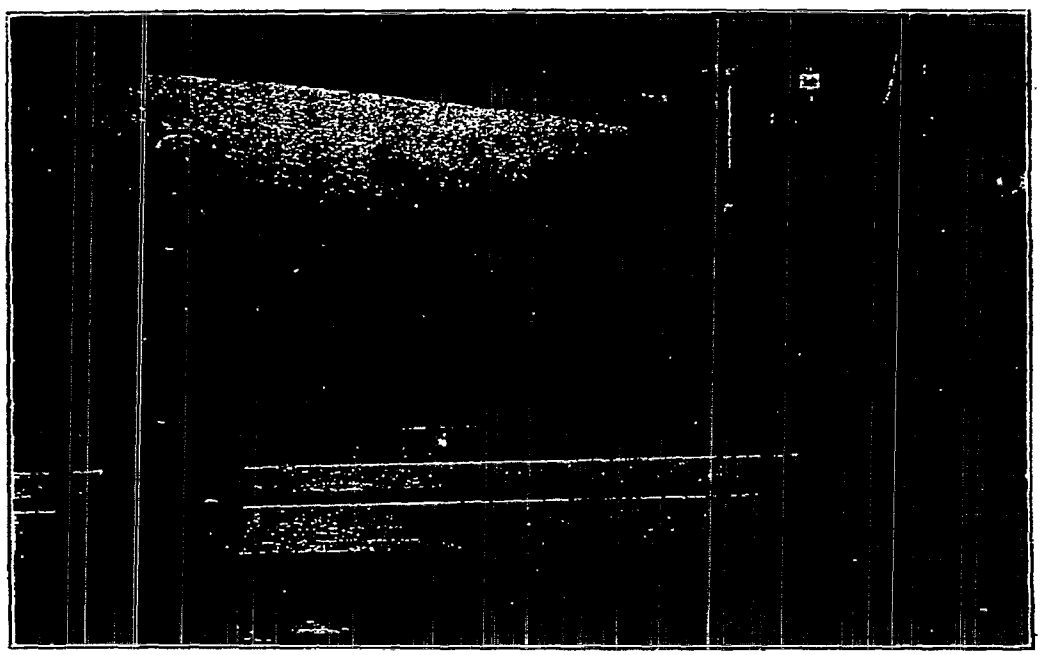


Figure 3

A review of our accidents this year shows the punch shops to be among the safest shops in our works, yet accidents continue notwithstanding our best efforts to live up to the code. It is not, however, because of any inherent weakness in the code, but rather because no code has been developed which will cover the seemingly exhaustless ingenuity of the human being to devise ways of getting into trouble. Of 27 accidents, but

nine have been to press hands, and of these, only four were due to the presses themselves. The other accidents occurred to die setters, truckers and repairmen, and their causes may be briefly described as follows:

Ring fell on foot.
Cut finger on scrap material.
Foot cut stepping on scrap material.
Struck in eye by flying particle.
Die fell on foot.
Scrap material struck foot.
Turning table over, rod hit face.
Hand truck tilted and load hit foot.
Gas blew on face from annealing furnace; turned gas on too suddenly.
Stepped on material.
Hand struck scrap material.
Gas ignited in man-hole.
Cut hand by scrap material.
Fell against pile of material.
Scrap material hit hand.
Wheel on slotting machine struck hand.
Window glass cut hand.
Die fell on foot.
Die shoe fell on foot.
Die fell on leg.
Table slipped and screen on back hit man.

A hasty conclusion might be that better housekeeping would improve matters, but I can assure you that our punch shops are models of factory neatness. It will be observed that five accidents were due to falling objects and we are constantly endeavoring to reduce hand lifting and haulage by substituting portable cranes. Several accidents were due to employees' stepping on material and, perhaps, a rigid inspection as to the shoes of the employees would have prevented one or more of them.

In any event, it is evident that while guarding the presses will largely eliminate accidents to operators, this does not wholly solve the problem for die setters, while for other employees, the general requirements first mentioned, such as spacing of tools, suitable aisles and good general lighting plus good housekeeping, daily inspection of foot-gear, gloves for materials and scrap handlers, minimizing of hand lifting and haulage, goggles for die chippers, etc., will have to be the mediums through which accident reduction may be expected.

DISCUSSION

MR. A. F. DUNNEBACKE (Olds Motor Works, Lansing, Mich.): Out of 4,662 cases reported to our first aid room in the last eleven months, 65 per cent have been injuries to the hands, 1,113 have been due to handling material and the big majority of those have been handling sheet metal.

Now, I have talked repeatedly to our shop superintendents and our foremen, but they are inclined to think that handling sheet metal is something that you cannot guard, that a man has to work so long and, gradually, he acquires safe methods of handling sheet metal. Do you think there is any way of cutting down the injuries resulting from sheet metal cuts, or does the man simply have to work until he acquires a way of handling it safely?

MR. AUEL: I am looking for help now. I can see that we have gone the limit with guarding and yet these accidents happen. You will find that in every punch shop or every shop regardless of what it is, your accidents may be divided into two distinct classes; one class, those caused by the tools of that department and, the other class, such things as has just been mentioned, handling of material, trucking, slipping and the falling hazard.

Clean housekeeping, immediately performed, getting rid of the scrap will eliminate some of it. Where we stack great piles of sheet material, we have had fellows swing their arms and take the corners too suddenly, so now we put a bit of sheet iron, an angle piece on the corners, or we put a toe board along the floor. That has cut out the occasional one.

We bale all our scrap because we get a higher price and yet that bailing of the scrap has introduced a set of hazards.

MR. EMERSON H. POHLS (Oneida Community Limited, Oneida, N. Y.): We have the same hazard in handling material, but I would say, to a lot less degree, and I believe what helps most is watching who actually handles the material. In other words, I wouldn't say, "Fire the foreigner", but you have to do this much, you have to find a job that the average foreigner can do and do right. If a foreigner is handling your material, you are bound to have an enormous number of accidents. If you have the English-speaking employee handle the material, you will find your accidents are on the decrease.

MR. EDWARD J. CLARK: (Ternstedt Manufacturing Company, Detroit): When I first went to the Ternstedt Manufacturing Company, it was a common practice to have at least three or four of their steel handlers in the hospital at one time and as a continuous process from severe lacerations. Our first attempt to cure the matter was by the use of suitable gloves.

Our next step was through supervision. The superintendent of that particular department was taxed with selecting only men who were were capable of understanding good English. They were thoroughly trained and instructed before they were allowed to go on their own hook in handling steel, and our efforts in that respect have just resulted in much good. During the nine months of this year just passed, we have had four such accidents and of much less severity than those previously experienced. I should say, look to your supervision.

MR. W. H. JAMES: (Mueller Metals Company, Port Huron, Mich.): Our presses are principally on trimming operations, and during the war, we had some 25 or 30 presses running on fuse parts, absolutely unguarded. I was placed in charge of those presses to devise some means by which I could get the operators' fingers out of the danger zone.

Well, I eliminated the foot press. I brought an arm around the back of the press which was of the left-hand type. We put our stock boxes over on the left-hand side of the machine and the motion was picking

up a piece of stock and pressing a lever, putting the piece of stock in and going through the same motion, with both hands away from the danger zone.

Since we got away from that quantity production and went into small business, such as some of you automobile people will recognize, we have come across lots of different shapes where shoes cannot be used. We found that shoes slowed up production to such an extent that they have been thrown out. I adopted a sweep guard.

MR. GEORGE H. HAWES (Hudson Motor Company): We found some dangerous press feeding conditions. Among them was the feeding of the Essex connecting rod for the Essex car. A man would take a rod out of the barrel, put it on a 400 press, tramp on the press and take it out with the other hand. A hand was lost in the department prior to my arrival there. They told us we could not do it, but we built an automatic feed on a belt tramp principle with a hopper and the slide came out and placed that rod on the press. The rod was coined-pressed and the next one coming out pushed that rod into a barrel.

We spent six weeks before we got the first model built. We put it on the job and it was constructed so that the hopper came so close to the press that it was really more dangerous than if we had left it alone. We took it back to the tool room and redesigned it, putting a second step on the pusher so when one pusher came along and pushed the rod out through one point, the other one slid back and gave it a second push and placed it right on the die.

Prior to this time they were getting about 400 Essex connecting rods an hour. By putting a helper on the press to bring up fresh stock and move the full barrel from behind the press so that the operator could give all his time to feeding that hopper, they brought the production up to 1,600 an hour.

Now, the company spent upward of $1,200 in that tool. I was severely criticized for the expenditure until the time study department came down and took a time to study that operation. It developed that the increase in production many times paid for the investment, to say nothing of the fact that they have forever eliminated the chance of an amputation on that operation.

We took washers, felt retaining washers, flat washers and various other parts and adopted the same idea with them. We had one automatic feed there that had 18 different shaped pushers on it. It was one feed but it had to have different shaped pushers to fit the different types of material that went on the press.

If you have any propositions in your plant that you think can't be licked, make up your mind that they can. We have at least 90 per cent of our present stuff on a press which can be taken off without getting the hands under the press, and we can take a major proportion of that and feed it automatically. Let us feel this way: That a press is a bull-dog and a vicious bull-dog, and just as Mr. Thompson said,

don't get your hand in its mouth. In other words, if he is a bad bulldog, shoot him. Don't chain him to a fence and put a muzzle on him, but get rid of him. Play safe!

EXHIBIT AND DEMONSTRATION

MR. A. L. KAEMS (Simmons Bed Company, Kenosha, Wis.): I assure you that it gives me great pleasure to see this splendid crowd here today. When we think back years gone by and remember the hardy corporal's guard at our meetings, it is surely gratifying for those who have been in this work to see what interest has been worked up in this.

We are running 700 presses. In 1919, we cut off 36 fingers. One department alone cut off 24 fingers. That department cut off 6 fingers the first 6 months that I took up this work and has now run for 4 years without cutting off a finger. And furthermore it has increased the production in that department by 60 per cent. So you can see that safety work pays for itself.

You can never make a thing safe without increasing production. If all of you who have so much trouble with you supervisors would show them that you can increase production and pay for what you are doing, there isn't an executive who is going to cut off his nose to spite his face. Show them that you can do that and they will let you go to any length. That has been my experience in the many years I have been in this work.

We have a little room in which we have a lathe, a shaper, emery wheel and a drill press, and in that little place all our work is done. It sure is the biggest paying proposition in the plant and there is hardly a plant anywhere but that it can't afford to do that too.

MR. F. J. LITTELL: (T. J. Littell Machine Company, Chicago): You may be interested in a way of trimming a die casting so that there is both safety and increased production. The Stuart Manufacturing Company of Chicago had a raised flash which they had to put that on the die. It was a dangerous feature and they were getting very slow production. They put in a dial feed and are now able to catch every stroke of the press, from 60 to 70 a minute. I think it is 70 now. They have increased their production two and one-half times over that of hand feeding. In other words, one press does what two and one half other presses did before, and it is absolutely safe. They use a No. 2 dial, 15 inches in diameter. Just recently they put in an additional unit, which makes three units.

We had another concern that had tons and tons of blanks—round slugs. They wanted to make nuts from them. They rigged up a dial feed but it was a slow proposition to feed those things into the dial. So we made them a coin feed. They can run that at from 60 to 80 revolutions and catch every stroke.

Now, in regard to handling scrap, we cut the scrap up into small pieces and drop it into a barrel ,and if the sheets are not too large and the stock too heavy, it does away with a very large part of the scrap proposition. I know that at the Simmons Company, they have their scrap boxes as large as three or four feet across and three of four feet deep. They have them on wheels. A good many people use iron barrels and, in that way, do away with scrap handling.

There is another thing that may be interesting—a roll feed construction. A great many people are now using a roll feed that feeds from right to left instead of from left to right. The dials are all arranged that way and they find it more convenient. It looks as though, in the future, all single rolls will have to be built in that way. The Kuppenheimer Company is using this type of feed. They tell us that they change sometimes from 10 to 20 times a day, and in order to set their roll feed quickly, they use a distance piece from the shoulder over the adjusting block and fasten that distance piece to the front of their die.

MR. O. D. BAYRER (Travelers' Insurance Company, Hartford, Conn.) Here are a few points I think might have a bearing on the safety work. The first one is: How are we going to get plants to install proper equipment? Are they putting in the proper kind of a press to do the job and do it in a safe way? On a redrawing operation for the drawing of simple shelves, why hasn't some one advocated the more general use of the horizontal press? Now, we all know that the slide feed is certainly a fine innovation. It is true that slide feeds have been employed for 30 or 35 years but we have not capitalized the good thought as we should. You take a horizontal press on redrawing operations—thelogical result is that you can put your slide feed or your gravity hopper on an almost vertical plane and make them drop down immediately in front of the punch and you have automatically taken care of the slide feed.

Now this thought may or may not be a mere fancy, but I think it has some merit. What are we going to do about foot presses? How are we going to prevent accidents in the jewelry industry where the man must hold the little bit of a piece of a watch chain, or some other little piece, to pierce a hole the size of a small needle. Now I tell you gentlemen, the only way to eliminate accidents on the foot press is to install a device similar to what is known as the safety ram.

WEDNESDAY MORNING SESSION

CHAIRMAN AVERILL: I am sorry to announce this morning that our first speaker, Mr. Stunzi, is unable to deliver his paper. He has asked our former chairman, Mr. Blank, to deliver this paper for him.

PLANT HOUSEKEEPING

J. Jacques Stunzi, Consulting Engineer, Lancaster Steel Products Corporation, Lancaster, Pa.

Safe Practice Pamphlet, No. 45, issued by the National Safety Council, covers this subject so thoroughly that it is difficult to prevent duplication of example or thought. It is the A B C of good plant housekeeping. I just want to quote two points from this pamphlet about the responsibility of management:

Contrary to general belief, good housekeeping is much more a problem of good management, than it is a duty of employees. Good housekeeping cannot be secured by merely making a rule and then disciplining the workers. The management has a much greater responsibility than this. If the employees are required to keep everything in its proper place, the employer must first provide the place. For example, it would be foolish to expect the men to keep the plant free from oily rags unless the employer provided a number of suitable containers for their disposal.

The second responsibility of the employer to is provide enough places and have them so well distributed that their use will require little or no additional effort on the part of the workmen. It must be made easy to carry out any plan to attain the best results.

One thing is sure; it is a whole lot easier for the safety engineer to propagate and instill the standard practices of good plant housekeeping in a concern where the chief executive is the outstanding example of orderliness, than in a plant where the big boss neglects the approved standard practices.

There may be a few items that might be added to Pamphlet No. 45, such as the benefits of whitewashing and painting, especially in older buildings having a comparatively small window area. Some other points that might be added are: Adequate ventilation and purification of the air—maintenance of proper inside temperature and humidity—elimination of unnecessary or avoidable noises or fumes, etc. Some of you will say that such and such item belongs under the jurisdiction of the maintenance department or hygiene department. Even so, if one or the other subject is not covered in your plant, take it up with the proper executive and co-operate. It is a factor that may affect plant housekeeping considerably and if properly presented, will bring about the desired results.

Some time ago I read an article describing the fine spirit of co-operation among the employees, the welfare work, the medical service, the fire and safety equipment and fire and safety records, of the Endicott-Johnson Plants in New York State, (the largest shoe manufacturing concern in the world). The remarkable success which this organization has accomplished in the relationship of employer and employee, accident prevention, happiness and prosperity, is a noteworthy story. This vividly written article culminated in the following words: "We feel that fire prevention and safety work in all its phases for this great industry, mean nothing more or less than *good housekeeping.*"

Some executives still believe that a plant manufacturing a heavy product, or one that uses a lot of oil or grease or has an abnormal quantity of scrap, etc., cannot be kept as clean and orderly as a plant that makes a light and clean product.

In the first class, take plants such as iron and steel foundries, steel mills, chemical plants, etc. In the second class, take textile mills, plants for finished food, as cereals, etc. While there is a different standard of cleanliness in different industries, there is no reason why a steel mill should not be able to live up to its standards as a textile plant is living up to its own. Every industry and every plant has its own specific problems which have to be recognized and dealt with as such.

What Is Plant Housekeeping?

Plant housekeeping seems to the simplest factor in plant management, because in principle, it is just the same as at home. Your home, whether it consists of a house large or small, surrounded by a garden or not, whether it consists of an apartment with one or many rooms, it is composed of the same items. It is a house with stairway, corridors, rooms, kitchen, cellar, etc. It has floors, wall closets, windows, etc. It has a heating system, water and gas pipes, electric wiring, etc. All these items belong to the home.

Then you have your different items of furniture, such as tables, chairs, beds, dressers, benches, gramophone or piano or radio, etc.

Then there belongs to it the kitchen, the pantry, the laundry or wash tub, the bathroom.

Then the cleaning closet where the housewife keeps the brooms, brushes, dust cloth, pails, soap, etc.

Then hubby's tool chest, more or less complete with its sometimes incredible paraphernalia.

Then perhaps a garage with a four, six, or eight cylinder car, giving a lot of pleasure and costing a lot for gasoline and repairs, and so on.

Is there in principle, a difference between these items and those we have in an industrial plant? Have we not one or more buildings, with rooms, perhaps larger in size, furnished with equipment of different character, each one for a certain purpose?

Is it not up to the plant engineer, just as to the housewife, to keep all this equipment in proper working condition? Is it not up to the safety engineer to see that the maintenance department attends to its many functions, such as cleaning the windows, the floors and stairways, the yard, etc? Should he not watch carefully that all installations are kept in first class condition and properly guarded? Should he not confer with the works manager or the superintendent or the plant engineer, as the case may be, if the floors in the operating departments are not "picked up," if the aisles are obstructed, if material is carelessly piled up, if milk bottles are thrown out in the yard or just put on the floor at any old place, or if other rules pertaining to proper housekeeping are ignored?

Should he not co-operate with the production manager who is in charge of the stores control system as to proper storing of material? If such system is properly functioning there will be a place for everything and everything in its place.

How in the world is it possible that of two women, with about the same amount of work to be done (to keep the home spick and span), one, in the early afternoon, is ready for calling on some friends, or is doing whatever she pleases, and the other woman is drudging from sunrise to sunset? What is the reason for this great difference of time spent for a certain task?

The first woman is the efficient housewife. She has a definite way of doing her work, a method in planning her work. A certain number of functions are of a daily routine; others may be attended to every second day or so, others once a week, and so on. She has for each function the proper implements, does her job the proper way, that is within the proper time and at the proper time, that is, in proper sequence.

The other woman, though the longer worker, is the one who finds life a drudgery; after some time she may neglect one or the other of her duties and slowly get away from her thorough housekeeping.

In one plant there may be just a few janitors for instance, who keep the plant spick and span and in another plant of the same size and character there may be several times as many maintenance and service workers, apparently hustling the whole day long and still missing equipment or corners of the plant.

Needless to say that the expenses for plant housekeeping are considerably higher in the second manufacturing plant.

This reminds me of a case I had to deal with in a good sized plant in the Middle West, some years ago. The boss of that plant was finicky in the extreme, as to clean floors and stairways, etc. At short intervals he "raised cain" with the superintendents about cleanliness, with the result that more and more sweepers were engaged, until the plant pleased the boss.

One of my tasks was to write up the functions and duties of every employee, from the general manager down to the last sweeper, for the purpose of standardizing the work as far as possible and to determine the normal number of employees necessary for the standard production. The results were surprising. Here I wish to give the figures referring to the sweepers only, who, as was to be expected, were the least efficient ones of the entire plant. There were 33 sweepers and after a little planning I came to the conclusion that seven sweepers could do the same job. Of course these men received a bonus in addition to their normal pay and it paid many times, as the saving to the plant on this item alone was in the neighborhood of $27,000 a year.

This is just another illustration of what can be accomplished if the proper method is applied to a certain task, not matter what kind of job, as long as it refers to routine work.

Benefits of Systematic Housekeeping

The benefits derived from as system or method that brings about the desired result as to plant housekeeping, may be enumerated as follows:

1. Greater safety.
2. Surest preventative of fire dangers.
3. Creates better working conditions, more and better production; consequently higher wages, because less waste.
4. Makes satisfied workers. More than that, an orderly kept plant with clean and pleasant surroundings may influence for the better their habits. It will be imitated and extended to their homes, thus benefitting the families.
5. Draws a better class of labor and eliminates those who do not feel at home in a clean and orderly atmosphere.
6. Has the same effect on outsiders as the appearance of a well dressed man. It is the visual sign of prosperity.
7. Is one of the finest advertisings for product, management and workers. It creates confidence at first sight. The first impression prevails.

While a lot of functions are the same in principle as at home, it is the magnitude of each function and the great number of human beings that make such tasks grow to a real industrial problem. Some of the factors that may or may not create difficulties are, the kind of co-operation from the boss down to the youngest helper, and the kind of organization that defines the type of management, if military, functional, or mixed, that is: line and staff.

Without going into the details of organization methods, what I want to emphasize here it that the safety engineer should have full authority to enforce rules, regulations and methods, as approved by his supervisor. Give him authority and make him responsible for the results.

And now we come to the most important point to be dealt with: The human factor. Let us just consider two characteristics of the human factor; the average slow conception of facts or reaction of brain, and antagonism towards dogma or, to say it in everyday language, "mustn'ts and don'ts."

To quote the "Traveler's Standard," a publication of the Travelers Insurance Company of Hartford, Conn., it would be wrong just to pass out a booklet of rules and regulations, asking the new employee to read it, and then consider the requirements as to safety, cleanliness, orderliness, etc., to be fulfilled. Most booklets of that kind are couched in negative and prohibitive terms. They consist largely of "don'ts" and "mustn'ts" and the average response often is a feeling of antagonism, which occasionally manifests itself by the display of incredible ingenuity, devising ways and means to circumvent the rules. It does mean that sound instruction should be given by competent persons with just as much thoughtfulness and care as are bestowed upon the details of the manufacturing

process, and which also means fairly close supervision after the training period is ended.

The medicine you took last year will not cure the cold you have this year and in like manner the educational work you did in 1923 will have only an indirect effect upon the new men and girls you employ in 1924. Moreover, some of those who benefitted by your last year's work are likely to backslide unless they are reminded by an aggressive safety engineer.

Every employer, every safety engineer, in fact every executive, should feel he has a never ending duty to perform towards his employees, just as certain manufacturers conduct never ending advertising campaigns to secure new customers and retain old ones.

Because they have been reminded of it so constantly the people of our country are supposed to know that "FORD" is the name of a well known make of automobile; that "KLAXON" is a horn to give warning signals; and that "A.C." is a sparkplug. By personal trial or by the testimony of others we have perhaps learned something one way or another of these particular commodities and scores of others also, and yet the manufacturers continue to spend vast sums of money to inform the public of the pleasure or values to be gotten through the purchase of them. Their purpose is two-fold:

1. They realize that we are prone to forget and are therefore less likely to seek a given brand if we are reminded of it frequently.
2. They know that from year to year new citizens leave public schools and are becoming active partners of our industrial life, and have known heretofore but little of the many commodities advertised in our magazines.

Scientific experiments show that the salesman has to repeat his sales point five to eleven times before the average buyer has the mental picture of what the salesman says and before the sales points have the desired reaction in the customer's brain. Our problem does not differ from that of the average salesman. We, too, are salesmen in a way. If we do not succeed in bringing the essential points home in such a way that they will be remembered and create the desired reaction (in our case, co-operation of all our co-workers and employees in the plants), we have not succeeded in getting the proper housekeeping idea across. It is not enough to work up rules and have attractive posters, etc. Keep on telling the employees all you know with reference to good plant housekeeping. Write articles for the daily news. Repeat your story until you see results, and these results can be measured if you keep proper records. It will be worth while to standardize the rules and regulations, forms and records, for this endeavor. The wise Jewish Prime Minister Disraeli of Victorian England said, "The secret of success is constancy to purpose."

It still does not appear to be so dicult to reach the standard set for good plant housekeeping. However, I have not said all. There are a good many other obstacles to be overcome and, like any other way to

success, ours is obstructed with hurdles. There is no way around them, if we want to win. Have the courage and be determined to win.

Dealing With Violators

In each plant or organization there are some individuals who cannot even be reached through methods as described. Fortunately there are only a few of this type. Keep a vigilant eye on those who constantly ignore or violate the standard practices of good housekeeping. Then have a good talk with them individually, or do as a speaker at the last meeting in Cleveland, explained: "Most of the bad men in our industrial plants only need to be given a little authority to make them good." Should this remedy fail, then we have to resort to occasional house cleanings, with reference to those who constantly violate our rules, and the proper time for such house cleaning is when production is slowing down and if you investigate the records of these very violators, you will find with rare exceptions, that you do not hurt the production in quality or quantity, by letting these law breakers go. Therefore, do not forget occasional house cleaning as an essential to perfect housekeeping. If you have a barrel of apples in your cellar and you do not pick out the bad ones from time to time, the possibility is that a good many of the good apples may get bad.

Another point that is of real importance to good plant housekeeping is the tendency of man to imitate. I have said enough about imitation of good examples. However, it applies just as well to bad ones. Therefore, if you detect that some "boob" made sketches or scribbled on the wall, have same removed before another boob imitates such deed. This rule can be applied in all instances where things are done the wrong way or against the law of common-sense and ethic: Correct such conditions immediately after their detection, do not wait until some other individual with inclination to vandalism and disorderliness has imitated the bad example.

Good housekeeping does not necessarily mean spending a lot of money for improvements or methods or rules applied, it is the hearty co-operation of every employee and the management, with the safety engineer, that will help to reach the goal. Mr. Charles Schwab's words, "*Succeed with what you have,*" can be applied to our task as well, as far as expenditure are concerned.

Our problem is not to keep a plant properly "picked up," clean and orderly, regardless of cost. Far from this. It is the engineer's task to reach and maintain the desired standard of plant housekeeping at a minimum cost. A carefully detailed schedule of the routine work involved will be helpful, and in this connection a budget showing the expenses for special equipment, repair parts, labor, janitors, window cleaners, etc., will be of considerable help. I would suggest that all of you work up such budgets, giving a fair estimate as to expenses, listing also number of employees, floor space of plant, yard area, etc., and send these data to the office of the Automotive Section of the National Safety Council. Such information, if properly tabulated, will not only give a very clear picture

as to standard practices on housekeeping, but it will give us as well, accurate information as to expenses involved. More than that, it will give us fairly good average cost figures for the various labor and equipment involved, thus enabling the safety engineer to correct or improve his costs accordingly.

Resolutions Suggested

The Automotive industry is one of the foremost branches of our national industries. so let us set up the following resolutions:

1. That all the plants belonging to the Automotive Industry adopt standard rules to be issued by the Automotive Section of the National Safety Council, as to Plant Housekeeping, and that a revised Pamphlet No. 45 be our standard.
2. That these rules be put into effect on or before January 1, 1925.
3. That a committee be nominated, who shall receive monthly reports from all the plants, similar to the Safety Standard report of the General Motors Corporation.
4. That the Committee compile an annual report, based on information obtained through a standard questionnaire, to be published in the official publication of the National Safety Council.

Everyone of us should write articles in magazines and our daily newspapers, make speeches at the meetings of the Manufacturers' Associations, Chamber of Commerce, Rotary Clubs, etc. Every one of us should work up a questionnaire and send same in to the bureau of the National Safety Council, Automotive Section, for tabulation and issue of a standard questionnaire. Start campaigns within your factory departments to see which one has the highest number of points as to Good Plant Housekeeping, and put up in this department a framed poster, which reads: "This is the cleanest department in our Factory."

DISCUSSION

MR. R. F. THALNER, (Safety Engineer, Buick Motor Company, Flint, Mich.): We started a campaign similar to the one recommended by Mr. Stunzi in one small department that did not employ more than 30 men. My assistant went in there and talked with the foreman and frankly sold him on the idea. He cleaned up his department and we took a picture showing the department before and after it had been cleaned up. We gave him a lot of publicity in our house organ and mounted those pictures for him to take into his department. We took them around the plant and without any suggestions on our part, other departments commenced to call us asking for pictures of their places. It just seemed to spread like wild fire through the entire shop. We really were surprised the way it took. Whenever a man cleaned up his department, we took a picture of it and published it in the *Buick News*.

The thing got to be so hotly contested that we finally hit upon the idea of putting a score card in each department and each factory,

and we rated them the same as restaurants are rated for sanitation. The superintendent got behind the thing and for the foreman who had the best looking places, he put up a chicken supper or chicken dinner. By using the competitive instinct, we got some wonderful results along housekeeping lines.

MR. W. H. JAMES: (Mueller Company, Port Huron, Mich.): Of course it is all right for us fellows who are in charge of the safety movement in plants to take a personal interest; it is another thing to get the run of employes to take the interest. We have, in our plant, an industrial commitee. From each of the 16 departments one man is selected by his fellow employes and one man is appointed from each department by the management. That gives us 32 for our committee. We meet monthly. The "big boss" is present.

The different committees, grievance committee, safety committee, and all that sort of thing, are appointed out of this membership of 32. I have had the honor of being the safety chairman for about six years now and they have dubbed me the "safety engineer."

In forming the safety committee, we have generally had about two or three members. I claimed that was not enough. So at the last inaugural meeting of the new committee of 32, I asked the president to allow each one of these 32 men, that is, two from each department, to be the safety committee. I called those fellows together and had a little talk with them. I told them what I required along plant housekeeping lines.

Some of our departments were pretty dirty, especially after the noon lunch hour. Orange peelings, banana peelings, all that sort of stuff, was thrown all over the floor. In a few weks, I began to notice a great improvement. Paper and other debris was gathered up and placed in the waste cans. One man was allowed to go to the cafeteria in our plant and get the milk before the whistle blew. The empty bottles were placed in his little receptacle to be carried back as soon as the boys resumed work. Nothing was strewn about the plant.

With one or two from each department interested in safety, especially as regards the housekeeping end of it, we are going to get some place. I know I am beginning to see the results in our plant.

Employment of Sweepers

MR. S. H. REAMER (Cadillac Motor Car Company, Detroit): We were employing 135 sweepers. After putting on a time study of this work, we now have 58, a saving of 77 sweepers. These janitors are under one head, a janitor foreman who has an assistant. The foreman in each department is held responsible for the cleanliness of his department. The cleaning is done by gangs, four or five to a gang. When they finish a certain department, they present a book for the foreman to sign. If things do not look the way he thinks they should look, he refuses to sign the book. If the book is not signed, they

cannot get their money and of course they immediately get in touch with their foreman and he adjusts the matter. Of course, it only happens now and then that a foreman thinks a department has been neglected and refuses to sign the book. As a whole, the plan is working out very satisfactorily.

These men average about $6 or $6.50 per day. That is determined by the square footage and the conditions of the department to be cleaned. Where the sweepings ar heavy, they would be paid at a higher rate than in a department where there were only shavings and light stuff like that.

Furthermore, our rags are all collected after five o'clock. We have a laundry which makes a collection of rags at four o'clock, but after five, these janitors on this piece work basis make a complete survey of the whole plant and every rag that is left in a waste can or on the floor is collected and taken outside and burned. On the first collection, the rags are taken back to the laundry and rewashed. We find that it pays. All of you are not fortunate enough to have a laundry, but when you do have one, I think this plan would be best.

MR. ALFRED C. KENNEDY (Oxweld-Acetylene Company, Newark, N. J.): It might be interesting to the delegates to know that in our plant the management conceived of the idea that the best way to put good housekeeping over was to sell it to the foreman. So they made this announcement, that the foreman who had the best record of clean housekeeping and good safety methods during the year would represent the company at the annual Congress of the National Safety Council. You can readily see what that means to a man. I know it meant a great deal to me and it was through this plan that I became a representative of the company, the only one sent here.

Report of Nominating Committee

MR. BLANK: These are the nominations we wish to bring to you: For chairman, R. F. Thalner, safety director of the Buick Motor Company of Flint, Mich.; for vice-chairman, G. A. Kuechenmeister, of the Dominion Forge & Stamping Company, Walkerville, Ontario, Canada, and for secretary, J. R. Anderson, safety director of the Continental Motors Corporation, Muskegon, Michigan.

(The report of the committee was accepted by unanimous vote).

SUPERVISING IN RELATION TO SAFETY

T. P. Archer, Vice-President and General Production Manager, Ternstedt Manufacturing Company, Detroit, Mich.

When we come to consider the question of safety and its application to present day industry, we have to go much deeper than mere theory can ever delve. We have to fashion much more craftily, than any mechanic has ever yet been able to do, because we are dealing with an

element that is not theoretical; with an element that is not mechanical; but with the daily operation of this thing which we call the human mind.

It has not been been so very long ago that we had in our factory a considerable number of accidents. I will say it has been a couple of years ago. It began to become a very serious problem. We began to do some very serious thinking because it had begun to touch our pocketbooks. You know, the ordinary hard-boiled production man does not care much what happens to the other fellow because he has in mind just one idea. He probably has a pretty hard-boiled production superintendent behind him and that man has a general manager behind him and they all have just one thing in mind—to get production out of the shipping door so that they can get money in the treasury door. That is the thing they continually pound in on the daily round or daily travel. Just one thing: get it out no matter what the expense or the result. If they loose a few fingers, a few feet, an arm sometimes or a hand or a toe, it is only an incident in the day's work. They forget, until it is brought to them right through their old pocketbook, that safety is just a matter of economy and just as important a feature of the economic operation of the plant as the operation of their machines, the threading of their material and furnishing their supplies.

So we began to consider this problem because it had touched our pocketbooks good and plenty. I made several little trips. I went to one very large industrial plant, one which you all know and which is represented here today. I sat across the table from the general manager then of that plant, (he is not there now) and I said to him, "Bill" (that isn't his name but it will do), "I understand you fellows are doing a lot from a sefety standpoint. You are spending a lot of money and accomplishing a lot". I could not have started a greater explosion. This man is pretty well-known for his ability to sling cuss-words and he slung them double-barreled that morning.

"You are absolutely right that we spent a lot on safety. You are right a couple of times that we have accomplished a lot of things, but it has not been safety. A year ago I let a man talk me into spending $350,000 for safety. He went out and hired all the experts he could find. He built all the machines that anybody could recommend. They came in here and built fences seven feet high around most of our presses and most of the other machines. About a couple of months later, they were not satisfied with that, and the fences were shoved up another foot and a half. In spite of all this, our accident record kept going right on up."

The Human Element

I asked, "What was the reason?" To tell it to you in a short way, it amounted to this: They had spent money on every device that any one could suggest; they had carried out every theory that any

one had to offer; they had built and executed every technicality that their crew of experts presented. They had organizd safety committees; they had put up signs; they had a big meeting to start off their campaign, with a band and all the foremen present, and they had all their employees get together and the president addressed them and it went off with a big blare. They said, "We are going to have safety in our plant and they had safety for a couple of days. Then they got busy on production and everybody forgot about it and in six months most of the stuff was in the scrap heap and in a year they had more accidents than ever before. And why? Because they had forgotten the one important feature which would have served to amalgamate all their theories, all their mechanical constructions, into a successful operating plan. They had forgotten to take into consideration that they were dealing with the human element. They had forgotten to take into their confidence the foreman and superintendent and the men who are operating and are daily responsible for the operation of the employees, and the men who are actually out doing the work. They had not sold them, had not educated these men to the reason for all of these movements and all these mechanical devices being installed, and the result was that the first time a fellow found a guard around his machine and the thing was in the way, he ran a truck into it and threw it out on the scrap heap and went ahead and cut off fingers.

The biggest cry in industry today, the biggest cry there was in industry yesterday and the biggest cry in the future of industry is the cry for brains. I have said this many times before. It is the biggest demand; it is the biggest problem that we men who have charge of the largest industrial organizations have to face. The human animal is naturally lazy. The human mind is the laziest function of the human animal. We are prone to be creatures of habit. It is mighty easy to let the other fellow do your thinking for you. If possible, we always insist on the other fellow doing our thinking for us. Habit is simply automatic thought. There is an idea. Habit is the one easiest acquired human tribute because it is the simplest line of least resistance that the human knows how to follow. Habit means automatic thought.

If we would acquire in our workers something resembling automatic thought, couple that up with automatic machinery, couple that up with our fine theories, wouldn't we be approaching somewhat the solution that we are after in dealing with the human element, with the supervision of the human element in industry? And how do we acquire habit? We acquire habit through education And what is education? Education properly applied becomes knowledge, because education of itself amounts to nothing until you learn to apply the information that you have obtained. Then it becomes knowledge. And how do we acquire knowledge? We acquire knowledge by supervision, by training, by teaching.

Education Is Most Important Function

All of our present industrial organizations, or the greater part of them, certainly those who have grown large enough that they cannot be operated by one man who is the superintendent foreman, general manager and even office boy, are organized on what is termed the functional basis. We have our specialized engineering departments, our production departments, our financial departments, our safety departments, and we are gradually learning that we are going to have our specialized educational departments. You fellows, it seems to me, will function best and function most and reach a nearer accomplishment of this entire plan of safety supervision when you realize that our most important function is education.

We cannot hope to succeed in our plans to educate or train the great number of workers that come to us daily and leave us daily unless we realize that this feature of education is a day-to-day proposition and a tomorrow's problem, and so continues on through the life of the organization, because in dealing with the human element, what you tell them today means little tomorrow. That you tell them tomorrow does not mean that they will remember it the next day. You have to tell them today, you have to teach them tomorrow and keep on teaching them if in the long run you ever expect to accomplish a lasting fixed habit which, in its operation, may become automatic thought and, to a certain extent at least, accomplish this great aim that we have before us.

I am mighty glad to be able to stand up here today and tell you that, generally speaking, we men who have the direction of some of the medium-sized and larger companies believe in this safety movement, not from a humanitarian standpoint alone, but from the old-fashioned economic standpoint. We believe in cooperation. We believe in engendering and, if possible, compelling cooperation among the employes and particularly among our supervisors and our teachers. We haven't many rules in the Ternstedt Company. I don't think we have any, so far as our general supervision is concerned, except just one and that rule is just this: we must have co-operation.

Ever stop to analyze that word before? Just stop and analyze it a little. If you always get cooperation you always get everything else. If you can educate any one man to the fullest type of cooperation, with all the rest of his fellowmen, you will get everything else that you are looking for. That is what we drive for, that is what we attempt to obtain at all times in the supervision of our factories because we know that if this fellow here helps the other fellow next to him, and the other fellow next door as faithfully and carefully helps the other fellow next door to him, the general goal for which we are all striving will be reached all in a bunch with everybody on the same train.

You fellows who are safety men or safety educators have a lot of difficulty obtaining from we fellows, the production men, the type of

cooperation that you require. There is just one way to do it and that is to get under the other fellow's skin.

A Safety Lesson Brought Home

It has not been so long ago that we had in our factory as hard-boiled a foreman as anybody else had. He had a reputation not only in our factory but all over town. His department was known as a "butcher shop" and that was not far wrong. But he had just this one idea in mind. He had been dealing with punch presses and machinery for so long that they were just so many piles of machinery and so many motors. He had 125 operators. We could not talk safe supervision to that man in any language invented. As a production man he was unexcelled but as a safety man he had a rating much below zero.

One day, Mr. Clarke, our safety man, was in my office and complained about this particular foreman, saying "If I could ever get that man Harry to work with me, we would get somewhere". I said, "Why don't you cut his fingers off?" I did not mean it; I was just mad. About a week later it happened. Harry cut off a finger and then he began to think—not much, just a little bit, but enough to make him think. He had been daily cutting off a lot of fingers throughout the plant through the carelessness of his supervision, having the idea that when he told someone a thing once they ought to know it from then on.

Harry began to think. Safety devices were put on more quickly when they were needed and things went along fairly well for a while. Soon they began to slip and before long were back in the same old track. A miracle happened. Harry got married and he married a girl who had been operating a punch press. Then it occurred to him that he might have married a woman with her fingers punched off. He is now the best safety foreman in the Ternstedt Company and he will keep it up.

The reason why I told you this story is that if you cannot get cooperation any other way, punch their fingers off or get them married. It is a sure cure.

While I am talking to you fellows as safety men, I want to get something over to you. I know how you get up and talk about us production men—how we never think of anything but production. We had an accident in our plant not many days ago. A man had his foot broken. The report came up to me and I said, "Get me the written report and I will see just what happened". The report came up and it seem that the accident occurred while two men were handling a truck, one pulling and one pushing and one of them had his foot run over. You have that kind of hazard every day and have had ever since we had trucks.

I said, "That is interesting, I am going to look into it." We thought we had the fellows trained so they would not run over somebody else's foot. So I investigated and here is what I found. The party who

was bossing the job of moving the truck was the nurse in the hospital; the man who was pulling the truck and got his foot run over was assistant safety engineer; and the man who was pushing the truck was the safety engineer. So there are men who don't think besides the production men.

We, of the producing end, are looking to you to carry on this educational feature from a standpoint of proper supervision in a way that we, who have our minds cluttered up with the daily activities of a general business, cannot do. We cannot give to this particular movement the attention that it needs. We must depend upon your specialized education and your specialized function to carry on the gospel of safe supervision to the men who are under our direction and who are our associates continuously, daily and weekly and monthly and yearly.

You are our one best hope; you are the men upon whom we must depend. In your specialized function, we like to think of you men as our first army of self-defense. We like to think of you men as going on with just one idea and that idea is this, not to make every industrial worker or every industrial supervisor a professional safety man, but to make every man a professionally safe man.

DISCUSSION

MR. R. F. THALNER: Mr. Archer, I would like to ask if any pressure was brought to bear on this foreman who was so hard-boiled before the time that he amputated part of his finger or before the time that he was married?

MR. ARCHER: We did everything except put him under a punch press. Most of you men certainly have had the same experience along that line that we had. I have been a punch press foreman myself, not so many, many years ago, either, and I know just how I felt when anybody came down there and got in my way. I had a punch press department with about 20 presses at the time and I was trying to get out of that 20 presses work that could not nominally be gotten out of 50. Some way or other, we were getting it out and any sucker that came down there and got in my way, God help him, because I was certainly going to land on him.

With all due respect to you safety engineers, when these things were reported to me, I could remember back when I was in the same position that he was in and I knew just what he was up against. He had exactly the same production problems and some way or other there are just two things these fellows are thinking about, production and their weekly pay envelope. He knows that his pay envelope won't continue unless his production keeps up with it.

Unfortunately, the natural feeling is that any safe practices are simply production interferences. We spent two years, I think it has been practically that long, attempting to educate by moral suasion and im-

press upon this man the fact that safe production could, properly applied, increase his daily production. As I told you before, he had to punch a finger off before he woke up to the fact.

THURSDAY MORNING SESSION

STANDARD STATISTICS

E. J. Clarke, Ternstedt Manufacturing Company, Detroit, Mich.

In our fight for reduced accident experience there is nothing more important to success, than good reliable statistics; no business or undertaking is worth while that does not keep records of cost and experience, and before activities begin in building or construction work, we must estimate the cost, and there must be reliable information.

Books of any technic are statistical, for they represent the experiences regarding the matter treated. Weather conditions are recorded by the government to determine whether our seasons are changing; whether we have ample rain, also warmth to favor crops; whether we are having more winter or more summer weather, and vice versa; in fact unless we have reliable information to guide us in our undertakings we have little chance of getting a desirable result, and this pertains to injuries in industrial plants with equal importance.

To get statistics, we must make records, and depending upon the character of the information desired, must we design our records to so enlighten us. Should this be multifarious as is the case we must design our records to consider the task of keeping them as a factor, for we all have that habit of putting off the laborious tasks, and punctuality in the easier tasks; and unless we design our record forms to minimize the work of tabulation, or, being able to employ assistance for that particular purpose, we must look to our own available time, and design our forms in perfect sympathy therewith; otherwise we will neglect it after a time, for other matters and later on shoulder the results of neglect.

We cannot depend upon our memories to carry a lot of detail, and the more gregarious are our duties, the less we shall be able to recall, and the greater will be our percentage of error in result. We must be able to determine what department is giving us trouble; the character of machinery therein; what were the time lost and comparative costs experienced at other intervals, and this applies to all departments. Unless we have records, we are unable to approach the management to secure funds in applying restrictive measures, because we fail to show actually what losses have taken place. Memory is a fickle jade; many times have we asked a foreman to guess the number of passes to the hospital he had written in the month, and rarely have they guessed more than half of those actually recorded in the hospital.

While I would not imply that lack of, or limited records will cause failure, still I am sure that we cannot work with any great efficiency

unless we have complete analytical records, and can plan our attack as does the engineer, or army general. The entire trend today is toward scientific analysis to enable close estimate, or make improvement over former experience, and without this, it is pure guess work.

Comparison with others experience demands records that are informative, and in addition, these must have been tabulated under similar conditions and with similar penalties, for unless this is done, there is no real comparison, and only your own previous experience is comparable to your present; outside and the general experience is lost as to comparison. Since the advantages appear to lie with comparable methods, we have the inducement to adopt records that will serve fully its purpose to ourselves, and in addition furnish data that is comparable to other similar operations compiled in a similar manner.

Character of Records

To be worthy of the name, accident records should give us all the desirable information; cause; extent, cost, appliance, location, how frequent, how severe and department classification. There must be a unified character of penalty attached if comparison is made with other plants for each specific injury; and withal, our form should be so fashioned that it will tabulate all these items of information, with a minimum of labor and time.

The hospital record which contains information required by compensation boards is another item we must consider in adopting a form since this is usually compulsory and our form should be in perfect sympathy with it and should contain the data localizing our desirable information, and enabling our further comparisons previously mentioned.

Recently a committee appointed from General Motors representatives, adopted a very desirable form, which appears to fill every need from all standpoints, and requires but little labor to tabulate, and we believe that the specimens shown herewith will readily convince you of these points.

The General Motors Corporation accident report form may be outlined as follows:

All departments are listed with the number of 250 hour workers for each department and the accidents are divided into three main divisions, machinery, materials and miscellaneous.

Under machinery accidents, there are seven subdivisions—1, punch presses; 2, grinding and polishing; 3, other metal working machines; 4, woodworking machinery; 5, miscellaneous machines; 6, power transmission; 7, hoisting apparatus.

Under materials are: 1, power trucks; 2, hand trucks; 3, elevator crane conveyor; 4, hand labor.

Under miscellaneous are: 1, electricity; 2, molten metal; 3, liquids, gasses and vapors; 4, falling objects; 5, nails; 6, hand tools; 7, falls of persons; 8, other causes.

At the right hand side of the report form, in parallel columns are listed the number of lost time accidents for each department; the days lost and the severity.

The report deals only with time losing accidents. The 250 hour workers are the total hours worked during the month divided by 250.

Classification has been somewhat of a deterient for keeping of records, due to a feeling that the strict classification was unjust to his plant, which had mixed up its operations in making progressive lines to facilitate production.

In this respect there is much room to substantiate such view but there is much in common method between let us say automobile manufacturing whether the plant be large or small, make its own parts or purchase them, and simply assemble; the automobile is different from most any classification of other lines, but not largely different from each other, so that a new classification to suit might be suggested, which would allow comparison with similar industry, and not be the discouraging element that causes limited or no records to ensue by reason.

Even this drawback is hardly justified as an excuse; we should have records in any event to enlist support; we need support from our superiors, from the foremen, from the job setters, in fact all who may be in contact with employe's and suitable records to confirm the experience of all departments, during a certain interval, is one of the indispensable methods of securing this support, and this applies to the plants of limited size more so than to the larger ones whose several departments are applicable to present classification, as the departments usually are complete in themselves.

A hospital sheet comes to me daily and contains the experience for that day. This shows the department what type of injury, and number of such, while below, it classes those sent out for special treatment, whether minor or major, also to me it indicates where proper redressing is being secured; again, at the end of the month it comes compiled into totals, and showing the cost of compensation, time lost and cause of injury in total, though I get a separate slip immediately following any severe injury and I investigate it. I cannot see where more than 10 minutes per day are required to make up and tabulate the entire record. System explains it.

At the end of the month we give to each job setter, assistant foreman, foreman, and superintendent a copy of the previous month's experience, which shows all cases treated in the hospital during the month; character of injury; and whether this was on a machine; if time were lost, and if compensation were paid, the amount; we charge up all time beyond actual first aid. The criticisms made are evidence of the interest therein.

Selling safety longer sounds odd to those who hear of it. Why should not the safety director of each plant be a salesman, and being with the manager of the plant, who is the arbiter of the funds spent for safety and who may be enlisted where necessary to emphasize the safety item to

recalcitrant department heads, where they have bought safety and put it to a poor use.

What is more effective in this selling process than a fine classified report that enables comparison with similar operations? What is more useful and impressive to the lukewarm foreman, then a comparable report, testifying as to his poor record in comparison with other departments? What is more convincing than the questioning of the foreman as to certain cases which he believes in error? Why should we not adopt a standard record form; the kind that a congress of many minds and opinions have selected? Standard statistics have come to stay and deserve the support of the safety man of every plant.

DISCUSSION

MR. A. L. KAEMS: (Simmons Company, Kenosha, Wis.): I have carried out this idea and found that it works out well for the reason that the department foremen get it and the first thing they look to is how much does it cost our department. Everybody wants to keep down his costs and the only way they can keep down their costs is, of course, by keeping down their accidents.

MR. W. F. DITTMER: (Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.): We endeavor to keep a record of every lost time accident. Of course, we record every visit to the relief department, but as I say, we have not made any effort to prevent those numerous visits because we are fearful that if we criticize or go after these fellows, they will cease to come there, which would mean that our cases of infection would increase. But every case of a lost time accident we do record and in order to avoid any trouble between the different departments, we do not compare one with the other, on account of the class of our work.

We are now running with probably 22,000 men in the Pittsburgh district. We advise the departments daily of the accidents in a particular department that is, just as soon as I get the report I advise the superintendent and the safety man in that department and, at the end of the month, we endeavor to give them a total list of all the accidents that have occurred asking them to try to beat their own record, not asking the switch bore department to try to beat the controller or the controller to try to beat the punch shop, etc. We feel that that is easily the best method whereby we can get results.

MR. E. F. BLANK (General Motors Corporation, Detroit): We have statistics for four different reasons; in the first place, to compare the experiences of one department or of one factory with another, to give both the factory and department heads an idea as to where they stand in safety, as well as the employes. We also have statistics to give the plant manager some idea of how these departments are standing. It probably is well to have those statistics in the form of dollars and cents, converted in some way, because that is what the

plant manager is looking for. He wants to know what the compensation costs or medical costs are that are incurred by the different departments.

We also have statistics for the help of the safety engineer in analyzing accident experiences. No safety engineer can do the efficient work he should do unless he knows where accidents are happening and the causes of such accidents.

(Chairman Averill relinquished the chair to Mr. R. F. Thalner, the new chairman.)

EYE PROTECTION IN METAL WORKING PLANTS

ROUND TABLE DISCUSSION

MR. GEORGE S. THOMPSON (Royal Indemnity Company, Detroit): Goggles, in the opinion of the speaker, is local option to this extent, that they won't be used unless they are insisted upon. Now, psychology is a wonderful thing, and in listening to a discussion on it a short time ago, I was greatly impressed with one particular expression the speaker made. He said, "We draw from our sub-conscious minds, our sub-conscious selves, but bear this in mind, we only bring up what we have sent down". I thought that was the whole speech. It was to me, because if you send down negative thoughts, it is absolutely as sure as you are a foot high that that is all you are going to get back. You can't keep taking out and not putting in, or if you send down all bad, you are going to get all bad in return, for as you sow so will you reap.

Now, where does the goggle fit into industry? It fits into industry in this way, from my angle, that the eyes are the windows of the soul. Without eyes a man is only 20 per cent efficient. Take his eyes away and what has happened? You have reduced the human efficiency of that man 80 per cent.

Now, can industry afford to do those things? I don't think so. Industry does not want to do those things. We thoughtlessly go to a grinding wheel—I have done it myself. I have a hunk out of one of my eyes now, all foolishness on my part I grant you that. I attempted to grind a No. 60 drill on an eight-inch stone and there was only one thing that could happen and that did happen. I did not have glasses on or goggles or a shield, and as you know, a No. 60 drill is a very small article. In fact, it makes a hole about a thirty-secondth of an inch in diameter, so it is not very large.

In attempting to repoint that drill, one of the obstructions on the surface of the stone, which was not the smoothest thing in the world and you know they are not kept very smooth in the tool shop because every one is grinding everything from a No. 60 down to an inch and a half, and just in endeavoring to touch that up instead of going over to a stone we had for that purpose, that drill broke in the middle and the center piece of it flew up and cut a gouge out of my eye.

A pair of ten-cent store goggles would have saved me from paying $18 every time I bust one of these lenses. That was only a simple thing and yet it occurred to me and I imagine, I try at least, to have common sense and use ordinary discretion, but I did not do it in that case.

Don't expect the man who is getting 45c or 50c an hour, or maybe 60c an hour or 30c an hour or $2 an hour, if you please, out in your shop, to use eye protection if you don't tell him, if you don't insist upon it, of you don't make the line of least resistance very, very smooth for them so there is no obstruction at all.

Mr. Schwab has said that a man from the neck down is worth $2 a day. From the neck up, there is no limit. You know that is very true. When a man's eyes are out, what have you got? A $2 man is all you have and you hardly have that.

Can we afford in industry today to continue along the path we have been traveling and allowing a stubborn tool maker, a thick-headed machine repairman or the ever-hurried maintenance man to continue to go along and put his eyes out and cost us a lot of money and himself a lot of money because we have not done our part, and that is sell him on the idea of protecting himself? I have often likened that situation this way: We take a big corporation or a small corporation. That is a building; the building is enclosing machinery. Now, if any one came along and started to throw bricks in through the windows of that building, it would not be long before the arm of the law would reach out and say, "Come on, boy. You are in the wrong street. We are going to take you down where you belong!"

Importance of Eye Protection

Did you ever realize that each and every one of you is a corporation in yourselves? What have you got? Nothing but your ability to produce results and sell them to somebody else. That is all you have. Now, if you are going to deliberately throw bricks through your own windows, you are destroying your own corporation, are you not? It is perfectly simple. It is a fact and you are decreasing your own particular efficiency just that much. I have decreased my efficiency because in this lens here, if I happen to get something in the other eye, I have a little difficulty when I am going upstairs. I don't quite reach as far as I ought to. I don't function right because I broke one of the stained-glass windows in my cathedral. That is the reason.

Now, what shall we use to prevent it. The only way that we can come to the answer of that is to go back to the local option question, and that is this: There is a grinding wheel. That is one unit, only one unit of industry. We have a buffing wheel; that is another unit of industry. We must take each one of these particular machines in industry and we must say that that machine, to be right and safe, must have certain equipment. That equipment must be to watch the pro-

tection of the operator first. That is where we have to start from. We have to protect him.

Now, what kind of goggles shall we use? What type of shield shall we use? What type of protection shall we use on that particular machine? If I should stand here and tell you that one pair of goggles made a certain way of a certain kind of material to fit a man in such and such a fashion would be the one to use, why I would be just an unmitigated fool, that is all. It would be preposterous for me to stand up before you and endeavor to push that down your throats because I could not sell it to you.

You must find out that if goggles are the result of analysis of accidents on those machines, then goggles must be worn. A lot of us don't like to be vaccinated but we are just the same. Why? Because we know from analysis that it is a protection against a certain trouble. Then why not vaccinate for goggles on grinding wheels or shields or some type of construction that is going to eliminate the danger of the accident.

Let Men Select Their Goggles

MR. A. L. KAEMS: (Simmons Company, Kenosha, Wis.): We had a lot of trouble getting the men to wear goggles, especially in one department where we are pouring all day long, making our children's beds. When I looked into the matter to find why they did not want to wear goggles, I found a reason for that. They had been furnished with a certain kind of goggle which the purchasing department thought was what they needed and it was a cumbersome thing to wear all day, especially when a man was perspiring.

I got a lot of samples, got the men together and let them decide upon a certain goggle. They picked the cheapest goggle that was on the market. It costs them about 12 cents apiece and they have been wearing them for four years and we have not had an accident in that department. And it is *their* goggles that they wear. The superintendent of that department tells me that any time I come in here and find a man working without goggles, I will get a box of cigars, and I have not got it yet due to the fact that the men had something to say about the goggles they were to wear. I think the men should be consulted about the wearing of their goggles.

We had another bad condition where we saw tubes. We saw iron tubes and sparks and very fine particles are everlastingly thrown off. They wear goggles but from the fine particles that were blown off, the men's necks were continuously cut. We have men who have worked a long time on those saws who have scars on their necks today. We took up this serious trouble and started out to remedy it. We worked and worked until we found a certain guard, a very cheap one, that could be put on that saw and we have not had a bit of trouble from that time on. Not a man has been in our hospital for a year and eight months to have a wound dressed from that cause. That absolutely does the work.

The thing that you must do is find out the cause, remove the cause and when you have done that you have solved your problem. In the case I have cited, the men like the work and do more work than before. When we put this little guard on they had to make a different move than they were accustomed to making. That was the only thing that at first hindered a little bit. Why did it hinder? A man thought he could not make as much money as he did before. After one day's work, he had gotten away for his old habit, formed the new and it did not bother him a bit; in most cases it increased his earning power.

MR. THOMPSON: A large plant was making ball bearings and one of their operations was the grinding of the cone. The cone bearing was merely a hub with a channel in it and it was hardening in the channel only. Now it was of the greatest and most vital importance that grinding dust particularly must not accumulate on the arbor upon which this little hub was set and then the grinding wheel was fastened to a table that traveled on a center and it gave the rocking motion which caused the grinding action. So you were not grinding in any one particular place for any period of time. The wheel was knife-edged and it was just a matter of cleaning that out. Now that was all done by girls and they had in that department 200 girls, that is they had equipment for 200 machines and were operating as many as they could get girls to operate.

Eliminating the Spark

Well, the girls came in and looked down this place, and there was a girl sitting there with "moon-shiners" on, big goggles, and they said, "Why, this is a dangerous job. I don't think I want to work here." They had difficulty in getting the girls. We went in there and looked the place over and said, "We don't see why you should have any difficulty with this." Of course, the swinging of the grinding wheel and the bearing rotating did give you a complex condition because you could not put a housing system on there which would by any means catch all of the sparks. The wheel had to be hooded and protected in some manner and still the operator had to see the work.

We tried glass shields and it was not long before the glass was frosted, naturally, from the sparks striking against it and cutting the glass. That would not do. So it was finally eliminated entirely by doing this: Eliminating the spark, or quenching it at its source. That was all done just by taking a little piece of round belt leather and fastening it to a semaphore that operated over the hood of this grinding wheel.

The grinding wheel wears down, too. One wheel will last for just a day and two hours, that is 10 hours, because when the wheel gets down to a certain point, its surface cutting speed is bad.

By taking this little piece of belt leather, two inches long, and letting it right down on the wheel, the result was that all those sparks, every

one of them, went down into the funnel-like receptacle that was made to catch them but which did not catch them heretofore because they continued to go around the wheel. It is the one that goes around he second time that hurts because when it hits, it sticks. Look at one under a ten or twelve thousand magnification and you will find that it is just exactly like my fingers and when it hits the flesh of the eye, it hits that way and burns its way in. It doesn't come out either. You have to go after it and sometimes the structure of the eye, after it has forced itself in there, will grow over the outer edges and then it is a very delicate and a nasty operation to remove it. A magnet to pull it out will tear that structure and then you are going to have trouble because a cataract will form, or a white spot. Now that means that the doctor has to take a magnifying glass and cut every one of those little sections and then get under the piece and take it out.

Goggles for Snagging

MR. H. L. W. BOWLES (Maxwell and Chrysler Motor Corporation, Detroit): All the men in our snagging room are wearing their goggles. Men from the crank shaft department come over for just a minute to grind some tool. So I went to the foreman of the crank shaft department and asked him what his men were doing over in the snagging department grinding tools as they were not supposed to be over there. The tools should go to the tool room where the men were wearing goggles and where they have an exhaust system and shields to protect the eyes. I said, "Are you going to stop that for me or shall I go to the superintendent?" He said he would stop it and since that time we have had no trouble. The tools go to the tool room and are ground by the proper men. We don't allow the men from the various departments to go into other departments to grind tools or to use a machine in another department with which they are not familiar or are not supposed to use.

While I am talking I want to relate a little experience in our spot welding department. I had had considerable trouble getting the spot welders to wear goggles. They would wear them while the inspector was there and when his back was turned, off they would come. Finally I got a pair of goggles that had been used and took them to the company doctor. They were all marred and had little nicks in them. I said to him, "Doctor, what effect would spot welding have on the eyes if it has that effect on the goggles?"

He said, "It wouldn't have any material effect for possibly five or ten years, but when the eye gets in the shape that goggle is in, only worse, as it will, it is just like shutting out the light from the window. As soon as it gets covered with scars, the man is blind." So I went to the men. "Now see here. If your eyes get in the shape that goggle is in, and they will in the course of a few years, you are going to be blind. I am going to have a bunch of goggles here and let you take

your pick." I called up our goggle man and I had two or three men from each department and the assistant foreman come together and I said, "Now take your pick and we will supply you with any type of goggle that you want.'

They took several pairs down and tried them out. And they picked the ordinary automobile driving goggle with amber lens. There is no particular strength there but I can't get those goggles off those men now. I can't go in there any time of the day on any kind of work that the men haven't all their goggles on. They picked their own."

MR. W. H. JAMES (Mueller Metals Company, Port Huron, Mich.): In our tool room, we could not get the fellows to wear goggles while they were grinding. So I put a glass on the wheels, a glass shield. I made one myself and in the repair shop I put this little piece of a leather belt on. We have not had an accident since two months ago when I started it. Previous to that time we were having from eight to ten or twelve a month. In the tool room, all the accidents were eye trouble. Since I put this window over their wheels, we don't have any. That is, on the finer wheels. Of course, on the coarse snagging wheel, the boys wear their goggles, but in the production brass shop they all wear goggles. We don't have any trouble there.

Tool Makers

The tool makers are the only men who give us any trouble in our shop. We had some difficulty in trying to get those fellows to wear goggles. I would not do it myself. But this glass, this window glass, is adjustable so that if the glare of the light throws the wrong reflection on your work, you can adjust this glass so you can see perfectly through it and it does not interfere with vision at all. By that means we have taken care of a lot of accidents in our department.

MR. H. O. PRESTON (Texas Company, Port Arthur, Texas): I am sure we all agree that for certain jobs and certain work goggles are an absolute necessity. But there is a very good point which has been brought to my mind. I am wondering if the solution would not be, in the tool room and machine shop where they grind tools, to eliminate the goggles and use the glass shield, if that would not solve the question where they do not want to wear goggles that might be unsanitary when they are perspiring, etc. I think that point which was brought out is a very good one.

MR. A. L. KAEMS: We have used a glass shield and since that time have had no trouble, but we are going to try the leather just the same.

MR. S. H. REAMER (Cadillac Motor Car Company, Detroit): There is one thing we have overlooked in selling our men the goggles and that is the sterilization of the goggle. Now, let me lay great stress upon that. We have a man who does nothing else but sterilize goggles and every goggle, before it goes back to the tool crib, has a new

band put on—the old band is cut off and a new one put on. Our men look for the new band and if they get it, they know it is all right. If there is no new band, they will not take the goggle out. Now, I think that is a pretty good guarantee that he knows he is getting something that is all O. K. As far as the balance of the goggle is concerned, it has been well taken care of.

MR. THOMPSON: It seems to me that so far, with your kind of help, we have produced what I would say is a tentative set of standards. In analyzing a little bit, I find here that for the tool grinding in the tool room, it seems to be the consensus of opinion that a glass screen would be the thing to use. Don't forget it. Go home and put it into practice and try it out. Now when you some to snagging, you want a goggle. You see how easy it is if you will only get together and talk over your experiences, how from sifting it out we can get the greatest number of opinions for the one particular article to be used? Now for welding, the consensus of opinion is a goggle, a regular automobile goggle; for chipping, a laminated lens by all means.

ADJOURNMENT.

Cement Section

October 1 and 2, 1924

HENRY A. RENINGER, Chairman
Special Representative, Lehigh Portland Cement Company, Allentown, Pa.

H. G. JACOBSEN, Secretary
Bureau of Accident Prevention, Portland Cement Association, Chicago, Ill.

WEDNESDAY MORNING SESSION

CHAIRMAN JACOBSEN: Gentlemen of the Cement Section, this is the Thirteenth Annual Safety Congress, and we are here to take part to the best of our ability. It is very encouraging to see the big gathering of cement men here.

Major Reninger, Chairman of our Section, cannot come to this meeting.

He has asked me to give a summary of what has taken place in the cement industry since we met last year, in Buffalo. That meeting did a good deal to get new activities under way at many plants, and during the past year we have had the pleasure of seeing several plants that, in the past, had not done very much in regard to safety work, take up this very important work and obtain excellent results.

Possibly the most important activity in connection with accident prevention work has been the No-Accident Month campaigns which have been conducted at many cement plants. Several were conducted during the month of September. This being the first of October, I am sure that we, today, will get the results from some of these plants.

The "Study of Accidents," that was published in May of this year, on the 1923 accidents, compared very favorably with figures from other industries. Last year the cement industry was able to show a very considerable reduction in severity rating and also a small reduction in actual number of accidents. Practically all other industries showed increases. It is well known that accidents during the last two years have, in general, gradually increased. It is somewhat puzzling to understand why accidents, after the good work accomplished in past years, should suddenly increase. This is one problem we should get after here, and see if we cannot find some reason for it, and some way to remedy it.

The cement industry is extremely fortunate in having, through the Portland Cement Association, practically all cement plants in the country thrown rather closely together in work of this kind. There are not very

many industries that have equal opportunities to gather information and figures. We know fairly accurately what takes place in the way of accidents, as well as in accident prevention work and, knowing that, we ought to be able to do better work than a good many other industries. I believe that our figures show we are doing better work.

REPORT OF NOMINATING COMMITTEE

First on the program is "Report of Nominating Committee." Mr. Purkhiser, of the Lehigh Portland Cement Company is Chairman of that Committee. We would like to have your report, Mr. Purkhiser, for Chairman and Secretary.

Will George Ross please take the Chair?

(Mr. Ross assumed the Chair.)

MR. PURKHISER (*Lehigh*): Mr. Chairman and gentlemen: Mr. Halpin, of the Marquette, Mr. Cam, of the Canada Cement Company, and myself were appointed a Nominating Committee to nominate the officers. We thought this matter over very carefully, sort of reviewed the work for the past two or three years, and after discussing the matter from all angles, we want to suggest the renomination of Major H. A. Reninger as Chairman, and H. G. Jacobsen as Secretary. We felt that the work which has been done is very complimentary to those men. The very fact that we have so many present today proves this.

Do I hear a second to this nomination? (Nomination seconded.)

CHAIRMAN ROSS: It has been regularly moved and seconded that Major Reninger be nominated as Chairman, and H. G. Jacobsen as Secretary, to serve for the ensuing year. All those in favor, signify by saying, "Aye;" contrary, "No." (Nomination carried.)

(Mr. Jacobsen resumed the Chair.)

CHAIRMAN JACOBSEN: I am sure that Major Reninger will be glad to serve another year. He has always taken a great interest in this work, and I know it must be very important business that keeps him in Allentown. This is the first Cement Sectional Meeting he has missed since the war. I shall notify Major Reninger that he has been elected Chairman of the Cement Section.

Next on our program is a paper which I know you will all enjoy listening to. It is by B. F. Affleck, President of the Universal Portland Cement Company, who for many years has taken a very active part in this work.

MR. AFFLECK (*Universal*): I want to emphasize or rather repeat what Mr. Jacobsen has said about the good attendance. I must confess that while I have been interested in this subject for a long time, I have never attended any of the National Safety Congresses, but I have attended the Safety Committee meetings of the Portland Cement Asso-

ciation a number of times. I am quite gratified at the large number who have left their respective places of business and employment, in many cases many miles away, and taken the time to come down to this meeting. I think it is well worth while for your respective companies to have you here. We have two of our men here, I wish we had a third, but it was not practicable at this time.

I have written down some notes which I will read.

SAFETY FROM THE EXECUTIVE'S POINT OF VIEW

S. F. Affleck, President, Universal Portland Cement Co., Chicago

One of the outstanding developments in recent years relates to the preservation of health and the saving of life and limb. The medical profession, including of course dentistry and surgery, has with the aid of the chemist, engineer, and inventor made great progress in the prevention and cure of disease. I need not quote the figures but the reduction if infant mortality, for instance, now as compared with a generation ago is quite remarkable and it has been truthfully said that if Dr. Gorgas as someone else had not discovered the cause and applied the remedy for yellow fever, the Panama Canal would never have been built. Typhoid fever, as a result of joint action of several professions, has been very much reduced and our various communities will no longer tolerate a condition of water supply, even for a brief period, which contains typhoid germs. In the Engineering News-Record of September 25 is an article indicating a definite tendency on the part of the Courts to hold municipalities or water companies liable when they furnish water containing typhoid germs.

Out of the World War came an advance in surgery which enables the surgeon to save both life and limb in cases which were formerly thought to be hopeless.

The interest which industry is taking in the question of safety and related questions is impressively shown by the large attendance at this Congress and by the formidable program of numerous sections, and it is to the credit of the cement industry that it is not only doing its part in its own field but co-operating with others who are working in their respective fields.

It is a strange paradox, I may say, in passing, that, while certain elements have been acting along these lines, the World War had undoubtedly the effect throughout the world of greatly reducing the value placed on human life. Of course, it must be admitted that while we all hope that the world will never see another great war, several nations through various agencies are more of less actively at work on inventions which on the one hand are calculated to make war more deadly than ever and on the other hand to resist or repel these increasingly destructive methods of attack.

The slight value which is placed on human life is well illustrated by the casual attention given to the daily loss of life by the automobile. The newspapers in Chicago record in various graphic forms the daily and cumulative loss of life from this cause but, while considerable effort is made to apply a remedy, the figures continue to mount higher and higher and the public at large shows little interest. I refer to Chicago, but the same conditions apply in New York and other populous centers of the country where traffic congestion introduces a great hazard.

Classes of Accidents

Accidents, as you of course well know, divide themselves into three general classes—

1. Those which may with more or less truth be called unavoidable.
2. Those which are due largely or entirely to carelessness of the person injured.
3. Those that are due to carelessness of a person or persons other than the one injured.

It is perhaps beyond human ingenuity to prevent accidents of the first class although the situation in this respect can doubtless be greatly improved and as the years pass we will probably find means to avoid many accidents which we now class as unavoidable. As to the second class which, speaking broadly, includes of course the reckless, incompetent or drunken automobile driver and the insufficiently skilled or insufficiently trained workmen in our industries, much can be done to improve conditions. Industry is not directly concerned with finding the way to control or curb or punish the automobile driver who is responsible for injuries and death, but we can, I think, get some satisfaction out of the thought that we do better in this resect than the automobile driver.

I need not tell you of the progress which the cement industry has made along safety lines, but I do wish to say at this point that the work of the Accident Prevention Committee of the Portland Cement Association has been most excellent. Mr. Jacobsen has been tireless in his efforts to stimulate enthusiasm and he has been most industrious in compiling and arranging the data so as to show clearly the record of the industry. You are more familiar with the actual work than I am, both as applied to the industry as a whole and to the individual properties which come under your care, but I think you will agree with me when I say that we have quite a distance to travel before we reach the goal.

Notwithstanding the great improvement which has been made since the beginning of the safety movement, there is still a great deal of room for improvement in guards and various devices to keep employees away from danger. But as I see it the particular place where there is most room for improvement is in the training and education of the employees. This training and education, strange as it may seem, is in a direction

opposed to a well known but hard to explain human trait—the willlingness to take a chance or, to state it more accurately, the preference for taking a chance over taking more time or more care. This is especially noticeable in automobile accidents at railroad crossings where in spite of adequate warning signs the driver prefers to take a chance on beating the train to the crossing rather than wait until the train has passed. In talking with the claim agent of a large railroad a few days ago he told me that in the majority of automobile crossing accidents on his road the automobile ran into the train rather than the train running into the automobile.

We all know that in our plants men will disregard a warning sign and walk across a place above which other men are at work on construction with danger of dropping a tool or similar object. They will walk across this dangerous area in the face of warning signs and barricades rather than walk around it. They will climb over a revolving shaft rather than walk around it. They will start a piéce of machinery which has been under repair first and replace the safety guards last instead of reversing the operation. They will neglect slight injuries, especially cuts, burns, or abrasions in spite of instructions to the contrary, until infection has begun.

Prevention Is Difficult

Prevention of accidents is, I need scarcely tell you, a large and difficult proposition. It is one on which much more information and advice can be obtained from the novice than from the expert. By that I mean that the outsider can say: "You are having too many accidents, why don't you prevent them? It is easy to do it. Put up barricades, put up signs telling the workmen to be careful and so forth." In other words, the difficulties are less apparent to the outsider than to the man who is called upon to remove them. Executive officers have a great responsibility with respect to accident prevention. They are responsible for providing the means for education in safety, to teach restraint and consideration for the safety of others, and they must realize that they cannot shift the burden of final responsibility.

In a study of a number of accidents it is usually found that about nine out of every ten would not have occurred if someone had done some little act or if someone had used a little more care.

In all cases, before a construction job of any magnitude, either in new work or repairs, is undertaken, the situation should be carefully studied by those in charge and the safest way of performing the work selected. The figures show that more accidents are due to failure to give work of this kind proper study, than are due to unguarded machinery, and they are just as inexcusable on the part of those in charge of such work.

In carrying on accident prevention activities there should, of course, be a comprehensive safety organization consisting of officials, foremen,

and workmen, because if safety work is to be a success it must be everybodys' job to prevent accidents. Although safety committees are invaluable in promoting safety education, we must get into personal contact with the workmen themselves and keep the subject ever before them.

It is well known that conditions under which men work and their feelings toward their work and their superior officers are very important; that pleasant surroundings and proper conditions make for better and more careful workmen and a higher standard of citizenship. Doubtless there is a great deal in the psychology of accident prevention. I believe that the experience of the U. S. Steel Corporation proves that providing comfortable working conditions and adequate sanitary equipment, beautifying the premises with grass plots and flower beds, organizing fellowship clubs, etc., has been an important factor in inducing the feeling of hearty co-operation which has resulted in increasing production and in reducing accidents.

I am not belittling the responsibility of the employee in accident prevention, but the lead must be taken by the employer. In the stress of business and the hurry for production, a great deal depends upon the attitude of the chief executive and his assistant. It is necessary that he have a sincere desire to prevent accidents and that he be willing to make some sacrifice to accomplish that end. It is not sufficient that he wish there were no accidents; that he is sorry that workmen are so careless; but he should point the way; he should lay out the plan of campaign; he should build up that feeling of personal responsibility or conscience which will make every man feel that the success of the work largely depends upon his own efforts.

We condemn a man whose carelessness injures another, but we know he would not have done it had he stopped to think—he did not feel that personal responsibility or have that conscience which would have prevented the accident. We must teach him to think. We cannot do it by merely installing safety devices and telling him to be careful. We must reach him by other means—not by preaching, but by creating an atmosphere of personal responsibility and co-operation around the works and carrying it, so far as we can, into the homes.

That phrase "creating atmosphere," reminds me of a story I heard some time ago. At a certain college there is a long corridor which gave a great deal of trouble—the students throwing burnt matches and cigarette butts and cigar stubs, etc., on the floor. They watched the students and cautioned them and reprimanded them and put up signs, "Don't spit on the floor," and all that sort of thing, but no remedy, no effect. They finally put some lights in this corridor, whitewashed the walls and ceiling, and created an atmosphere of cleanliness and order, and from that time on, there was no offense. In other words, when this corridor was made to appear light and clean and orderly, there was no temptations, no thought of throwing rubbish in the corners. We have this condition all around our plants, and while this point may seem very

trivial and unimportant, I think an orderly condition in our buildings and around our buildings in the yards, etc., will contribute very greatly to creating an atmosphere and bringing about a mental attitude of cheerfulness and contentment, peace of mind, and care in industry.

I do not think we attach nearly as much importance to that very simple condition as it is entitled to.

In our own personal experience, I am sure we have all noticed the difference between our state of mind under certain surroundings, certain disorder, noise, confusion, and so forth, on the one hand, and under a condition of cleanliness and order and quiet on the other had.

Foreign Labor

I am rambling somewhat here, but if I may have the time, Mr. Chairman, I want to emphasize this, do not overlook the fact that the foreign labor, of which we have so much, including the darky labor, is human; those people are human beings exactly the same as we who call ourselves native or Americans or English or what not. After all, the difference between so-called foreign labor and native labor is a difference only in degree. I call myself an American, yet I am only one notch removed from foreign, my father came from Scotland and my mother came from England, so there is only one degree difference between me and the fellow who has just arrived from the old country.

One of the difficulties in handling that foreign labor, I think, arises from the fact that we are prone to consider all the men who speak a foreign language—that funny language you can't understand—as foreign labor.

We have thirty-one nationalities at one of our plants. These men have their national traditions and their language and dialect and all that sort of thing, and in may cases there are traditions of many generations standing, of antipathy between one group and another. Now, if we class them all as the same foreign labor and treat them all alike, we are very likely to have trouble. We have to recognize they are human beings, that they cling to their traditions just as we would cling to ours if we went to some other country. We will get along better if we recognize those things until the second generation of these foreigners come along, when they will begin to blend better.

Safety and welfare work in the Steel Corporation has the active support of its chief executive, E. H. Gary. In 1906 a meeting of all casualty managers of the subsidiary companies of the corporation was called in New York, where ways and means of reducing the number of accidents were discussed. In 1908 the first safety committee for the corporation was organized. At that time Judge Gary advised that they would not hesitate to make the necessary appropriations of money to carry into effect every suggestion that seemed to be practicable for the improvement of conditions at their mills, as far as our employees are con-

cerned. Later Judge Gary wrote the presidents of the subsidiary companies: "The U. S. Steel Corporation expects its subsidiary companies to make every effort practicable to prevent injury to employees. Much can be done by designing new construction and machinery with all practical safeguards. Expenditures necessary for such improvements will be authorized. Nothing which will add to the protection of the workmen should be neglected. The safety and welfare of workmen is the greatest concern."

Since that time, under the general direction and support of Chairman Gary, a welfare organization of great magnitude has been built up.

From January 1, 1912, to January 1, 1923, 84,491 men have served on safety committees in the U. S. Steel Corporation. Ten thousand three hundred and thirty-one men are now serving on such committees; 20,719 employees have been trained in first aid and rescue work; and 863 are now in training. During this period the corporation has spent, in safety and welfare work, a total of $126,885,911.

Using the year 1906 as a basis, the corporation shows a reduction of 55.39 per cent in serious and fatal accidents; and using the year 1912 as a basis, a reduction of 70.20 per cent has been made in all disabling accidents. Through the reduction of the accident rate as it existed in 1906, 39,374 men have been saved from serious injury or death since that date.

DISCUSSION

CHAIRMAN JACOBSEN: I am certain that we all enjoyed listening to Mr. Affleck's paper. It gives us food for thought and a good many directions in regard to our public safety, home safety, and industrial safety, and those all are tied together more or less. A careless man in the street is not going to be a careful man in the shop. So safety work must be universal, it must be conducted wherever we are.

There is one point Mr. Affleck brought up that I paid particular attention to, that of keeping the plants clean. That is something I have personally dwelt on rather heavily on several occasions. Mr. Affect spoke right to the point when he said that atmosphere has more to do with our accidents than generally admitted. We act somewhat unconsciously and our mind is sometimes affected by the surroundings. Unquestionably a man will do better work, will feel better mentally and physically, in a clean plant, orderly arranged, than he will in a plant in which rubbish and dirt collects everywhere. Our accident figures in the Cement Association show conclusively that those plants that pay particular attention to keeping things orderly are, in general, the best plants also in accident prevention work. It is logical that they should be.

MR. PURKHISER (*Lehigh*): There is no question but what a clean plant is more efficient than a dirty plant. If runways are piled with rubbish and used for storing obsolete machinery, we cannot very well

talk safety to our men. At our plant, we feel that if we expect our men to be clean and prevent accidents, we have to show them that we mean to assist.

MR. UHLMAN (*Dixie*): At our plant there were two old railways abutments right near the main office, very unsightly looking structures, so I got it in my mind that they would be good places for bulletins. We fixed them up and they are now very attractive.

We are doing very well at the Dixie Portland Cement Company's plant. I am not doing very much alone, it is "we." We all get down to business, and if there are a lot of "we's" in the game, we are going to do some good. I must say the big "we's" are back of us. Mr. Klein, our Superintendent, if he has been away for a day or two, on his return will look at the bulletin board, and if it is unfavorable, he looks for an explanation. In the morning, also, that bulletin board is the first thing he sees. The same with Mr. Hardy, the President. He comes to the plant about twice a month, and that bulletin board is the first thing he looks for. So I think we have the big "we's" back of us and we ought to accomplish quite a bit.

I must say that safety is what we make it; it does not make itself.

MR. E. H. BROWN (*American Cyanamide Company, Niagara Falls, Ont.*): I am not a member of this Section, but I would like to express a word of apreciation, for the splendid paper we have listened to. I am sure it is a very good thing for an executive to give up his time and come down and tell the fellows who work in the ranks and are trying to put over the safety idea just how near the management is to that idea.

The speaker emphasized the necessity of education over the mechanical point. I can well assent to that. Everybody finds, as the years roll by, that safety is largely a matter of education. Atmosphere and education are almost synonymous terms. It isn't what we call safe in the plant. it is not the man directly interested in safety; it is what we do. The atmosphere we create in the plant leads the other fellow to believe and know that we believe in what we are preaching and we are endeavoring, day by day, to carry it out.

The outstanding feature has been stressed. No one can conceive of an ill-kept plant that can be a safe plant. Statistics show us that where the housekeeping idea is carried out to the fullest possible extent, where the accidents are reduced to a minimum.

The large number of men serving on committees in the steel plants has been emphasized. That is a splendid thing. I think, however, the rotating of workingmen's committees, keeping the influence abroad in the plant, is worth while. A man may come on a committee and he may not be oversold to the accident prevention thought, but he is going to get some idea in that committee as to the stability of the thing, as to the genuineness of those who are trying to put it over, and when he has served his term on the committee and goes back into

the ranks, he has to carry with him that atmosphere of safety and the fellows working around him are going to see that it means something.

CHAIRMAN JACOBSEN: I would like to ask Mr. Purkhiser to take the chair and conduct the meeting while the next paper is being read and discussed.

(Mr. Purkhiser assumed the Chair.)

CHAIRMAN PURKHISER: The man who is to give us a paper now, Mr. Halpin, of the Marquette Company, I know is making some excellent records. When it comes to conducting "No-Accident Campaigns," he sure can do it.

NO-ACCIDENT MONTH CAMPAIGNS

T. F. Halpin, Employment Manager, Marquette Cement Manufacturing Company, La Salle, Illinois

On receiving a request from the officers of the Cement Section to speak in "No-Accident Month" campaigns, I was greatly pleased to attribute this honor to the success with which campaigns have been waged in our plants, also because, we, I believe, were the first in the cement industry to conduct a "No-Accident Month" campaign.

Safety has come to hold in our plant life just as important a station as raw products, coal, and cement. Public life as well as private life requires that more and more thought must be given to prevention of the numerous accidents, which today appear as a black spot on the records of our country.

Remarkable progress has been made in accident prevention but we still have much to do. Men must be taught that work and safety can go hand in hand. It is the driving force of such conviction that will help to avoid unnecessary risks.

The figures in our plant show that when interest in safety slackened, the number of accidents increased. In 1921 when interest was revived, when our campaigns began, the number of accidents were cut down to just half the former number. It is because of this psychological factor that we wage "No-Accident Month" campaigns.

Association of the human element with accidents is forcibly illustrated by analyzing the causes of the accidents. It is not uncommon to find that over one-half of them are due to carelessness, unsafe practices, and disobedience of the most elementary rules. Going up the scale of men, over one-seventh of the accidents are due to lack of adequate supervision. Most of the fatalities reported in the cement industry in the past come under the classifications "Smothered by slides of material," and "Run over or crushed between cars." Both of these causes arise from a confused mental state, a mind that, untutored in safety, will not instinctively take safe measures when possibly a quarrel at home or lack of sufficient sleep disturbs its balance. With good

supervision and a little teaching, but it must be constant teaching, we will eventually eliminate these causes. We must everlastingly plug at the men, to lead them into grooves of safety habits so that no matter what the time, the season, or the environment, our men will develop a safety sense—something instinctively warning them against dangerous practices. Minor cuts, bruises, burns, etc., that cause loss of days work are hard to explain except on the basis of indifference and failure to report injuries.

Create Sense of Safety

To create a new sense of safety in our men is our objective. We no longer subscribe to the old idea that every calling must exact its toll of human life and that production must be measured in life and blood, as well as in dollars and cents. Any industry founded on those principles is doomed; for all the forces of civilization today are centered on saving lives of workmen as well as of kings and presidents.

We have discovered that we must employ psychological and educational processes to effect these results. That is the reason why we have had "No-Accident Month" campaigns. A month gives us ample opportunity to maintain an intense interest over a period sufficiently long so that the effort becomes noticeable, but the goal, when reached, is a goal worth the effort. One week is too short. Some plants have tried and succeeded with three months, but only after good hard plugging in unsuccessful campaigns. One month seems to be a good starting point if enough interest has been created before the campaign begins.

To prove the value of accident prevention is easy. It is only necessary to review an old lesson painfully learned in the school of experience. For those who are still untaught, for those to whom the humanitarian appeal is not ever present, it is enough to mention that in the cement, as in other industries, the consumer must bear the cost of production; and that therefore, he who produces under the most favorable conditions will in the long run win the trade, the good will of the community, and eventually swallow up the laggard. Workmen's Compensation Acts today, have made accidents a burden on business. To use a lawyer's phrase, they create "absolute liability." The express object of this legislation was to make an accident, even if no negligence on the part of the employer, an industrial expense and we might as well accept that fact. Insurance some times leads people to think they are shifting the burden, when in reality they only distribute it. Those who realize the true condition seek prevention rather than compensation. Labor commands and will continue to command more and more legislative correction in this country. We are far behind the continent of Europe in our remedial legislation. Development is inevitable; it is up to the industries to keep the pace. We must learn to educate, to deal with life just as efficiently as we deal with production problems.

To carry conviction even deeper into the minds of those who are not yet sold to the safety idea or the campaigns, let me indicate that our plant which in the Portland Cement Association Accident statistics for the past year ranked eighth in the number of man hours worked, has cut its accidents to one-third its former number so that last year it ranked seventh in the severity column, it being the largest of the six best plants. These results we attribute to our successful campaigns, and the safety idea which we keep pounding into each workman. Once a plant has tried and experienced a safe month it is rejuvenated, so to speak, and never again thinks it profitable to resort to the old system. I could keep you here all day reciting tables and making comparisons for you—all of them favorable to the results of campaigns. Through the whole cement industry there was last year a reduction of 16.8 per cent in accident losses. This is especially significant in view of increased industrial accidents for the country as a whole. Just look at 1921-22 when 29 no-accident month campaigns were conducted—accidents were reduced 48 per cent, days lost were reduced over one-half; and fatalities were cut down 45 per cent at these plants.

We must not forget that any movement indicating that the management is interested in the welfare of the men will awaken a response from these men. If you can convince a man that he is regarded as valuable for his own sake; that his labor is not a commodity along with raw material and finished products, your safety work is half done and it is then possible to get cooperation rather than obedience, in which lies the difference between pushing a man into safety and letting him pull with you for safety. The indirect benefits are more or less intangible but anything that leads to a better understanding and good will is certainly worth considerable effort and such results are being manifested daily in plants which have tried "No-Accident Month" campaigns.

Conducting the Campaign

Once we have decided that a campaign is beneficial, the next important step is to conduct one. Interest must be aroused so that everybody looks forward with great interest to the big show. It is a selling problem, but we are selling something intangible and all salesmen know that intangibles are most difficult to sell. Our first problem is to attract and hold the attention of the men. This is purely a psychological problem. To insure success, we must have the solid backing of the management. And when this has been assured, there must be something attractive and novel in the first approach. We have tried letters signed by the Superintendent and addressed to each employe, we have tried various race stunts on bulletin boards with all sorts of publicity on the race. Some try large illuminated bulletins revolving on a huge drum. Anyone with ideas can think up a suitable send-off. A plant need not go beyond its own gates to get material, or ideas, or to secure a competent working staff for the campaign. It is better to draw on

home material; it is not apt to be stereotyped and the feeling is more personal.

After we have drawn attention we must create a live interest and for that we need a working organization. The foremen are the principal cogs in the machine. The only way to insure their participation is to lay the responsibility for accidents on their shoulders. If they cannot produce without sacrificing life or limb, they are incompetent and should give way to men who can do so. Most foremen are willing to undertake the work if they have any interest in the plant at all.

Now, we are ready for the third step—sustaining interest in safety for one month and creating such an intense desire for it that it will hang over till the next campaign, so that in time, we have so directed the minds of men that they will have formed a new habit, adopted a new state of mind. We want to avoid creating morbidity, but we do wish to encourage each man to look out for his fellow worker as well as for himself. The great obstacle in the third step is the frequency of labor turnover. That must be reduced before much can be done in the formation of new habits. If not, we would be constantly trying to teach old tricks to a new dog. The only alternative is to make the teaching so intense that it will burn its way into the minds of the men and make them feel that they are working for a good outfit that is worth staying with.

There are a few fundamentals to be learned in all teaching, in all dealings with men: (1) you must do the thing as vividly as possible; (2) you must present your subject from a new angle each time; (3) you must anticipate any objection; (4) you must make your lesson simple, direct, and concrete.

Departmental Competition

I spoke before of departmental competition. At the Marquette plant, we made a sporting proposition out of our last campaign. We designed a race track on a bulletin board, each department was represented by a miniature auto and each day of the month took one section of the track. The driver was the foreman, and by positions of the cars, each man could tell at a glance how he stood among his fellows. This stirred up great interest.

Good results can be had from demonstrations of how accidents occur and of how to avoid them. Put a man to work in a bin and let others watch just how he avoids an accident by taking necessary precautions. Use a dummy alongside to show what happends when no precautions are used. It will never do to let anything in connection with accident prevention degenerate to a joke, for then the task becomes doubly difficult. difficult.

Mere bulletins are not enough. Promiscuous use of just any kind of bulletin does more harm than good. If a bulletin does not create any interest, it would be better not to use it. It is not always the nicely

printed bulletin that has the most effect. Unless we sow we shall not reap and if we do not give food for thought we shall have very little thinking. Good bulletins set the thinking machinery in motion.

Safety bulletins published by the National Safety Council teem with suggestions which can be reworked to apply more directly to your own condition. You can find books full of information about races of all kinds, homemade posters, prizes, trophies, competitions of one sort and another.

The foreign element, which is too often overlooked, must be reached. Movies have been used successfully in bringing home to those men the causes of accident. Pictorial bulletins are also of great help. The bulletin boards can be used nicely for the publication of your accident statistics, also for safety rules, which must be few, short, and simple. If you make too many rules, your men are apt to find themselves violating a rule every time they move and will consequently discount their value. During the campaign, these features are impressed on the men under the guise of sportsmanship.

In the campaigns, we must not unduly handicap ourselves by having misfits in our organization. A physical examination of those entering your employ and an examination once a year, of those in your employ, will help a great deal toward eliminating complications. Many fatalities can be avoided by instructing at least a few men in each department in the Schaefer method of resuscitation which is most effective in cases of electric shock, asphyxiation from pernicious gases in bins and tanks, or any other cases of arrested respiration.

All suggestions made by employes should be carefully considered; if guards are necessary, put them on; any improvements in machinery that will lessen risks, make the plant a clean and convenient work place rather than an eyesore, will make your employes 50 per cent more willing to enter a campaign with you.

Many men, however, are cold to all appeals, are actually not interested in the work. These men can be reached best through the foremen, or through the safety committeemen. A personal conference with each man is not impossible and when the foreman is the consulting party, the men are more apt to be impressed. Hence, the necessity of having the foreman completely sold to the idea. Plant preachers, poets, and orators can't do half the work of a foreman because they are not vested with his power. Oftentimes if an injured workman can give a talk, it carries tremendous power, because he is a living example of the lesson he is teaching.

Undoubtedly, you gentlemen assembled here can multiply my suggestions a thousandfold, but that is at it should be. None of you would have trouble in finding a suitable ending for a campaign. Never fail to let the men know the exact results!

A campaign, should have an effect on men like a circus has on boys. The hangover must be as permanent as possible. It should decrease

injuries at least one-third for the next few months and the period until the next campaign should set a new record. Men are apt to grow cold to any idea as they become more familiar with it. It is, therefore, necessary to keep interest up, and the safety committee should consider its work only begun and not finished at the end of a campaign. An efficient method of letting the men know that there is continual supervision is a rigorous inspection system, and if offenders are found, warnings should be given, a few words the first time, more the next time, still more, and if they fail then a period of suspension may be in order. The company will not suffer, for an unsafe workman is like a defective appliance creating liabilities rather than assets.

Designated "No-Accident Campaigns," whether they be over a period of weeks or months, are sure to assist greatly in the reduction of time lost accidents. The results are certain, the methods have been tested by the fire of experience; it only remains for you who have not conducted them, to note the records of plants who have and their standing in Accident Prevention work—then do likewise.

DISCUSSION

CHAIRMAN PURKHISER: That certainly was a splendid paper, Mr. Halpin. Anyone who hears a paper like that cannot help but see why your company is successful in conducting "No-Accident Month" campaigns. Can you tell us when you conducted your first "No-Accident Month" campaign?

MR. HALPIN (*Marquette*): December, 1920.

CHAIRMAN PURKHISER: With what results?

MR. HALPIN (*Marquette*): We went along for twenty-six days, or until the day after Christmas without an accident. On the twenty-sixth, a chap was injured and he lost five days. That was in our mine, but after that this department went one hundred days without an accident, because they were all a little peeved because they spoiled the record.

CHAIRMAN PURKHISER: You have conducted them each year since?

MR. HALPIN (*Marquette*): Sometimes twice a year.

CHAIRMAN PURKHISER: Have you had more accidents in later years?

MR. HALPIN (*Marquette*): Of the four or five we have conducted, we went through one with absolute success, in others we lost one or two days each time; but we got results. One day did not mean much, because we cut the accidents down and kept them down. I might say, however, that we have not been conducting any "No-Accident Campaign" in the past forty-five days, but we have not had any time lost in that time.

MR. JACOBSEN: I think it would be interesting if Mr. Halpin would indicate the reduction in accidents you have had since you started

your "No-Accident Month" campaigns, as compared with previous years.

MR. HALPIN (*Marquette*): Of fatalities we had one or two or three a year, but we had only one fatality since we started our "No-Accident Month" campaigns. Our time lost campaigns and permanent disabilities have been cut 75 per cent. When I say 75 per cent, I mean we lost fifteen hundred days the first year, next year, seven hundred, then three hundred and fifty days, and now we are pretty low. The reduction has been very splendid.

CHARLES ROTH (*Pennsylvania*): Our Safety Committee decided to arouse some enthusiasm among the employes, so in April, 1924, we had our first "No-Accident" campaign, and we went through successfully, without an accident. The first thing we attempted to do was to sell the idea to the foremen; before going to the men. At least a month before the campaign opened, we went around to each man, and sent him a letter through the mail, asking for his co-operation. The first day of April everyone was set, everything looked lovely. Then came the worst snowstorm we had had that year and, of course, upset everything. Everybody expected we would have a bad month, but after clearing the yard up, everything went along fine.

MR. MCFERRIDGE (*Lehigh*): Mr. Chairman, I want to congratulate Mr. Halpin. There are sixteen Lehigh plants, and I happen to have the only one that did not go through 100 per cent perfect in the June, 1924, campaign. I have been superintendent at various Lehigh plants, and in seven campaigns, I have had the pleasure of seeing us go through successfully five times, and lose two times, due to very minor accidents.

My experience at Birmingham is rather a recent one. The mill has been operating only about nine months. During the construction of the plant we employed several hundred men, and built a plant in a little over nine months, without a fatal accident. At the time of our "No-Accident Month" campaign, we had been operating for almost a year. In the campaign, we lost out the third day before the end of the campaign, by having a man fall on a pile of rock; it caused him to lose two days' time.

In preparing this campaign, I was a little dubious as to the outcome of it, in view of the fact that we had a good deal of darky labor, but I started our usual Lehigh method of getting the foremen together and then began the campaign with a mass meeting, a little music, a few speeches, and then got up a "rube" band. We fixed up each member of the band as if he was crippled from some accident, had them parade through the plant, turned on the illuminated sign, and then got every member of the Safety Committee to go through that plant and get after the fellow who was not doing what he should do.

We changed our bulletins daily and kept up enthusiasm by keeping a score board. In spite of the fact that we had a new organization and a class of labor which was pretty hard to handle, we came through with only one accident, which caused a loss of two days. Unfortunately, ours was the only plant of the Lehigh sixteen to lose any time.

CHAIRMAN PURKHISER: I don't know a man in the Lehigh organization who has had the privilege of organizing as many campaigns as Ray has. He has been the superintendent of seven different plants and he has done a lot of pioneer work. When you think of his going to Birmingham, building a plant and starting it off, you realize that he is doing real pioneer work in that territory, and I am sure his experience has been worth a great deal to us.

I am going to call upon Mr. Simms, who is Chairman of our Mill No. 2 at Mitchell. Unfortunately, our Mill Chairman of No. 1 could not come. Mr. Simms is foreman of Mill No. 2, which is holding a record. At Mitchell we have one quarry that supplies stone for Mill No. 1 and Mill No. 2. Mr. Simms is General Foreman of Mill No. 2 and that mill—not including quarry—has gone two years and five months, a total of 2,644,000 man hours without a time lost accident, and I am sure Mr. Simms is the man who has put a lot of push and pep into that mill and is responsible for the results.

MR. SIMMS (*Lehigh*): I was not expecting to be called upon to make a report here, but I will quote a few figures. At Mill No. 2, we keep a record of the time lost in each department. Here is "General Repair Men": 1,741 days without a lost time accident and those repair men work all over the plant. The kiln department: 1,715 days without a loss of time. The raw department: 1,714 days. Electrical department: 1,323 days. Coal department: 1,204 days. Shops, which work quite a number of men: 1,272 days without a loss of time. Raw mill, that is quite a dangerous place, where there is lots of noise: 1,261 days. Engine department: 1,223 days. Carpenter shop: 1,156 days. Bag room: 882 days. Packing house, which you all know produces many accidents from getting cement in your eyes: 862 days. At Mill No. 2, which is the mill I am foreman of, we have worked twenty-nine months without a lost time accident.

I heartily endorse Mr. Halpin's statement, in which he says that a "No-Accident Month" campaign, is only an appetizer for many months free from accidents. We have proved that at our place. We want to keep a campaign on the year round, and I am sure that with the help we have from other plants, we all can do better than we have been doing.

CHAIRMAN PURKHISER: We started our first campaign, in the month of June, 1920. We followed the general lines Mr. Halpin spoke of. We also went along for twenty-six days, but then the water boy,

who was supplying water to the different departments, entered into a wrestling match with some other fellow and fell on the floor and fractured his arm. The second year we went through with a clean slate. In 1922, both mills at Mitchell decided that they would start a month earlier to be sure to go through the month, and since May, 1922, our mill has not had a time lost accident.

We are proud of that record; and, for that resaon, we have our entire safety committee down here, and a good number of our foremen. We have looked forward to this meeting with a great deal of anticipation, and with the expectation of getting more push and pep to continue this splendid record.

MR. SASS (*Universal*): At Buffington, we have not run very many "No-Accident Month" campaigns, for we try to make every month a "No Lost Time" campaign. At the time the man is hired, we start talking safety to him. We tell him of the different hazardous conditions around the mills, if there are any. We tell him where the dispensary is, where he can go and have his cuts, scratches or other injuries taken care of, even a cut he got at home. We tell him where the cafeteria is; in fact, we try to tell him everything we possibly can about the plant before he goes in.

As some of the gentlemen have said before, we try to create an atmosphere, create a state of mind that will make the man more valuable. The idea the man gets at the hiring is the idea that he is going to carry in his mind when he goes into the plant. When the foreman gets the man, he carries that idea along, and in only a short time we will find out whether that man is going to be an asset to the plant or otherwise. If he is going to be otherwise, we replace him.

We endeavor, at Buffington, to make the Safety and Employment Department the clearing house for the plant. In other words, it is the last place where the buck is passed. When the man comes to us, we try to help him out. He may come for advice about something regarding the plant; he may come for some advice regarding something that is troubling him at home; but whatever it may be, we don't forget to help that man out, because when we help him out under those conditions, he is going back in the mill to help the Safety Department out in the same way.

We have quite a few men working in the machine shop and structural shop, who, for a long time, were in the habit of cutting across the tracks to see who would be the first fellow to get to the cafeteria for something to eat. Fences were put up, signs were put up. The fences acted as hurdles, sometimes the fellow did not clear the hurdle and he took a spill. So we started talking to the boys in those two departments, and figured out for them just how much time they gained in cutting across the track, instead of following the roadway around to the cafeteria. It was only a matter of a few seconds.

We put it up to them as a kind of sporting proposition. If they wanted to hold some races from the machine shop or structural shop

to the cafeteria, we would furnish them with a starter, and possibly give them a prize, but we asked them in a nice way to keep on the roadway. I am glad to say, at this time, that any noon you want to, you can watch these men coming from the structural shop, storeroom, machine shop, and you will find that each and every man follows the roadway. The fences have been taken down, there are no more hurdles and they keep off the railroad tracks.

Every week we hold three meetings. We have three units at Buffington, Mills 3, 4, and 5. We have meetings on Monday and Wednesday. Once every month we hold a meeting in the machine shop, which takes in the shops, structural shops, storeroom and the electrical repair shop. Talks are given every week. We ask the men for suggestions for the talks. Any suggestions that are offered we act upon in some way; either get in touch with the man and tell him about his suggestion, and if it cannot be taken up at that meeting, we notify him that it has been postponed to the following meeting.

From January to the last of August, this year, we have had these talks going on. In the first eight months of this year, as compared with the corresponding eight months of last year, we reduced lost time accidents about forty-seven per cent, although we have made an increase in the average daily force of about nineteen per cent. In my own mind, I am firmly convinced that this has been due to the meetings that have been held and other little stunts.

We have a lot of homemade signs. Sometimes the man, unknown to himself, springs something and we make a sign out of it. The first thing he knows, something he may have said is on that sign. Those homemade signs are given a lot of attention. Watch the men going into the plant and count the number who stop to read. Although we have bulletin boards around, how many men would ordinarily walk ten feet to see what is in that bulletin box? But if he may expect to find something in there that has been sprung by some other man in the plant, he will go over and look at it.

We had a campaign that we started somewhat similar to the "No-Accident Month," only we made our a kind of "Smile Campaign." Each and every man was asked to speak to the other man when he came in on his different turns during the day. We did not care whether he said "Good morning," whether he said "Hello;" but the idea was to get every man to speak to his fellow worker. By starting off with that smile on his turn, it got so that every man began to think the other fellow was cooperating with him, which, no doubt, he was. That cooperation and good fellowship, has had a great deal to do with the decrease in lost time accidents.

At the different meetings, men are asked to act on the square with the foremen, they are asked to act on the square with their fellowmen, so that a better understanding and a state of mind is created that helps to reduce lost time accidents; and they are being reduced.

We had a book passed on to us from our city office. It was a talk given by Sherman Rogers for foremen, on "Spark Plugs and Grounded Wires." I wonder if any of you gentlemen here have seen that book. If you have not, it is worth while reading, especially if you are out in the mill. It tells a lot of truth and gives some very good information.

As I started off to say, we have not had many campaigns, as far as one month is concerned. It has been a continual one all the time. By creating atmosphere, good fellowship, cooperation, from the time the man enters the plant, I think you will find that your lost time cases can be reduced.

MR. COMPTON (*Louisville*): I think I might brag a little. Anticipating this meeting, and judging the condition of our log sheet on accidents, we decided to make the month of September, at the two plants we have at Speed, Indiana—one being a portland plant and the other a natural plant—a "No-Accident Month," and I am glad to say we were successful.

This is the first "No-Accident" campaign we have had this year, and I believe it is the second successful one we have had since we began preaching safety at that place. It was very gratifying to be able to conduct the campaign successfully at this time. We have been having a number of minor accidents during the past year and could not quite figure out why we were having so many, so we thought we would try a "No-Accident Month" and see if it would not help us out, and it certainly has.

On the papers that have been presented this morning, I should say our experience follows right in line with points brought out in the two papers, especially Mr. Affleck's paper concerning the point of cleanliness around the mills. I have had the pleasure, in the last few years, of visiting the major portion of the cement plants in the United States, and it was proved conclusively to me that cleanliness was a great asset in safety work.

It always struck me that a whitewash brush and a few concrete walks around a plant did more than any one thing to help drive home the idea of cleanliness. If you have cleanliness, naturally, the accidents become fewer.

There was another point on cleanliness, to continue on that same line. In giving you an idea of our experience, two years ago, our record in severity rating of the Portland Cement Association, I believe, stood fifty-fourth. We followed along the lines brought out here this morning, and last year we stood twenty-second, and this year we are hoping to drop that still lower.

It has also struck me that in safety work, there are certain stages which a plant has to follow through. I believe we all agree that each plant has its own special problem and you cannot lay down any rule for them all to follow, you have to have different things for different

places, and let each one work out their own salvation, but in a general way, for all plants your safety work passes through two or more stages.

You start out a safety movement and it is mighty easy to cut down the number of lost time accidents by the usual methods, and you have good results. Then you come to a point where you still have a few accidents, and it is pretty hard to make them any lower, you probably go about two years in the same rut. That is when you have to change your tactics and employ different methods than you have had up to that time.

At this time, I would like to say, in behalf of the Louisville Cement Company, that we would be glad to welcome all who wish to visit our plant at Speed. We will arrange the transportation. We will leave up the bulletins we have had during the past month, and you can get some idea as to how we carried out the campaign.

MR. EALES (*Bessemer*): We have never had a "No-Accident Month" specified. We have carried on the work right along and have a campaign on all the time, the same as at Buffington. We find that selling the idea to the foremen is the best means of cutting down our accidents. We have meetings occasionally and we assign subjects to each foreman. The quarry foreman's subject might be "Car Accidents," "Men Getting Between Cars," or something like that. We limit him to about ten minutes in his talk. We have had good success with that.

Probably we are not like some plants, we have no employment department, so we cannot get the man at the start, only through the foreman. The foremen employ their own labor, so we have to rely almost entirely on them for putting the safety feature over at the start. We have had an improvement in our plant this year over last; we have had one or two minor injuries, but that is all. During the first four months, we went along without an accident, then we had a fellow buried in the shale pile, and a little while after that we had three accidents in one night, all in different parts of the plant and on different occasions, but all in one night.

Up to the present time, we have had seven accidents this year, the longest is twenty days lost time, and we figure we are not doing so bad. Last year, the longest was two hundred days; this year, we have been more fortunate.

The friendly attitude that was suggested, we try to encourage. It helps.

CHAIRMAN PURKHISER: I have noticed Mr. Halpin's paper and the discussion has been along one line. All seem to depend upon the educational feature of putting over your safety program. I am wondering if any of the plants represented here try to put over a safety plan by means of mechanical safety guards only. All of your plans have been sort of educational. Now what percentage of the accidents

that are occurring in cement plants today are directly due to mechanical defects.

MR. HALPIN (*Marquette*): As long as I can remember of accidents at the Marquette, I know of only one accident that was due to lack of guards. The guarding of this particular piece of machinery would have prevented the accident. I might say, from what I read and figures I have gotten from other plants, that perhaps ten per cent of the accidents in the cement industry are due to lack of guards.

MR. CAM (*Canada*): What I have on my mind is this: How can we stop carelessness? Fatal accidents, who are they up to; are they up to the mill, are they up to the executive? Who can eliminate the cause of fatal accidents? How is it that after a fatal accident you say, "Oh, yes, they always used to do so and so, they are not supposed to do it," or, "Yes, that was always a dangerous thing."As you look back in the record of the Portland Cement Association, you will find that certain accidents occur in the same way year after year. Now, who is responsible for the elimination of fatal accidents, and can we do it," or, "Yes, that was always a dangerous thing." As you look but how can we prevent the fatal accidents? Is it an executive matter, is it an operating matter, or is it both? That seems to be the big question we are up against. I expect that perhaps these other gentlemen are up against it, too.

We try to prevent fatal accidents, but we simply cannot; sometimes it is a raw man, sometimes it is a dangerous place, sometimes it is a dangerous man. We have killed several men in our mills. I guess many of you have had the same experience. It is a deplorable condition. Recently a man was given too much slack in a rope he had around his waist while in a bin; well whose fault was it? A gear falls on a man when he is in the bottom of an elevator. Is it the fault of the man who installed the mill, is it the fault of the man who built the mill, is it the fault of lighting, or is it the fault of not keeping the elevator in shape? Who does this come back to? Does it come back to the foreman, the general manager, or simply to the straw boss?

CHAIRMAN PURKHISER: Who will attempt to answer that question?

MR. MCFETRIDGE (*Lehigh*): I would like to answer that, partially. I might say that I think almost every phase of safety enters it. Usually when we have a gear driven elevator, we have a guard around that gear so that it cannot drop. I think the first thing is to guard your machine to the best of your ability, and the second thing is to train your men. I think the two go hand in hand, and it is up to the executive to provide the training of the men and guarding of the machinery. That is my personal opinion.

MR. EALES (*Bessemer*): We get very few accidents that a guard would have prevented; most of our accidents are due to the men as individuals. We have had no fatal accidents in our cement plant, but before it was built—we quarry flux stone—we had two fatal

accidents in 1917, caused by men being under the bucket of a shovel in the quarry. Those were our last fatal accidents. They were probably due to a combination of faults on the part of the two men and the shovel engineer. The men should not have been under there, and the engineer should have been watching.

CHAIRMAN PURKHISER: I think we all agree that guards are essential; they are really the foundation of your accident prevention work. We realize that if no machinery were guarded, there would be a great many more accidents than there are, but we take it for granted that most mills have done that foundation work.

MR. WILSON (*Tidewater*): In reference to "No-Accident Month" campaigns, after hearing all the good results from the rest of these plants, I feel ashamed to tell you our results of last month. We decided to put on a "No-Accident Month" campaign for the month of September, which we did, and on the 17th—we were successful until that day—we had a man in the quarry fall down the bank, injuring his leg. That man is still in the hospital, probably three or four weeks' lost time.

It makes me feel pretty bad to hear the good results from the other plants, but nevertheless, in line with what Mr. Cam has just said, whose fault is it when we have an accident that results in a tragedy. I might explain this accident of last month:

Two powder men were working on a high quarry bank, probably one hundred feet high. One powder man stepped out on a rock and it was loose; he came back and said to his buddy, "Don't step on that rock, it's loose!" He said, "What do you mean?" He stepped out on the rock and it did go down. The man caught him by the coat collar and that is the only thing that saved his life, he held him against the bank until the stone rolled down, and the result was only a badly lacerated leg. He might have lost his life. You might say if that man had obeyed orders, he would not have been hurt.

In June, we had a similar accident. We had another powder man who was trying to shovel dirt, as far as we can find out, and he was cautioned not to go up on this high bank. He was cautioned by two of the workmen not to go near it. In about five minutes, the men who had cautioned him, saw him rolling down the bank. That was a fatal accident. So it appears to me that mechanical features may be responsible for about ten per cent of our accidents and that the man himself is in the final analysis responsible for the remainder.

DISCUSSION

CHAIRMAN PURKHISER: We seem to agree that a "No-Accident Month" campaign is worth while. Why don't we all get together on some one month, why are we all using different months of the year, why not get

together and have the cement industry as a whole have a "No-Accident Month" campaign. Let's see if we can go for a month without an accident in the industry.

I realize that some of those who enter would not be successful, but if we could say that the cement industry, as a whole, went through a month with a great reduction, that would be a help. What is the most practical month in the year?

MR. CAM (*Canada*): July.

MEMBER: February has twenty-eight days. (Laughter.)

MR. HALPIN (*Marquette*): August is a good month.

CHAIRMAN PURKHISER: February, July and August have been suggested.

MR. AFFLECK (*Universal*): I cannot refrain, Mr. Chairman, from saying I think that is a corking good idea, to get the whole industry to set one month for no accidents. I think you will be surprised at the success which will come from the mental attitude of knowing that it is a nation-wide thing, and if it is not successful as a whole, it will be more successful with each individual plant that participates than without the united effort.

June is a short month without any holidays, and all the plants usually are running in June.

MR. HALPIN (*Marquette*): June is a good month.

CHAIRMAN PURKHISER: What would you think of the idea of taking a vote that we favor the plan and leave it to the Chairman and Secretary to set the month for us? They have heard the opinions of the different ones here. Or should we say, ourselves, or should we consult the mills that are not represented here.

MR. EALES (*Bessemer*): Set the month. It does not make any difference when you have it.

CHAIRMAN PURKHISER: Would you want to make a motion that we all agree to have a general "No-Accident Month" campaign, and let the Chairman announce the month through the Council, or should we do it here?

MR. AFFLECK (*Universal*): Do it here.

MR. MCFETRIDGE (*Lehigh*): Mr. Chairman, I move that all the mills in the United States and Canada cooperate in a "No-Accident Month" campaign, selecting the month of June for the month.

(Motion duly seconded by Mr. Halpin and carried unanimously.)

CHAIRMAN PURKHISER: I like to think of the Accident Prevention Work as a Mutual Loan Association. In our mills at Mitchell, we have eight hundred men employed. When you think of a building and loan association, you think of so many depositors and so many

borrowers, we might say. If the number of those who borrow from the interest of the campaign is larger than those who invest in it, there is going to be a shortage of funds. I am wondering what percentage of the men contribute to the general enthusiasm which promotes safety and what percentage takes from that.

There are a number of men whom you might say are a liability to an association; they are a liability to the plant as a whole. I am wondering if we cannot work on the basis of getting everybody to contribute, every employe to contribute toward lending of enthusiasm or the sound reasoning powers which might make it more unanimous in putting it over. I am wondering if in your various plants you have a few men who are really supplying all the enthusiasm and the majority of men are borrowing from that.

MR. SASS (*Universal*): I think we are depending on all the men in the plant and we are getting their support.

CHAIRMAN PURKHISER: Is your program being put over by the employes as a whole, or are a few of them really supplying most of the enthusiasm for the campaign?

MR. SASS (*Universal*): The greater number of the men. Our No. 6 Mill has had three months without loss of time, and Mills 3 and 4 have done equally well. Up at Duluth, they don't like to brag, but they can be induced to brag. They have had six months out of eight this year without a lost time case, so I will let Mr. Huth do the bragging.

MR. HUTH (*Universal*): I am not the kind of fellow who likes to brag, but our aim is to get the cooperation of all the men. We have men sprinkled here, there, and the other place throughout the mill to promote this work and put it across. Of course, you have to have a few to begin with, and by having them pass their thoughts and work along to the next man, it is sort of contagious, if it is brought to them in the right way. I believe in our plant eighty per cent of the men are contributing instead of taking away, because I do not believe that a few men, just a handful of men, could make a plant go along for as long as we have without a lost time accident.

CHAIRMAN PURKHISER: It sounds very reasonable. What do you think, Mr. Mallon: What percentage of your men are contributing to the record you are making?

MR. MALLON (*Louisville*): Most of the men are behind the movement, supporting the campaign, but the real pep depends upon a small percentage of what you might call the leaders in the plant, mostly the foremen. The others are anxious to have the campaign a success and they do as much as lies in their power to make it a success, but the real movement is dependent upon the leaders in the plant just like any other movement is dependent upon a certain number of leaders.

I do not want to give the impression that the rest of the men are not cooperating; they are cooperating, but it is more or less a passive cooperation. The active, the energetic effort, comes from the foremen and a number of natural leaders among the men.

CHAIRMAN PURKHISER: I am sure this meeting has been very profitable, we have received thoughts and ideas that are going to help us.

The meeting will now stand adjourned until tomorrow at ten o'clock sharp.

THURSDAY MORNING SESSION

INTANGIBLE ASSETS OF THE CEMENT MANUFACTURER

W. G. H. Cam, Power and Safety Engineer, Canada Cement Company, Limited, Montreal, Quebec

In the course of the last twenty years, at Montreal, Quebec, the manufacture of Portland Cement has won a place among the basic industries of many countries. As in the iron and steel trade, the periodical expansion or contraction of the market for cement is a sure indicator of prosperity or depression of the country's commerce.

And this is to be expected, for the prosperity of a basic industry depends primarily on confidence—confidence in the continuity of things as they are.

To establish this confidence is the business of a stable government, operating on the minds of citizens of the home country by far-sighted sober legislation, and reaching out to the minds of business men of other countries, by uniformly equitable, straightforward and fearless dealing in foreign affairs.

Wars upset confidence and breed a flock of unrealizable ambitions and hopes which it takes years of disillusionment to annihilate. Six years after the Great War we in Canada are still laboring to rebuild this confidence on the ruins of false hopes. In these efforts, curiously enough, it is the younger generation who, by their imperfect knowledge of the terrible sacrifices that the war involved and of the intolerable burden of debt which is their heritage, are best equipped for restoring the confidence of the world in a future which only they can see in a rosy light.

What is revolution and upset of normal conditions to elder men, is viewed by the rising generation as a splendid process of house cleaning, a sweeping away of worn out superstitions and shibboleths, and the establishment of a sane order of things in which all handicaps will be removed and all the prizes are for open competition.

In increasing numbers this younger generation is recruiting the electorate that supports the government of the day in all lands where parliamentary institutions prevail, so whether we will or no, the reestablishment of confidence lies in their hands: They are the promoters of national and international confidence.

Confidence and Credit

Confidence begets credit, and credit is the life-blood of enterprise and progress in business, and of prosperity, individual, municipal and national.

The market of the basic industries of a nation waxes and wanes with its prosperity, which is built on credit internal and external, which derives from confidence in stable relations between man and man in domestic as in foreign affairs.

Credit, national and international, is the foremost intangible asset which contributes to the success of the cement manufacturer and this asset is evidently out of his control, but it creates the market or demand which he is in business to satisfy.

His organization for this purpose depends for its success on certain prerequisites.

Means must be available to acquaint potential customers with the nature and use of his goods and facilities must be provided to convey those goods promptly and surely to his customers. So the second intangible asset is a publicity system, and promotion service.

To a certain extent this is provided by the public press, but in North America the Portland Cement Association was organized to supplement the means already available, and promotion work is one of the activities of the manufacturer's employees. This work is of course primarily the business of his Publicity Department, but it may be recorded in passing that every employee in the organization however humble his position can play his part in popularizing the product of his firm.

The third intangible asset is a transportation system with which may be linked fuel and power supply. The manufacturer will locate his plants strategically by a consideration of the grouping of demand and the various means of transportation available. Cheap coal or cheap power are contingent assets which will serve to weight his decision, so that these three items can be summed up in one word: Location.

We not pass from the realm of assets over which the manufacturer has no control or only partial control, and we come to those assets which may be broadly described as Company policy, that is to say economy and good will.

Economy and Good Will

Economy or good housekeeping means the use of the means available for a certain purpose so that there shall be as little waste as possible in arriving at the end desired.

There may be waste of materials or of power through poor purchasing methods, reckless usage or inadequate maintenance. There may be waste of human effort through poor purchasing methods, reckless usage or inadequate maintenance.

Under good-will are included the relations between the customer and the company, between employee and management, and between employee and employee. So in consideration of human efforts in industry, economy and good will are interlinked and cannot be separated.

Herbert Hoover makes the statement that "management has the greatest opportunity and hence responsibility for eliminating waste in industry."

As to the manner of man that is best fitted to undertake the heavy responsibilities of management, Gerard Swope, president of the General Electric Company, gives the position to the engineer, and many of us will endorse his argument.

> "To my mind," he says, "there is no better basis for human work than study along engineering lines, because it trains in exact analysis. If you will give to the engineer also cultural training, so that he has something of the history of the development of a people, of its civilization, of its tendencies—so that he can look upon social movements as they arise with some tolerance and also with sympathy, because one needs sympathy in life—then it seems to me that the engineer is the best fitted of any profession to grapple with the problems of life.
>
> "When the problem of establishing better relations between labor and management is solved, and the men find greater pleasure in the work they do, and receive remuneration commensurate with the service they are rendering, the engineer will have performed his greatest service. The engineer's training fits a man perhaps better than any other profession for this service to the community—and in service of that character any human being is going to find the best satisfaction and the greatest happiness."

Management and Man

Now the soundest asset that a manufacturing plant can have is a body of men who are healthy, content with their surroundings and living conditions, proud of their jobs and of the progress of the plant, interested in each other, and loyal to the company. Such a working force is an army which can be relied on to rise to the height of its opportunity.

If ever and whenever the relations between management and labor touch perfection in any plant you may safely predicate such circumstances. In such a plant the management has achieved a perfect machine for carrying out the process of manufacture according to plan. It is a trite saying that all the trouble in the relations between employer and employee arise from the employer regarding the man in his employ as a machine. Perhaps he did so regard him once, but he couldn't make the same mistake now.

Management has now to devote a great part of its purposeful thinking to the study of methods of inducing in the worker the disposition and habit of thought which will make him ready and willing to play his part in the process of manufacture.

It must be understood that the fundamental complexity of the problem derives from the fact that the major interest of the management is only a contingent interest as far as the worker is concerned. The sur-

vival and progress of the company is management's major concern: the survival and progress of himself and his family is the major concern of the worker. It is true of course that the individual officials comprising the staff of management—from general manager down to foreman—have a major personal interest identical with that of the worker, but their superior mental training and wider experience makes obvious to them what is neither obvious to the mind of the worker, nor necessarily true in his case: namely, that their tenure of office depends mainly on their successful administration of a sound company policy. Therefore in my argument, management is treated as a corporate body and the worker as an individual. Trades unions are the outcome of an attempt to marshal the workers into a similar corporate body with unified aim and policy independent of management's control.

The thinking of the worker is mainly emotional: made of hopes and fears, of jealousies and enthusiasms, of love and hate. The thinking of the management is thought directed toward an object: corporate motivated thought, dispassionate and reasoned. So the attitude of the management towards the problems of the individual worker is necessarily judicial, while the judgment of the worker as regards the attitude of the management is necessarily emotional. The problem is further complicated by the fact that while the worker as an individual can and will practice control of his emotions, men in a group have a kind of corporate soul whose emotions are far more unstable, far less accessible to reason than in the individual. This it is that accounts for 'esprit de corps', the corporate enthusiasm which the body of workers in a plant at times displays, when every man strains every nerve to attain some object which has been set before them. In other circumstances a similar unreasoning corporate emotion is inflamed with suspicion and hatred, and strikes or riots are the outcome.

Mobilization of Worker Effort

The approach of management to the worker must therefore be by way of emotional appeal, and it must be an appeal of so elementary a kind that it will be understood by the foreigner and the illiterate as well as by the native-born and educated.

If you want to gain the confidence of a young child you will show him a picture book, and do any small services for him that you are able. You will gain his confidence largely by what you do and not by what you say. So it is by services rendered, and by the display of pictures that a first appeal is best made to the feelings of the worker, and it is because an accident prevention campaign uses these methods, that such a campaign has been found by experience to sway men to a belief in the good intentions of the management more surely than any other form of benefit.

"*Accident Prevention Pays*" is now as established an axiom as "It Pays to Advertise."

Just as the advertisement preempts the thoughts of the casual observer and creates a want that is not of his own originating, so the safety poster, first aid work, medical inspection, shop inspection committee and safety

committee work preempt some of the worker's thinking and tend to make of him a "safety man," that is to say, a man who will look after himself and his fellows and who is convinced that that is also the desire and hope of the management. So the leaven works and a group opinion is formed that the management is out to give the men a square deal.

I would stress the point that there is no reasoning in the formation of this opinion. The opinion precedes the reasoning and it is the force of group opinion, an emotional appeal, which subsequently develops plant loyalty.

Plant prestige, another product of group emotions is fostered by interplant competitions in safety records, games, or even production efficiency.

Accident prevention campaign work then comes first in the plan of the management for developing what is also known as "better morale of the working forces." The subsequent items in the program are directed towards safeguarding the health of the worker (sanitary conveniences, baths, lockers, plant restaurants) assisting his social intercourse (clubs of various kinds, picnics and outings) improving his home comforts (housing and gardens) giving him recreation (athletics and playgrounds) encouraging thrift (old age pensions and employee stock distribution) and providing educational means for himself and his children.

This is called *"welfare work"* and the policy was summarized by Judge Gary of the United States Steel Company in 1911 in these words:

> "It is not important to consider what the treatment of the employer by the employee is or may be. The man who has the intelligence and the success and the capital to employ labor, has placed upon himself voluntarily a responsibility with reference to his men which he cannot escape and ought not to endeavor to escape. Satisfy your men if you can that your treatment is fair, reasonable and generous. Make the plant a good place for them to work and live. Don't let their families go hungry or cold; give them playgrounds and parks and schools and churches; pure water to drink, every opportunity to keep clean; places of enjoyment, rest and recreation; treating the whole thing as a business proposition, drawing the line so that you are just and generous and yet at the same time keeping your position and permitting others to keep theirs, retaining the control and management of your affairs, keeping the whole thing in your own hands, but nevertheless with due consideration to the rights and interests of all others who may be affected by your management."

Labor Attitude on "Cooperation"

One more quotation, to suggest the validity of this policy as an answer to the workers' view-point. The president of one of the railroad unions, speaking recently on that much abused catch-word "Cooperation" said:

> "I think of the railroad as two million men. Without the lives, the muscles and brains of the men who do the work, whether in

the section gang, in the shop, in the cab or in the office, the dollars would not earn one cent of revenue, the tracks would never feel a locomotive, the shareholders and their directors would have nothing of value to own and nothing to direct. And the men, because they furnish the energy of the vast machine, and because they are human, largely determine whether the machine runs well or whether it runs badly. At the one extreme, if they are all able and turned to their highest joint capacity and the morale is high, we have the possibility of a railroad giving 100 per cent service; if on the other hand the opposite is true and the morale is low, we have a pile of junk and a deficit.

"What is morale? In part it is an individual matter. It depends on the good will and the energy of each single man. If every man does his full part, each task is done well and waste is stopped. If the men are careless, indifferent or worried, the machine slows down; its efficiency is impaired and its production is decreased.

"Cooperation is a word much used, but little understood. If I am boss, and you want to help me, I may ask you to "cooperate." But when you ask me to do something you desire in return, I tell you to put on your hat and shut the door from the outside. Two people do not cooperate if one of them does all the work and the other has all the advantage."

In the economy of manufacture management designs the plan, just as the general staff of an army designs the plan of campaign. To carry out the plan management appoints officers who take charge of the detail instructions and hand them down to the rank and file. True cooperation is needed between man and man in a department, and between one department and another, individual cooperation and group cooperation. But cooperation is not needed between the rank and file and the general staff. Acquiescense and faith are demanded.

And in return for *this subordination, the management*,—that is the general staff—undertakes or should undertake the care of the material and moral needs of the rank and file.

This is not slavery: it is a free contract, and if observerd by both sides, there is no loss of self-respect by reason of the fact that labor barters its services to get what it wants.

Human Nature

In considering this preeminently important though intangible asset of the cement manufacturer—worker morale—we are dabbling in social science, a science which has been so little explored and the laws of which are as yet so nebulous that people can still be found to deny that such a science exists.

In other words, very few generalizations with regard to human nature are of universal application. Temperament, mental development and experience are three independent variables which baffle the seeker after

the human equation. All that we can be sure of is that every man feels in a greater or less degree the emotions that we share with the higher animals. How are we to find out what will be the thoughts of a certain man under certain circumstances? Our nearest guess is to imagine ourselves in his place, and that, however agile our imagination may be, is liable to be a poor approximation, for we cannot participate in the personal history that has made him what he is.

As a result of many generations of social intercourse we have learned to label as "common-sense" any thought which we find by experience that the majority of men with whom we have to do would evolve as the sequence to a certain event or series of circumstances.

Now the major interest of management as regards the men employed in the company's service, is to engage and hold at all times a working force which will constitute an intelligent, willing and disciplined human machine adequate but not more than adequate to produce the required output, and imbued with that spirit of individual and interdepartmental cooperation which will secure proper maintenance of the plant machinery and good housekeeping. *The major interest of the individual worker is security.* It is common-sense that this want should take the first place in his mind. His hopes and ambitions can hardly have the same urgency.

So we can see why industries having a fluctuating or seasonal demand for labor, appeal only to a limited extent to workers of the better grades. The civil servant is satisfied to work for a small salary because he is convinced that subject only to the quality of service that he gives, he has obtained a life job. That spells security. But the worker in industries where labor demand fluctuates, until he graduates into the foreman class, is rarely offered such security. Lay-offs are frequent: shut-downs occur from time to time and in some plants even annually. Peaks of demand now and again make necessary the employment of casual laborers who have no interest in the plant except as providing a temporary job. There is a procession of transients. In six months thirty jobs have been held by as many as two hundred and fifty men in the experience of one plant and that is no strange occurrence in a large group of industries.

All that such plants can do for the worker by accident prevention measures and welfare work becomes insignificant when they are unable to offer an intelligent, willing, thrifty man a permanent job. Hope of "better worker morale" must be postponed if a superintendent is incapable of offering on his side of the contract a fair prospect of the security for which the worker is prepared to barter his loyal service. How can casual laborers, temporary employees feel that they "belong." It is impossible. They will work for the wage, nothing else.

Labor Needs Promise of Security

And it should be remarked that industries giving only seasonal occupation, or having a fluctuating labor demand, have actually created on this continent a floating labor aggregate of men who have never stayed long in

a job and do not expect to, who are unmarried because they cannot or will not face the responsibilities involved, and who form the depreciated currency of the labor market. Among them, unemployment is accepted as a natural intermittent condition, and promotes the instinctive tendency to laziness, and the desire to get as much money as possible while giving the least possible return for it in honest endeavor.

So in the pursuit of better "worker morale" the management of a company is handicapped, first, by the fluctuation of labor demand incidental to the industry in question, and secondly by the quality of worker who makes application for the jobs available when labor demand is on the increase. *The more permanent full time jobs a plant is in position to establish, the better will be the opportunity of cultivating good worker morale.*

Security, which means primarily a fair annual living wage—and second, the various advantages that we have grouped together as "welfare work"—is what attracts the intelligent, willing thrifty man. It will attract others, too, of a less desirable kind, but an experience superintendent or employment manager with the aid of medical inspection will readily separate the wheat from the chaff.

Much of the floating labor is foreign-born, and lacking command of the English language such men in this country early receive a harsh training in the predatory instincts of their fellow-men, and cultivate thereby an absolute distrust in the humanity and straightforwardness of employers that nothing but years of painstaking education can eradicate.

How well the safety engineer knows the difficulties that surround the offer of fair compensation to an illiterate foreigner whose knowledge of English varies in inverse ratio to the degree of his distrust in the investigator!

Labor Turnover

It has been pointed out by responsible opinion at various times that labor turnover is a heavy charge on most industries: that each new man engaged costs anything from $8 to $200 to train, and in American plants one to three times the number of men on the plant force represents the turnover of one year. I have indicated that to a certain extent this turnover is due to the existence of a floating population of transient temporary labor, but there is no doubt that some part of labor turnover is controlled by management, and as worker morale and accident liability are involved, the subject deserves study. Men may be hired who are unsuitable: the job may be misrepresented: patronage in hiring may develop if a foreman is allowed to select freely men of his choice: pay may be inadequate: prospects of promotion may be lacking: foremen may be incompetent: workers may be hired who live too far from the plant. Fluctuation of labor demand is not entirely dependent on market conditions, for if the physical condition of the plant is poor, either there will be an excessive number of repair men on the pay-roll or partial shutdowns for emergency repairs will affect the pay envelope, and damage the plant prestige.

Each plant has its local problems: a plant that is isolated and draws its working force from a farming community will as a rule suffer very little in its employee list by reason of seasonable shut-downs, as the men laid off will retire to their farms with the assurance that they will recover their jobs when the plant resumes operation. On the other hand, with a plant in the suburbs of a large city, shut-downs usually involve a large labor turnover, and accident frequently increases on the resumption of operations. For the city worker, as a rule, has no alternative occupation, and just as a cement plant will at certain seasons of the year recruit for example from the lay-offs of a shipbuilding firm or a sugar refinery, so the city cement worker who is laid off will, if possible, find occupation in another industry. It is, however, to the credit of management in the cement industry that cement workers show a tendency to return to cement plants when occasion offers. Undoubtedly in recent years much has been done in cement plants to make the cement worker's job more pleasant. It was never a very strenuous job with the exception of one or two departments; there is less justification for the eight-hour, three-shift day in a cement plant than there is in most other industries. But it was in the old days a dangerous dirty job, with exposure to bitter cold in the winter and intense heat in the summer.

Even nowadays the majority of plants are excessively dusty, and the popularity of the kiln room in winter has not appreciably diminished. But now there are wash-rooms, and conveniences, and lockers, and pure drinking water; new standards of good housekeeping have been set, while accident prevention campaigns and committee work have interested the plant force in the progress and objects of the company, so that the posting of a daily production record is of real interest to the men, and plant periodicals are appreciated by a widening circle of readers.

The test of a well-managed concern comes in hard times which put on trial the quality of foremanship that has been developed in a plant. For the foreman is the instructor of the rank and file and the interpreter of management's policy. To get and keep the kind of man who will identify his personal interests with the interests of the company, who will defend the company's resources when the pinch comes, and inspire confidence in the management by his actions and conversation, every effort should be made to build up a large nucleus of permanent jobs, for the men holding these jobs are in the right circumstances to develop such qualifications. They should be encouraged by committee work, and by prompt executive action wherever possible on their recommendations, to take a pride in the physical betterment of the plant. They should receive a direct reward for any product of their ingenuity improving any detail of plant economy. They should be stimulated to feel that a good accident experience is one of the principal objectives that the company delegates to their charge, holding the well-being of the employees as a matter of first line importance. And the more desirable the job has been made, the greater must be the care exercised by employment manager or superintendent in selecting his man. Patronage and nepotism must be excluded and merit

must get precedence over seniority. The ability to effect this is one of the more important qualifications of a good superintendent, and one calling for considerable tact, a quality that is uncommon but beyond price.

Without the loyalty that the right sort of permanent employee undoubtedly acquires towards the company whose prosperity means his livelihood, plants are bound to suffer sporadically from half-hearted and discontented workmen, petty thefts, absenteeism and maligning, favoritism and back-biting, and welfare work is liable to be misunderstood or to degenerate into paternalism. The permanent employees are at present the backbone of any plant. Our ideal should be to make of them the entire worker body.

DISCUSSION

CHAIRMAN JACOBSEN: I am sure we all appreciate this splendid paper. It shows a real study of the underlying problems in connection with our Accident Prevention work, whether related to the workmen or the executives.

MR. AFFLECK (*Universal*): In regard to the elimination of the twelve-hour day and the statement that there is less necessity for it in the cement industry than in other industries, I would like to say that as a part of the steel corporation we eliminated the twelve-hour day nearly a year ago, and I think it would perhaps be of interest to you to know that our experience with it has been very satisfactory. We increased the hourly rate, and we changed the hours from twelve to eight, which means a fifty-fifty split of the reduction in earnings; or, rather, we reduced the day four hours and increased the pay for eight hours' work to the equivalent of ten hours at the old rate. Our men are, without exception, pleased with the change. They have indicated in many ways satisfaction with the change from twelve to eight hours, even though their daily earnings were reduced.

CHAIRMAN JACOBSEN: We are very glad to hear from you, Mr. Affleck. It is a very live subject in any industry, and I am sure it is in the cement industry.

In my travels around the country, I frequently get into discussion with people on the question of the two or three-shift plan. A few days ago, the question came up again, and I prepared a table which shows to a certain extent the rate of accidents in two-shift plants and in three-shift plants. I found that the plants running three shifts had about ten per cent less accident losses than those having the two-shift plans. I think that is what we can expect. Men working shorter and more reasonable periods will be less likely to have accidents.

MR. AFFLECK (*Universal*): The Century Magazine for October contains what I think is a well-written article by Rose Ledt on the eight-hour day. I think the title is, "Now That They Have It, What Will

They Do with It?" She has gone into a number of the steel plants and interviewed the men, and she tells about the information she got in some of these interviews.

One of the arguments against the twelve-hour day made by the reformers and uplifters was that the men wanted more time for self-improvement, reading, going to church, attending night school, and all that sort of thing. She finds they have not done very much of that; in some cases, yes, but not to a very great extent.

On the other hand, they have utilized their leisure time, she finds, in just fooling around, resting and working in the garden, building themselves garages, and things of that sort, prety much as any one of us would do if we had more leisure than we have now. We may think if we just had more leisure we would utilize that leisure in self-improvement, but, as a matter of fact, the probability is we would fool around, take it easy, play baseball, or golf, or tennis, putter around at one thing or another.

As I said yesterday, these men working in the plants are human the same as we are. They are moved, influenced, and swayed pretty much the same as we are.

Of course, it is only fair to say that there has been some increase in the cost of our product, due to the change from twelve to eight hours. What that is, we have not been able to calculate accurately, because conditions have changed more or less and comparisons are not accurate. Theoretically, of course, it would require, on the continuous operations, three men instead of two; in other words. fifty per cent more men. That is true theoretically, not practically, because when we changed from the twelve-hour to the eight-hour shift we rearranged the work and gave the eight-hour men a more exacting job than the twelve-hour men, and they are far more ready to take an exacting job than the twelve-hour men, and they are far more ready to take an exacting job They are not overworked; whereas, if they had an exacting job that kept them going all the time for twelve hours they might be overworked. The increase in the number of men necessary to man the plant, therefore, is not 50 per cent. I don't know exactly what it is. It is pretty hard to determine, but it is more nearly 20 or 25 per cent, I should say.

MR. WEITKNECHT (*Lehigh*): I think the question brought up with reference to employment as one of the intangible assets or liabilities of the plant must be handled somewhat like we handle the matter of personal safety. The fact of the matter is the employes were not the first to take to the question of personal safety, much as that may seem to have been the case. I think we all experienced the fact, that it was management in the industry that had to take the lead. The average employe, either by lack of capacity or otherwise, did not seem to take so well to personal safety and personal safety campaigns, as most of you realize. The matter had to be sold to them.

In regard to the excess time which they now have, the management must turn that time into an asset. It is one of the large intangible assets. Mr. Affleck has raised a very vital question: What will the men do with their spare time when they go from the twelve-hour to the eight-hour shift? How they are going to utilize their time will depend largely upon what initiative the management takes to help them direct their efforts along proper channels. That means more effort on the part of some executives than it does with others. It depends on the conditions, the environment, and so on. I think the important thing is that the management must take the initiative in the matter of directing or helping the employe utilize his time to the best advantage, so that it becomes an asset instead of a liability.

CHAIRMAN JACOBSEN: I believe that matter could be explained by Mr. Baylor, of the Louisville Company. They have done quite a good deal to build up the community out around their plant, and they have furnished a good many facilities for the men's education, enjoyment, etc.

MR. BAYLOR (*Louisville*): I will say I heartily agree with what Mr. Weitknecht has said. I really feel it is up to the plant management; those who have the plant production in charge, to also see that the men have some facilities for utilizing the four hours, we will say, during which they worked before when they were putting in twelve hours. It is up to the management to see that they have some facilities for using that spare time in the right way.

Realizing the importance of this work some five or six years ago, Mr. Speed, the president of the Louisville Cement Company, worked out a plan of opening up a community house. Our conditions may be somewhat different from the conditions in plants located near cities. We are more or less of a self-contained unit having a small town of our own which practically all belongs to our company, the largest part of our labor practically being drawn from this one small town.

We opened up a community house and secured help to take care of it. Mr. Gentry is the man who, in connection with his wife, has charge of this social service or welfare work for our company. The first year gave such good results we felt it should be continued in other directions. Our housing facilities at the plant were very much as you find in industrial towns of that sort; they were not of the best.

Following out this idea, we developed the plan of trying to replace a number of our old houses with modern cottages. The demand has been so great for this type of house that we have hardly reached the point where we have been able to do as much replacing as we would like to do. Everything that is installed in a modern home was installed in the cottages we built. The demand has been so great that we have not caught up with it. During the last four or five years we have built about twenty houses each year.

We had quite a large number of young men who had no place to go. The boarding houses were cold in the winter time and everlastingly hot

in the summer time. This past summer we built a small twenty-five room modern hotel with shower baths, steam heat, and all the modern conveniences. It is in charge of a man who understands hotel management. We are just getting it under way, but it promises to be successful and to appeal to the young man who has no home of his own.

Another outgrowth, which I might speak of, is the social service work. That work does not fall on Mr. Gentry's shoulders. The superintendend, the manager, the chemist, and everyone else is a social service worker. We are all, you might say, sold on the idea.

There was no church in our community, and there seemed to be a general demand for a church. Different ones would come to me and say, "I believe we ought to have a church in our community. Don't you think we could do something to start something of that sort?" There seemed to be a general demand from all sorts of denominations. We formed a committee and talked the matter over with Mr. Speed. He said he would take it under consideration. In thirty days he came back with a nice report, saying he and his sister would propose to build a memorial to their father, a community church.

We have now a very strong and continually growing community church in which no particular denomination is recognized. I don't know just how many are included in the church assembly, but I would say off-hand there must be fourteen different denominations, both Protestant and Catholic. We have two or three followers of the Jewish faith in our community and they attend church occasionally along with the rest of us, so it has worked out very nicely.

All of this work, this grouping together, I can't help but notice has made a much more satisfied worker. In other words, the fellows used to go home, come back in a few minutes, loaf around in front of the grocery store with their overalls on, kicking about the things that happened during the day. Now, the man hustles home, cleans up, goes to the community house, gets into a game of volley ball, tennis, or pool. He discusses various things. You will see a group of fellows discussing basketball instead of kicking about what the foreman has said during the day.

The ladies of the community are interested in church work. They are all a bunch of boosters. During the past two or three years we have been putting on a community fair in which the ladies of the community, with the help of the men, have been putting on an exhibit of fruit, canned goods, etc. They have been having a baby show, a health contest, and things of that sort. It is really outgrowing the community. We are getting more than we can swing. People are coming there from Louisville, Jeffersonville, and New Albany. We had the largest crowd I believe we have ever had in our community during the past September at the time of the fair, which is all the outgrowth of this social service work. In other words, we are doing all we can to take care of the man off duty.

We have a little trouble occasionally with the fellows whom Mr. Roth has referred to, in their drinking too much moonshine liquor, but those cases are rare and far between, and really have very little bearing on the plant operation. When something of that kind occurs we take the man to task and it seldom ever happens the second time.

At the fair, we pulled off a triangular athletic contest: the Louisville office, including the sales office and the truck drivers, as the first unit; our Brixment men as the second; and the portland mill as the third unit. We have a very interesting track meet and had a very large crowd. All of the men were there in the tug of war, the running races, and everything else, and we certainly had a fine time. The fellows in the plant knew the fellows in the office, saw them play the games, and found that they were not afraid to take off their coats and jump into the thing the same as the fellow in overalls. Everybody became acquainted. It certainly does produce results to know we are working for some one thing.

Just as Mr. Cam said, when you get men into the position where they are all watching the board for production, where they are as anxious to have the thing climb as you are, you have the ideal. When they pull off a good stunt, don't be afraid to tell them about it. They will appreciate it. The men watch the production just the same as the one in charge of the plant or the department.

CHAIRMAN JACOBSEN: I have had the pleasure of watching the workers out at the Louisville plant. It has been a pleasure to see how they have continued to take an interest in any new activities that have been brought up, and at the same time, I have been pleased to see a continual reduction in their accidents. So although this discussion may seem to be a little off color in so far as accident prevention work is concerned; nevertheless, it has a very direct bearing on it. For that reason, I think it is very essential that we keep in mind the necessity of interesting the men around the plant not only in accident prevention work but in anything else that has a bearing on their daily life. In that way, I believe, it is possible to come along, and, as Mr. Weitknecht said, those things must come from above; the initiative must be taken by the management.

MR. HALPIN (*Marquette*): Our conditions, are somewhat different from those at the Speed plant, inasmuch as our labor consists of about 60 or 70 per cent foreign elements. It is rather a difficult matter to get them into athletic contests, and so on, like you would a group of English-speaking people.

We have eight hours on all shifts. We have baseball teams, and so on.

We have one activity we started a few years ago, which I believe was the hardest one we ever undertook. It was the organization of a band. Music is one language all foreigners understand. They were

very much interested in the band, and I think it is the only activity that really has carried on successfully all this time. We have had a band for four years and it is still intact. It consists of nearly every nationality, such as Austrians, Poles, and one Irishman, but largely of Italians. We give band concerts every Friday night during the summer months. During the winter months we have a big hall where we give concerts every once in awhile.

It is very much more difficult to run those things where you have an organization made up of so much foreign labor.

MR. BONN (*Clinchfield*): As far as welfare work is concerned, it is practically all taken care of by the city.

To go back to the question of safety work, somebody said March was the first month they conducted a safety campaign. I can beat that. September of this year was our first month. We started out with six weeks' preparation, and on the first of September we thought we were going through fine, but I guess we were a little overconfident. We had an accident. We are not discouraged, and we will try it again. For the first nine months of this year, we have had a saving in lost time accidents of 43 per cent.

MR. SASS (*Universal*): We have a group of four buildings, three that we use for lodging quarters and one for a recreation building. Each house will take care of 104 men. One we use for the colored men, one for the Mexicans, and one for the whites. There is a recreation room at each end of the recreation building, one for the colored men and one for the whites, with a lobby in between. Any man entering our lodging house has to go through the lobby, so if any tramps come in they can be detected before they get through.

The buildings are equipped with showers and steam heat. The heating plant is a unit for the lodging houses only, so we don't depend on the plant for heating facilities. Outside there are lawns, bushes, and trees that are kept in good condition, and across from the recreation building we have a nice baseball field.

This takes care of our single men. We also have quite a few married men who have migrated looking for a job. They stay at the lodging house until such time as they decide whether they want to stay at the plant or not. If they do, they usually get a place in Gary or Indiana Harbor and bring their families.

The man with a family we can't do very much for, due to the fact that he travels from either Indiana Harbor, Gary, or Whiting, and he has to work according to train schedule. A bus is run from the plant to Indiana Harbor, when the different shifts change. Consequently, it is pretty hard to induce a man to stay over, because if he does he will probably have to stay around two or three hours before he can get a train or a bus away from the plant.

We have tried to interest the men in gardening, without much success. The only gardens we have now are those taken care of by the

different watchmen. The men seem to think they can do better in their own backyards. They have pretty fair houses down in Indiana Harbor and Gary. They have nice yards and can raise all the garden truck in these places they want without staying around the plant any longer than they can possibly help.

CHAIRMAN JACOBSEN: We will proceed with the next subject on our program, which is a paper by John H. Mallon, of the Louisville Cement Company on "The Human Element in Safety Work." I understand Mr. Mallon is going to show us a great many concrete examples of how he takes care of the problems of his plant.

THE HUMAN ELEMENT IN SAFETY WORK

John H. Mallon, Louisville Cement Company, Louisville, Ky.

That Accident Prevention pays and can be accomplished only by organized safety work has been so well presented in the papers read by Mr. Affleck, Mr. Halpin, and Mr. Cam, that I am going to omit any introductory remarks on this subject and plunge right into my discussion of the "Human Element in Safety Work."

Probably everyone of the cement companies represented here has had the same disappointing experience in the early days of its safety work. A mill well guarded mechanically brought no marked decrease in the number of accidents. This experience was so contrary to all expectations, that in most cases it took some time to realize that other measures were necessary, if accidents were to be prevented. In fact a few cement companies have never progressed beyond this first stage in safety work. It is so easy to console the conscience by running over the record of accidents, and pointing out that in 90 per cent of the cases the fault was unquestionably the workman's. But such statistics can never hide the fact that no matter whose fault, the resonsibility for every accident is the company's. Facing this fact and shouldering the responsibility, most of the companies have come to realize that the real problem in accident prevention is the human element, and that the answer to the problem lies in educating the workman, not in reading, writing, and arithmetic, but in Safety.

To do this—to keep before the workman the thought of his personal safety, to make him careful—is not an easy mater. Jerry McCollough, our team foreman, says, "When a man tells me how easy it is to drive a team of mules, I know he ain't no regular mule driver." So also when a man tells me how easy it is to educate the workman in Safety, I know he ain't no regular safety engineer. Accidents can't be eliminated overnight like the Huguenots on St. Bartholomew's Eve. It is a job requiring perseverance and systematic methods. I am going to explain to yo uthe methods employed by the Louisville Cement Co., not because they are original or because the Speed Mills have made a

remarkable record, but because these methods have brought about a very steady improvement, and because, as far as I have been able to find out, these same methods have met with the same success wherever they have been conscientiously applied.

First of all there is the safety organization. Of course the exact form of this organization would differ at each cement company, depending on local conditions. At the Louisville Cement Co., we get the best results when safety and production go hand in hand. We have at Speed two separate mills with an assistant superintendent over each. He is in charge of safety work as well as production. Each of these mills in turn is divided into safety divisions. The foreman in each division is held responsible alike for safety work and production.

When a mill can split up into divisions, there is nothng like a safety competition to keep up a sustained interest in accident prevention. At Speed not only do the two mills compete against each other for a yearly trophy, but each division competes against the other divisions of the mill. Scores in the form of baseball averages are posted regularly. The progress of the competition is also shown graphically on a large bulletin board, where barrels representing the various divisions are shown floating down, "Safety River." To increase the rivalry between mills, baseball and volley ball games and track meets are held. In this way a keener spirit of competition is aroused in safety work. This safety competition serves as a background for all the safety work.

The scores of the safety competition are also announced at mass meetings. At three o'clock on the last Thursday of every month the mills shut down for an hour, and the men are given ½ to ¾ of an hour's entertainment and ¼ to ½ hour's serious safety talk. You would be surprised how varied these meetings can be made.

We started out with movies, largely because we didn't know what else to do. We ran across some very fine films, among them "The Outlaw," "The Hand of Fate," "The Chance Taker Is the Accident Maker." "The House That Jack Built," and "The Only Way." "The Outlaw" is especially good for the start of a campaign or No-Accident Month. All of these pictures can be secured through the National Safety Council.

Besides pictures we have had first aid demonstrations, outside speakers, and from time to time the safety divisions themselves have furnished the entertainment, reciting safety poems, and singing safety songs (the National Safety Council can furnish a supply), boxing, sparring with sacks of waste astride a horizontal pole, chasing a greased pig, etc. There are innumerable stunts which make the men look forward to the last Thursday of the month. These safety meetings more than any other one thing keep up the interest in safety.

Another monthly feature of the safety work is the inspection. The inspecting committee is made up of a representative from each division,

and is headed by the construction engineer. The personnel of this committee changes every month, so that in the course of a year a great many men take an active part in the safety work. But more important still, the committee, going through the mill, advertises the fact that the company is doing its part safeguarding its workmen.

There is a third way in which the safety idea is emphasized each month. That is the house organ. Primarily our house organ, the "Speedometer," is a newspaper recording the news of the mill and the community. But one or two pages are always devoted to safety. Here again the National Safety Council with its Plant Publications Department is a great help, as it issues monthly a series of cartoons, editorials, and jokes, on all safety.

The mass meetings, inspections, and the plant paper emphasize safety at three different times during the month. In the intervals between these attacks safety is not neglected. A running fire of safety bulletins is kept up on the bulletin board. Here there is endless room for variety, and variety is essential.

First of all, there is the National Safety Council Bulletin. Then, there is the modification of the Safety Council Bulletin, using the illustrations of the Bulletin with your own wording. For instance, Jimmie Himebaugh hit the nail on the head when he said, "We can't cut out all accidents until every man is a safety man."

Next is the slogan. The National Safety Council gets out a pamphlet which has several hundred safety slogans in it. They will furnish it on request, and you can get a great many slogans, all of which apply to Safety. The safety slogan in this case is put up in blueprint form.

Another method of presenting the safety slogan is on a little card. Here is the safety slogan with appropriate words. It says, "The angels sang, 'Peace on Earth,' not pieces," and it represents a sheet of music. Just anything to draw their attention to the slogan.

Next is the use of the calendar, January with the dates on which accidents occurred, January the year previous marked in black, and underneath a little write-up on each accident saying who was hurt on such a date. For instance, we have taken the date of February 23, and said, "Last year on February 23, W. Goodson bruised his foot while working the quarry. He lost full pay for twenty-five days, which made him very sorry." Just something to make them realize there was an accident on that day last year and which might happen again this year.

Here is something a little more elaborate in the calendar, a picture of a girl, which will appeal to all men. You see the attractive picture of the girl. Underneath it says, "Make October a no-accident month. Do it for me."

Here is also something a little more elaborate in the calendar. Tear off every day one cause of accident. Monday, September 1, is careless-

ness. Tuesday, September 2, is absent-mindedness. Each day a new one appears. It is torn off and discarded as the day goes successfully by.

Then there is the use of the comic supplement. We all know certain national characters, and among the most famous, I think, is Jiggs. Here is Jiggs shown in the court room. The court has just sentenced a man thirty days for carelessness, and Jiggs says it serves him right.

Here is another one, Mutt and Jeff, Jeff catching the goat amidship and Mutt saying, "Don't kid about safety. You may be the goat." It brings these characters that men have always liked to look at, to the bulletin board. They will look at them just as quickly as they will in the Sunday papers.

Then there is the use of magazine pictures. Here are two magazine pictures on a background of red. The first represents an accident. Somebody telephones the man's wife. The wife says, "Hello."

He says, "Hello, Bill is hurt." It tells a story.

As Mr. Cam brought out, the way to appeal to a man is not by long argument, but by letting him visualize something that might happen to him.

Here, again, is a little story. One of his friends says of Bill, "Bill was a very nice young man."

Over here one of his friends says, "But awfully careless." Over here we see the results, and down below, "Never again." Just a little story along Mr. Cam's idea.

Another thing we found very successful and used for the first time this month is the Pictorial News. There is, I believe, more than one company which furnishes bulletins of that sort. It is something to make the men come to the board and read your bulletins.

Here we have it illustrated by steps. The placard says, "Help him reach the flag." The workman climbs one step each day as long as there is no accident. If October is a no-accident month, he will reach the top. Up that flight of steps travels the workman. Each day he says something to the men in the mill. Today he says, "I am going up." This little talk that he gives the workmen each day changes from day to day, so each day they come to see what he is saying about the Safety work and as the month progresses he walks right up.

Another method we had was this calendar. It says, "Watch me turn red." There is a red card placed over every perfect day. On each successful day one of these red cards is placed, and each red card says something. This is for the month of February. On Lincoln's Birthday it says, "Two down. Twenty-eight to go. A good start." You see it says something each day and the man comes up to see what it says. He sees he has had a successful day and this something to encourage him to make the rest successful. I am not as proud of this calendar as I

am of the ones that we have at the mill at the present time. This is just the origin of the idea. It has been further developed since this was started. Those of you who will visit the plant this afternoon will see the same general idea, but prepared in a little better form.

The next little novel stunt is a series of girls. These are the September girls. Each girl is named. This one happens to be Kathryn. Above each picture it says, "These are the September girls. Read what they have to say about no-accident month." Kathryn says, "You men all admire a good looking girl. Well, we girls all admire a careful workman." And a good many of them met Kathryn face to face. We have a different girl for each day during the month.

From time to time during the month we send men through the mill with placards. This particular one that I am going to show you was on a sandwich board on a cart which was hauled by one of our mules. About two days before this went through the plant the mule had backed right up to a dump and over the dump into the pond. So we say, "This mule won't get hurt in October. He has horse sense. How about you?" This one also refers to the mule. It says, "Which is the biggest jackass, the mule or a careless worker?" They all know what the mule did. We just put it up to them whether they had as much sense as the mule.

The next novel stunt is safety personified; rather carelessness personified. Here you see carelessness, a picture of the devil. The devil went through the plant and carried under his arm a wooden leg and a handful of glass eyes and tried to persuade the men that all this stuff which has been put out about not getting hurt in September was all bunk. He told them that he liked carelessness and accidents and went up to certain men, whom we had tried to persuade to wear goggles when they ground on the emery, telling them about his glass eyes and saying he had a few eyes on order, that if they continued to use the emery wheel without goggles the eyes would arrive just about in time to fit them up. We have found that for the first time those men have been persuaded that they should wear goggles.

The next is a blotter. We got out a blotter with the picture of the plant and printed over this side, "The Portland Cement plant of the Louisville Cement Company at Speed, Indiana, where there will be no accidents during October, 1922."

Then, as a method of reaching the workmen there is the pay envelope. We have placed on there the statement, "September is no-accident month. Practice and think Safety especially hard during the month of September." We also have printed on the pay envelop, "The amount of money in this envelope depends on the number of hours you worked during the past two weeks. Don't let the next two weeks' pay be cut down by an accident."

Here is a little safety button, something for the men to wear. "I am for a no-accident month."

One of our greatest troubles at Speed has been with the eye. We have had a great many eyes lost in the past four or five years, because, in most cases, the man would not wear goggles. So we secured a quantity of laminated lenses, and had a picture of the eye printed on paper pasted on the back with a statement something like this, "Two eyes lost at Speed this year. Goggles would have saved them. If you don't believe it, hit this lens with a hammer." The lens will break but the pieces will stick together on account of the lamination and not a particle will get in the eye. It proves conclusively to the man that goggles would have saved the eye.

Here is a little statement printed and distributed through the schools. We told the children to take it home and give it to their parents. "Don't take a chance in October. It is No-Accident Month at Speed."

Among the novel ideas is a little medicine. We passed a little dope out to the men in capsule form. They open the capsule, unroll the printed dope, and read, "You have no right to take a chance. The other fellow may have to take the consequences."

In last year's Safety parade in Louisville, we had a truck. On the truck was a big medicine bottle, and in the body of the truck was a little air compressor. We had a system of valves arranged coming out of the neck of the bottle, so that if you opened the valve there would be a shower of capsules. They went as high as the second story windows, and we had all the boys of Louisville running after that truck, collecting these capsules. The idea came from the advertisement for puffed wheat, which I believe most of you have seen in the newspapers.

Then, another idea is marking the site of the old accident. "On January 2, 1922, James Huckleberry was hurt here. A piece of iron struck him in the eye as he was entering a mill in which a fellow-workman was driving a plate. He lost thirty-eight days and an eye." As they go through the plant, they see where the other accidents have occurred, how they have occurred, and it is a warning not to let that same thing occur again.

On every tool which was sent out from the tool room and on every piece of supply which left the supply house last month was a sticker. On the material which left the supply room the sticker read, "This plant can't get along without supplies. You can't get along without Safety. September is No-Accident Month." The tool room tags said, "Don't let this tool hurt you. Remember, September is No-Accident Month."

In spite of all you can do to keep the idea of accident prevention before the employes, from time to time interest will wane. Then is the time to launch a no-accident campaign. Mr. Halpin has so ably discussed "No-Accident Months" that I will not dwell long on this subject. For another splendid discussion let me recommend another

of the National Council's Safe Practice Pamphlet, "Planning an Industrial Safety Campaign." If the object of a No-Accident Campaign is to revive interest, the keynote should be *Novelty*.

Competitions, Mass Meetings, Inspections, Bulletin Boards, House Organ, and No-Accident Campaigns—that summarizes the accident prevention methods employed at Speed.

Of course, the best gauge of the value of these methods is the number of accidents which they prevent. But what this number is we have no way of knowing. But we do know that if the safety work were to be taken out of the plant the number and seriousness of the accidents would show a great increase. Safety work in a plant is like alcohol in beer. If you eliminate the alcohol you are not long in finding it out. You can't get drunk on ½ of 1 per cent beer, nor can you eliminate accidents with ½ of 1 per cent of safety. But the higher the percentage climbs, the more kick you get. It may take more than one drink even of 5 per cent beer to make your head swim, but if the 5 per cent is there it won't take long to kill a grouch. And just so with safety work. It may not eliminate all the accidents at the start, but if the percentage is there, it won't take long to kill carelessness.

DISCUSSION

CHAIRMAN JACOBSEN: I am sure this has been very interesting, gentlemen. I frequently have the experience in going around to plants of having people say, "We can't find anything to put on our bulletin boards. We don't know where to get it. We have only the bulletins we get from the National Safety Council and they are rather inadequate to meet all conditions."

A few years ago I believe Mr. Mallon and I had a discussion on the same problem, and all that Mr. Mallon has shown you has been developed since. Mr. Mallon is very ingenious in getting many different things to fit in with safety work. There are many different ways in which we can get material for our bulletin boards. Personally, I believe home-made material is the most valuable.

MR. ROSS (*Missouri*): We have a bulletin service, but not as expensive as Mr. Mallon's. We have used the photographs. Most of our material applies to the cement industry, to a greater extent than the ready-made bulletins we purchase.

Speaking of competition, we have monthly competition among our foremen for better departmental performance for any month as compared with the record of the preceding year. For instance, for 1924 we would take the year of 1923 and compare the two years. The foreman whose department showed the best record over the past year would receive the cash prize. That works out very well.

In connection with that, we have a bulletin that we copied from the last Accident Prevention Bulletin of the Association. We pass our red stars, which say, "Watch very closely." They watch for the red star reports.

Recently we have had gatherings of foremen, subforemen, and various bosses at monthly dinners. This originated at the Kansas City plant where I believe it has been under way for about a year. I think Mr. Belfour could tell us more about the results from these dinners.

MR. BALFOUR (*Missouri*): For about a year we have been conducting foremen get-together meetings. At these meetings we have the foremen, subforemen, and other bosses, as Mr. Ross has said. We allow each foreman to pick one or more men from his department and change these men each month. We have these meetings in the Savoy Hotel in Kansas City, serve a good meal, and after the meal a paper is read. The subject so far has been quite often that of cooperation, and I certainly agree with Mr. Cam that I don't know what it means. The more we talk about it the more elusive it seems, but I wish to congratulate him on his definition. That is getting closer.

The effect of these meetings on the morale is good, and I venture to say that in the future each speaker will be very careful of what he says. It is getting so at the plant now that it is actually dangerous to tell a lie, because the man is immediately picked out and his statement is discussed for a week or so afterwards.

Each man at the table is asked to say something during the evening, and many good ideas have come from the men. Each idea is given consideration and thrashed out and for that reason men are not afraid to speak. We expect to keep this thing up in the future and so far we have gotten a great deal of good from it.

CHAIRMAN JACOBSEN: A question has come up which I think we ought to discuss here. That is the question of whether we wish to continue to count hernia cases as time lost accidents. Several big industrial organizations come to the conclusion that they will not count hernia cases as time lost accidents. I would like to hear an expression from this meeting as to what your pleasure may be in that connection, as that he can't come into the plant as a regular worker as long as he is on Accident Prevention and Insurance in November.

MR. CAM (*Canada*): The question of hernia cases and whether they should be treated as accidents or not has been forced on our notice by a series of accidents of that nature.

We have initiated a policy, which is not original in any sense because it has been done in many plants, of persuading any man who is troubled with hernia to undergo an operation if he can. We can't force him to do it, but we can frequently persuade him, and we attempt also, by medical inspection in some of our plants, to eliminate hernia cases before they come into the plant. That is to say, if the doctor finds

that a man shows any weakness in that respect he advises the man that he can't come into the plant as a regular worker as long as he is in that condition; but, on the other hand, he can be operated on, and after he has been operated on he will be a better man than he was before, and will become a regular member of the working force along with the rest.

Now, we work under compensation boards in most of the provinces in Canada. The compensation boards now reject hernia cases from compensation in nearly every case. It appears that the traumatic hernia, that is to say hernia which is definitely and solely the result of a shock or wrench of some sort, is a very, very rare thing. In almost all cases of hernia there is a weakness to start with and it takes very little to cause trouble. At one of our plants recently, a man had crawled under a locomotive to make some minor repair, just like he would get under an automobile. He did what he bent down to do and got up in a very ordinary sort of way. He didn't hit anything but he felt a pain when he got up. There was a hernia case. You can't call that an accident.

Take another example of a different kind. A man was wheeling a barrel of cement and burst a varicose vein in his leg. That case also was thrown out by the board in Toronto. I don't suppose that class of injury comes up so frequently, but there are those two things; hernia and varicose veins, which are constitutional defects and should not be treated as accidents. Would it be in order, Mr. Chairman, to propose a resolution?

CHAIRMAN JACOBSEN: Yes.

MR. CAM (*Canada*): I move that this meeting make a recommendation to the Committee on Accident Prevention and Insurance of the Portland Cement Association that in the future cases of hernia be not considered as accidents in spite of the fact that they might involve compensation payment, but that the Committee be empowered, in special cases, to use its judgment and declare a hernia case to be an accident if it is convinced that is so.

You would have to cover cases of traumatic hernia. Perhaps the wording of that resolution might be changed a little, but we don't want to eliminate cases of traumatic hernia. If a man takes a ten-foot drop and gets traumatic hernia, the probability is that the man was a good sound man and the fall was the cause of the hernia, but what we want to eliminate is precisely the hernia cases of the kind I have described, where the injury could not possibly account for the hernia, where there must have been a weakness.

It is an interesting fact that foreigners from certain parts of Europe are especially subject to hernia. You will find that the Galatians and Serbians and Croats and people from that part of southern Europe very often have abdominal weakness of that kind. Those are the men

that the medical examiner should give special attention to. It does not arise so frequently with the Nordic races, that is to say the northern Europeans.

CHAIRMAN JACOBSEN: You have heard the motion made by Mr. Cam, that this meeting go on record with recommendations to the Committee on Accident Prevention and Insurance of the Portland Cement Association that hernia cases, although compensation has been paid on them, are not to be included as time lost accidents in our statistics, unless they are traumatic hernia cases. Do I hear a second to that motion?

(The motion was seconded.)

MR. HALPIN (*Marquette*): In the event of fatality or death from hernia, shall that be counted in any way at all?

CHAIRMAN JACOBSEN: No.

DR. CHANEY (*U. S. Dept. of Labor*): It is true that in Canada the tendency of the compensation boards is not to include these cases. It is equally true that in the States the tendency is to include them, and it seems to me that you will have to be governed practically by what your compensation commissions do. Where the compensation commission counts it an accident, I don't see how you are going to count it something else. I am interested in it, because the difference between associations like this and the compensation commission complicate the matter of statistics from the standpoint of the United States Bureau.

It would be my suggestion that you can hardly control that situation as against the compensation commissions. The surgeons, for the most part are convinced that traumatic hernia almost never occurs and is so rare that it might be regarded as negligible, that there is always some weakness of the abdominal wall which allows the thing to happen. Compensation commissions reason this way: that along with this abdominal weakness there is nearly always some factor of strain which brings the hernia into notice and gives rise to a condition necessitating an operation, so that there is an accidental factor in it. I am not prepared to argue that there is one. I am simply saying the compensation commissions are taking that view in the States; that there is practically always some element of accident in the occurrence of hernia.

I should rather hate to see this organization take a stand so diametrically opposed to the one which the state compensation commissions are commencing to take.

CHAIRMAN JACOBSEN: Dr. Chaney, we are very glad to have you with us today. We realize that we will be compelled to pay compensation in almost every case, but we do have quite a few hernia cases on which there seems, you might say, almost no accidental factor.

This resolution is merely an agency for bringing the questions before the regular committee of our Association. It does not mean that we will

take the step that has been recommended here, but I think it is a point that should be considered.

I would like to hear from Mr. Sass as to what the practice is at his plant.

MR. SASS (*Universal*): In some cases, we have paid compensation for hernia, but we do not call them accidents. We don't include them in our accident statistics. If a man has been in the employ of the company a long time, and some time in the past may have strained himself to such an extent that he may have contracted a hernia and neglected at that time to report it, later on it having aggravated to such an extent that he comes to the dispensary to see the doctor, the case is written up and the department of safety and relief decides upon what we do, but we do not call them accidents.

DR. CHANEY (*U. S. Dept. of Labor*): My interest in it is purely statistical. The States send up to us in increasing quantities their reports of accidents. Now, if they adopt one view of this case and the Portland Cement Association, for instance, adopts another, we will have two sets of statistics which we would like to check against each other, but which we would be unable to check, because of the difference in the way in which they are handled. So from our standpoint, the statistical standpoint, it would be distinctly desirable that you should do whatever the state commission decides should be done. If the commission decides it is compensable, it counts. If it decides it is not compensable, it does not count.

CHAIRMAN JACOBSEN: Dr. Chaney, are there not some states that give a certain number of days for hernia cases no matter how long the man is off from work?

DR. CHANEY (*U. S. Dept. of Labor*): You mean a specific allowance? There are all sorts. I would not say what the different states do. All I know is that in a recent survey of the situation I found the States more and more tending to count hernia as an accidental case and grant compensation. I have sat with the commissioners a number of times lately and had cases of that kind come up, and I notice constantly they tend to grant compensation. In some cases there is a tendency the other way.

CHAIRMAN JACOBSEN: Won't you get a report from one state giving for instance thirty days and a report from another state giving ninety as basis for compensation?

DR. CHANEY (*U. S. Dept. of Labor*): I don't deal with those specific allowances at all, so that would not affect me.

CHAIRMAN JACOBSEN: You only count the accidents and not days lost. Then we might also call hernia an accident without a time charge for it.

DR. CHANEY (*U. S. Dept. of Labor*): It is only reported as an accident as far as our operation is concerned. In the matter of time, we would,

if a hernia case were reported to us, utilize the actual period of disability. Whatever time he was disabled or laid off would be his disability.

CHAIRMAN JACOBSEN: We have hernia cases reported that run anywhere from a couple of weeks up to half a year in time lost and that is just the truble.

DR. CHANEY (*U. S. Dept. of Labor*): That is a variation which you have in all sorts of temporary disabilities. What seems to be precisely the same injury in one case will run two weeks; in another two months. You have that variation constantly.

CHAIRMAN JACOBSEN: We have always received reports on hernia cases from all plants. We still do. We have not made any change so far.

MR. ROSS (*Missouri*): We had a man who started in to work and two weeks afterward he came in and complained about a hernia case. I would like to hear some discussion from others as to what they do.

MR. SASS (*Universal*): If a man looks physically able at the time he is employed, we employ him. We look him over generally, but there is no physical examination outside of this little examination we give him at the time of employment; looking at his hands, etc.

MR. MCFETRIDGE (*Lehigh*): If a man says he has no disease of any kind when he comes in, we have a card on which we keep a record, and it is put down on that card. He signs the card.

MR. HALPIN (*Marquette*): Is it not true that the purpose of this recommendation of Mr. Cam's was so that the awarding of the trophy that is given every year by the Association would be a better criterion of the exact accidents that occur in all the plants?

MR. CAM (*Canada*): Yes, and hernia cases should not be considered. That does not mean they would not be looked after. Medical attention will be given and they will be compensated, unless the commission rules otherwise.

MR. HALPIN (*Marquette*): Then these cases can be reported and should be reported just the same to the Association, who, in turn, can report them to the Labor Bureau, so there won't be any mix-up there with regard to statistics and it will serve the purpose that we want in this recommendation.

CHAIRMAN JACOBSEN: Mr. Cam, will you let the motion stand as it is for further discussion by the Committee on Accident Prevention and Insurance at the annual meeting of the Association in November?

Have you all heard the motion? Are you ready for the question?

(Motion carried.)

CHAIRMAN JACOBSEN: Gentlemen, this concludes our regular program. I thank you for coming to this meeting. I know you will take many valuable ideas back to your plant and that your accidents in the future will show a decrease.

ADJOURNMENT

Chemical Section

October 1, 1924

A. L. WATSON, Chairman
Personnel Director, Hooker Electrochemical Company, Niagara Falls, N. Y.

M. F. CRASS, Vice-Chairman
Grasselli Chemical Company, Cleveland, Ohio

I. D. McNAUL, Secretary
Safety Engineer, Du Pont Fibre Silk Company, Buffalo, N. Y.

CHAIRMAN WATSON: Our program is exceptionally full this morning, gentlemen, because of the fact that we had to eliminate one of the papers yesterday and, therefore, I am going to ask your permission to permit the elemination of the reading of the Chairman's report and several other reports that might be presented at this time but which would take up considerable time. I do, however, wish to ask the Chairman of the membership committee to let us know of the membership.

REPORT OF MEMBERSHIP COMMITTEE

MR. I. V. KEPNER (Pennsylvania Salt Company): At the last annual Congress held in Buffalo the Chemical Section had 126 members. Since that time we have had 12 cancellations but have been able to get 30 new members, so at this time we have 156 members of the Chemical Section. There are a whole lot of the various industries that have the chemical hazard and I should like to have the members of the Chemical Section see if they couldn't get the various chemists at some of their neighboring plants to affiliate with their section. The members of the Chemical Section get certain data that the Chemical Section issues and I should be glad to have you send us the names of those wishing to join.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN WATSON: There is one other item of business which must necessarily take place and that is the appointment of the nominating

committee to make nominations for officers for the section for next year. The present officers have decided that perhaps a great deal more benefit can be derived to the Chemical Section if we should enlarge upon the executive committee and, therefore, I shall make the appointment now of a nominating committee, asking them to make nominations for three officers, chairman, vice-chairman and secretary and nine others to serve on the executive committee, making a total of 12 persons on the executive committee. That is more or less of an experiment but it is felt this will help the section considerably.

I will appoint Mr. Kershaw as chairman of that committee and Messrs. Rogers, Keefer, Thomas, and Duncan. I will ask them to retire at this time and bring in their report as soon as it is practicable to do so.

DANGERS DUE TO MAL-PRACTICE IN THE HANDLING OF ACID TANK CARS

M. F. Crass, Grasselli Chemical Company, Cleveland, Ohio.

This subject could well be sub-divided into types of tank cars specially constructed to meet the requirements of the acid business. For instance; muriatic acid cannot be carried in steel direct, so a distinctive transportation tank has been created for this service. There are various types in use, which can be roughly summarized as—wood stave treated, wood stave-rubber lined, steel sheet-rubber lined The American Railway Association requires that the under-frames, trucks and brakes be constructed according to definite specifications, but the superstructures or containers are of a type constructed largely according to the owuer's specifications.

Steps have been taken and are now under careful consideration, tending toward a standardization of construction; the Bureau of Explosives has been cooperating with shippers for several years past with this end in view.

Without question such standardization, when it comes, will tend toward the betterment of the service in general, and reduce such danger of leakage in transit as may now exist.

Acids, such as sulphuric and mixed acid, are transported in steel shell tank cars with entire safety. Very little action on the steel shell results when carrying gravities of 60° or stronger. With gravities weaker than this the action of the acid on the steel is progressive with the reduction in the gravity of the acid and it is for this reason that tank cars are not, or at least should not, be used for low gravity acids.

All acid tank cars are protected in the course of transportation by the white acid label as required by the Bureau of Explosives under authority of the Interstate Commerce Commission. The presence of

this label on a tank car makes it the duty of all railroad employees to exercise unusual care in the handing of the car, for all corrosive acids come under the "dangerous article" class.

It also places an obligation on all receivers of acid that of removing these labels when the tank has been discharged, for the protection of the label applies to the product carried and not to an empty tank car.

Not only is there an obligation on the part of railroad employees to exercise care in switching these cars, but the same obligation extends to the consignees of these tank car shipments, although as we will show, this responsibility is in many instances overlooked. Let us retrace our steps for a moment to consider the safe-guards which have been woven around the construction, design and transportation of tank cars.

Among the precautionary devices required by A. R. A. tank car specifications is a safety vent equipped with a lead disc calculated to rupture at 30 pounds pressure. This is a necessary precaution because of pressure which may be built up in a sealed tank car through temperature variations and other causes.

Dome Capacity for Sulphuric Acid and Mixed Acid

Tank cars for sulphuric acid and mixed acid service must have a dome capacity of equal to two per cent of the total capacity of tank. The dome area is designed for use partly as an air cushion and also to provide room for possible expansion of the acid in transit. Good practice makes it mandatory that shippers load acid to the base of the dome only *and not into the dome.*

On the other hand, it is very bad practice to ship a tank car with the shell partially filled, for this places an undue strain on the tank and tank anchorage in transit. It is the duty of the tank car filler or loader to carefully examine and properly seat the gasket which serves as a seal under the dome cover, otherwise, difficulty will be experienced in emptying the tank at destination.

The federal government, through the Interstate Commerce Commission, has issued regulations for the transportation of explosives and other dangerous articles—among which may be quoted the following excerpts from freight tariff No. 1 of the Bureau of Explosives:

1—Promotion of the uniform enforcement of law, and the minimizing of dangers to life and property incident to the transportation of explosives and other dangerous articles.

2—Precautions which must be exercised by the shipper in preparing such products for shipment.

3—Precautions which must be observed by the carrier during course of transit.

It is further stated that the Bureau of Explosives will be utilized by the Interstate Commerce Commission in the execution of these regulations.

This precautionary effort—most of it bearing the authority of federal law—ends when the tank car is delivered to the consignee for unloading and it is here we again take up the thread which we dropped in order to consider the transportation safe-guards outlined in the foregoing.

The Consignee's Responsibility

Judging from the appearance of the dome sheets on some tank cars which were returned empty, this responsibility is not always recognized by its fruit, unless we speak in negative terms—that is, by the evidence of abuse.

Acid splashed domes and dome sheets devoid of paint are evidences of carelessness in the use of this equipment. Sometimes this is due to careless loaders, sometimes to leaky discharge connections. Cases have been known of discharge pipe being connected up with a rubber hose connection dripping acid all over the adjacent equipment and no attempt made to correct the trouble. Such conditions tend to limit the life of equipment and also tend to subject the men discharging the tank to unnecessary hazard. Another source of abouse is the application of pressure in its discharge greater than the equipment is supposed to withstand.

Sometimes conditions are such that the unloading track is needed for other purposes and it becomes desirable to dispose of the unloading as quickly as possible. The easiest way and, we fear, a rather common practice, is to "shoot the pressure" to the tank and thus expedite the job.

From rather extended observation on the subject we are inclined to question whether the limitations concerning pressure permitted are fully understood.

The tank car is primarily a container—a carrying agent if you please—it must also, because of its character, be capable of withstanding sufficient air pressure to permit the discharge of its content. There is danger that the hydraulic pressure to which the tank must be tested every five years will be taken as indicative of the pressure which can be safely exerted in the course of service. No one conversant with the testing and maintenance of boilers or other pressure equipment would consider for a moment keeping such a unit under working pressure equal to those exerted under special tests. The commons practice is to provide for a safety factor. Because of acid being in the "dangerous article" class with a more or less constant corrosive action on the inside sheets of the tank, a larger safety factor is necessary in this case than in some other services; in this case it has been established at 2 to 1. Therefore, the stenciling on the domes of tank cars limiting pressure

to be used in the discharge to 30 pounds. That this practice has been a wise one has been demonstrated by the infrequency of acid leakage in transit and in the rarity of cases where tank cars have "let go" during the unloading or discharge operations.

In the few cases of the latter class, which have come under our observation, we have found, without exception, the cause to have been the excessive pressures exerted; in one case we have in mind this approximated 100 pounds.

In discussing this subject recently with a prominent bureau official, he used these words, "A tank car is not a blow case and should not be used as such."

Yet this is what is being done at many points throughout the country—weakening the container and shortening its life.

During the course of a nation-wide survey made several years ago covering 190 discharge points, it was found that 106 or 37 per cent were using pressures in excess of that permitted. Of this total we make the following sub-division:

24 points of 8.2 per cent used air pressure 31 to 35 pounds inclusive.
28 points of 13.1 per cent used air pressure 36 to 40 pounds inclusive.
21 points of 10.7 per cent used air pressure 41 to 50 pounds inclusive.
13 points of 4.6 per cent used air pressure over 50 pounds.

Some of the plants investigated connected up direct with a 100 pound air pressure main with no control other than an ordinary valve.

Average length of lines where over 30 lbs. pressure was used..165 feet
Average length of lines where less than 30 lbs. pressure was used ..... 86 feet
Number of lines over 500 ft. in length..... 18 feet
Longest line reported ....1760 feet

Blowing the Acid to a Height of 45 ft. using 60-Pounds Pressure

Largest number of bends in one line..... 22
Average number of bends where over 30 pounds pressure was used.. 8
(Very few swing ells were noted.)
Discharge lines where acid was blown over 30 feet in height.....22
Average pressure exerted at these points.....52 pounds

Conditions of Discharge

It would appear from the foregoing that storage tanks are generally located at points convenient for consumption purposes and very little, at least minor consideration is given to conditions of discharge.

Whether the 20 pounds permissible pressure is adequate can be judged when it is stated this pressure will lift a volume of acid to the height of 28 feet—sufficient to discharge into any tank on ground elevation,

to be used in the discharge to 30 pounds. That this practice has been a wise one has been demonstrated by the infrequency of acid leakage in transit and in the rarity of cases where tank cars have "let go" during the unloading or discharge operations.

In the few cases of the latter class, which have come under our observation, we have found, without exception, the cause to have been the excessive pressures exerted; in one case we have in mind this approximated 100 pounds.

In discussing this subject recently with a prominent bureau official, he used these words, "A tank car is not a blow case and should not be used as such."

Yet this is what is being done at many points throughout the country—weakening the container and shortening its life.

During the course of a nation-wide survey made several years ago covering 290 discharge points, it was found that 106 or 37 per cent were using pressures in excess of that permitted. Of this total we make the following sub-division:

24 points of 8.3 per cent used air pressure 31 to 35 pounds inclusive.
38 points of 13.1 per cent used air pressure 36 to 40 pounds inclusive.
31 points of 10.7 per cent used air pressure 41 to 50 pounds inclusive.
13 points of 4.5 per cent used air pressure over 50 pounds.

Some of the plants investigated connected up direct with a 100 pound air pressure main with no control other than an ordinary valve.

Average length of lines where over 30 lbs. pressure was used..165 feet
Average length of lines where less than 30 lbs. pressure was used ..... 88 feet
Number of lines over 500 ft. in length..... 10 feet
Longest line reported .....1760 feet

Blowing the Acid to a Height of 45 ft. using 60-Pounds Pressure

Largest number of bends in one line.....23
Average number of bends where over 30 pounds pressure was used.. 8
(Very few swing ells were noted.)
Discharge lines where acid was blown over 30 feet in height.....22
Average pressure exerted at these points.....52 pounds

Conditions of Discharge

It would appear from the foregoing that storage tanks are generally located at points convenient for consumption purposes and very little, at least minor consideration is given to conditions of discharge.

Whether the 30 pounds permissible pressure is adequate can be judged when it is stated this pressure will lift a volume of acid to the height of 28 feet—sufficient to discharge into any tank on ground elevation,

same as track. In some cases the size of discharge lines was variable, such as 2 inch and 2½ inch and 2 inch and 3 inch— 1 inch and 2 inch,— such lines, of course, would only discharge equal to the capacity of the smallest diameter in lines.

A multiplicity of ells and bends in the lines increased friction and a lack of wide swing bends which would reduce friction was noted. It is true that conditions are sometimes present which make it impossible of direct discharge without building up excessive pressures. At points where such conditions exist, the tank car should not be called upon to endure the stress, but rather an acid pump should be installed by which means difficult conditions can be solved with entire satisfaction and the unloading operation completed without danger to employees or strain on equipment. For points where the 30 pounds pressure will suffice but where the blowing line is connected with a high pressure main, a relief valve and pressure gauge should be a part of the unloading equipment, the first set to pop at 30 pounds. Dry air should be used for blowing because of the effect of moisture on the interior of dome. It is good practice to blow out an air line before connecting it up to the tank car. Naked lights should never be used around the dome of a tank car, whether the tank is empty or loaded. There may be hydrogen gas present.

In cleaning tank cars men should not permitted to enter until the sediment has been removed and the tank filled with water and discharged. Good practice is to insure the neutralizing of such acid or mud as may remain by adding lime, soda ash or caustic soda during the early stages of filling with water. It is not obligatory that car tanks be put under a water hydrostatic test. If the tank car is free from sediment, so that the washing out of the tank is not necessary at the time by the hydrostatic test, this testing with water can be dispensed with for certain classes of tanks. The test can be made by filling the tank and dome with acid and applying air to the required pressure. After the test is completed, the acid in the dome is syphoned out and the car is ready to be shipped to the trade. Wear and tear on the tank which is present because of a water testing is thereby avoided.

SUMMARY OF PRESENT PRACTICE IN INDUSTRIAL POISONING PREVENTION

Chemical Section, N. S. C.

Tentative Report

Of

Industrial Poisons Committee

Owing to the magnitude of the subject of industrial poisoning prevention, your commitee does not attempt, at this time, to make a complete report of present practices. It makes the proposal that the

National Safety Council issue for general distribution, under supervision by the Chemical Section, a series of single page leaflets or bulletins on specific industrial poisons and that the text of these bulletins be in such brief and non-technical wording as will permit wide distribution and will attract the attention of local physicians, plant executives, safety committees, plant foremen and individual workers.

The object would be to provide not complete data for the elimination of poisoning in particular processes and the accurate diagnosis of disability cases but merely a suggestive guide or warning for each important poisonous substance. Periodic revision of the bulletins would have to be made in order to keep step with changing practices in both manufacturing methods and medical knowledge.

For illustration, some 15 or more bulletins are submitted herewith as a test of the general idea. All of these are in tentative form and have not been finally checked for accuracy by the entire committee membership. Free criticism will be cordially welcomed.

E. J. Riederer
C. E. A. Winslow
Lawrence T. Fairhall
William F. Boos
Charles F. Glueck
William R. Webb
S. E. Whiting, Chairman.

---

1. **SUBSTANCE:** Chlorine.
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: No. **Liquids:** No **Gases:** Yes **Dusts:** No **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** No **Skin:** No
4. **MINIMUM TOXIC QUANTITIES:** 3 mg. per liter of air fatal in ½ hour.
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Variable
7. **ACUTE SYMPTOMS after brief severe exposure:** Violent coughing, labored breathing. After apparent recovery, edema of the lungs may develop 5 or more hours later.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Persistent cough, decayed teeth. Sometimes indigestion and skin rash.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Unknown
10. **MEDICAL TREATMENT:** Acute: Application of artificial respiration if breathing has ceased, using the manual prone-pressure method. Keep patient quiet and under observation for possible edema of lungs.
11. **PREVENTIVE METHODS:** Handle cylinders of chlorine with care to avoid upsetting, overheating or breaking of connections. Provide ventilation for rooms in which cylinders are stored in quantity. Have suitable gas mask for emergency work.
12. **REFERENCES:** Dr. Pedley, Journal of Industrial Hygiene.
    Compressed Gas Mfg. Association.

---

1. **SUBSTANCE:** Arsenic **Poisonous compounds & mixtures:** (a) White Arsenic (b) Red orpiment (c) Arseniuretted hydrogen (d)
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: Yes **Liquids:** Yes **Gases:** Yes **Dusts:** Yes **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** Yes **Skin:** Yes

4. **MINIMUM TOXIC QUANTITIES:** 0.1 gm of salts fatal
   30 cc of gas fatal
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Non-variable
7. **ACUTE SYMPTOMS after brief severe exposure:** Vomiting, staring yellowish eyes.
   Cold perspiration, bleeding, color of urine much darkened.
   Loss of consciousness.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Colds in head, inflamed eyelids.
   Abdominal pains, yellowish skin.
   Disordered liver and kidneys.
   Perforation of nose membrane.
9. **CHARACTERISTIC SIGNS:** Arsenic found in urine and above symptoms.
10. **MEDICAL TREATMENT:** For AsH_3 collapse, prompt administration of oxygen (preferably containing 5% carbon dioxide, a respiratory stimluant). If breathing ceases, application of artificial respiration by the prone-pressure method.
11. **PREVENTIVE METHODS:** Substitute non-poisonous pigments for arsenic. Ventilate thoroughly and require high personal hygiene. Use rubber gloves. Avoid nascent H in solutions containing arsenic. Use acids having less than 0.035% As.
12. **REFERENCES:** Kober & Hanson's "Diseases of Occupation".
    Kreb's Pigment & Chemical Co.

---

1. **SUBSTANCE:** Phosphorus — **Poisonous compounds & mixtures:** (a) White or yellow phosphorus; (b) Phosphorus oxides; (c) Phosphoretted hydrogen; (d) (Red phosphorus non-poisonous); (e) (P sesquisulphide non-poison.)
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: Yes **Liquids:** No **Gases:** Yes **Dusts:** Yes **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** Yes **Skin:** Yes
4. **MINIMUM TOXIC QUANTITIES:** Of PH_3, 0.5% in air breathed for a few hours.
5. **ACTION cumulative or non-cumulative:** Cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Slightly with condition of teeth.
7. **ACUTE SYMPTOMS after brief severe exposure:** From PH_3, ringing ears, sharp chest pains, dizziness, great thirst.
   Loss of consciousness.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Swollen and sore gums.
   Ulcers in nose and mouth.
   Decay of teeth and jaw bones.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Above symptoms with history of exposure.
10. **MEDICAL TREATMENT:** Acute: For PH_3 collapse, prompt administration of oxygen (preferably containing 5% carbon dioxide, a respiratory stimulant). Application of artificial respiration if breathing has ceased, by the manual prone-pressure method.
    Chronic: Mainly dental surgery.
11. **PREVENTIVE METHODS.** For match mfg., use exclusively pure red phosphorus or the pure sesquisulphide. In treating ores, compounds of bronzes, exhaust fully all dusts and fumes.
    Guard against PH_3 gas from phosphorus impurities in ferro-silicon (in presence of moisture) and in calcium carbide use for acetylene.
12. **REFERENCES:** Dr. Hamilton in Kober & Hayhurst's "Industrial Health".

---

1. **SUBSTANCE:** Chromium — **Poisonous compounds & mixtures:** (a) Chromic acid; (b) Chromium sulphate; (c) Chrome alum, chrome lead; (d) Bichromate of potash & sodium
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: Yes **Liquids:** Yes **Gases:** No **Dusts:** Yes **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** Yes **Skin:** Yes
4. **MINIMUM TOXIC QUANTITIES:** Unknown
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Non-veriable except through personal hygiene.
7. **ACUTE SYMPTOMS after brief severe exposure:** Skin itching, eczema, skin ulcers. Perforation of central nose wall.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Extensive skin inflammation.

9. **CHARACTERISTIC SIGNS or proof of poisoning:** Limitation of nose ulcers to cartilage of septum. Chromium in urine.
10. **MEDICAL TREATMENT:** Lead-and-opium wash to neutralize the chrome action and remove it from the ulcers, followed by aseptic dressings.
11. **PREVENTIVE METHODS:** Enclose grinding processes to eliminate dusts. Exhaust fumes where necessary. Provide good washrooms and lunch rooms. Minimize direct handling and maintain high personal hygiene. Apply waterproof dressings to all skin abrasions. Rinse arms in hypo (sodium thiosulphate) at close of work twice daily.
12. **REFERENCES:** Kober & Hanson's "Diseases of Occupation".
Dr. Lewin, Berlin.
Dr. Boos, Boston.

---

1. **SUBSTANCE:** Manganese — **Poisonous compounds & mixtures:** (a) Any salts (b) (c) (d)
2. **DANGEROUS FORMS OF EXPOSURE:** **Solids:** No **Liquids:** No **Gases:** No **Dusts:** Yes **Fumes:** No
3. **MODE OF ENTRY INTO BODY:** **Respiration:** Yes **Mouth:** Yes **Skin:** No
4. **MINIMUM TOXIC QUANTITIES:** Unknown
5. **ACTION cumulative or non-cumulative:** Unknown
6. **SUSCEPTIBILITY variable or non-variable:** Unknown
7. **ACUTE SYMPTOMS after brief severe exposure:** None
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Trembling, nervousness, unsteady gait, especially walking down hill.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Manganese in urine.
10. **MEDICAL TREATMENT:** Nothing specific
11. **PREVENTIVE METHODS:** Ventilation of dusts containing manganese. Amount of exposure is slight.
12. **REFERENCES:** Dr. Casomajor, Kober & Hanson's "Diseases of Occupation". Dr. Charles, Jour. Neurol & Psychopath.

---

1. **SUBSTANCE:** Carbon monoxide
2. **DANGEROUS FORMS OF EXPOSURE:** **Solids:** No **Liquids:** No **Gases:** Yes **Dusts:** No **Fumes:** No
3. **MODE OF ENTRY INTO BODY:** **Respiration:** Yes **Mouth:** No **Skin:** No
4. **MINIMUM TOXIC QUANTITIES:** Acute, 0.5% to 1.0% in air breathed for a few minutes. Chronic, 0.5% in air breathed repeatedly for months.
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Almost non-variable
7. **ACUTE SYMPTOMS after brief severe exposure:** Throbbing headache, dizziness, vomiting. Rapid pulse, rapid and then slow breathing. Loss of consciousness.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Pallor, headaches, loss of appetite, general weakness.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Acute: Combination of blood cells with CO as shown by *pyro-tannic acid test.* Chronic: Reduced red cell count in blood (?), with history of exposure.
10. **MEDICAL TREATMENT:** Acute; Prompt administration of oxygen containing 5% carbon dioxide (a respiratory stimulant). Application of artificial respiration only if breathing has stopped and only by the manual prone-pressure method
11. **PREVENTIVE METHODS.** Thoroughly ventilate all processes that generate CO; also mines, street excavations, manholes, and carbon-fuel heaters. When entering contaminated spaces, use life line, vapor-proof lamp and adequate gas mask. Enforce two-man rule for work having leakage hazard e.g. gas-main work.
12. **REFERENCES:** American Gas Association's Commission on Resuse. from CO.
U. S. Bureau of Mines.
Kober & Hanson's **"Diseases of Occupation".**

1. **SUBSTANCE:** Benzol (benzene C_6H_6)
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: No **Liquids:** Yes **Gases:** Yes **Dusts:** No **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** No **Skin:** Yes
4. **MINIMUM TOXIC QUANTITIES:** 0.1% to 0.3% in air breathed for several hours.
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Somewhat greater for females and minors.
7. **ACUTE SYMPTOMS after brief severe exposure:** Trembling, throat irritation, vomiting. Weakness, rapid pulse, frequent urine. Loss of consciousness.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Pallor, rapid pulse, labored breathing. Weakness, various nervous disorders. Bleeding at nose and other mucous membranes. Purplish patches on skin and membranes.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Marked decrease in white blood cells, decrease in red blood cells, "aplastic anemia".
10. **MEDICAL TREATMENT:** Acute; Prompt administration of oxygen (preferably containing 5% carbon dioxide, a respiratory stimulant). Application of artificial respiration if breathing has ceased, using the mutual prone-pressure method.
    Chronic; Prompt removal from all exposure after first symptoms of bleeding or unusual pallor. No specific treatment known but restoration of blood to normal is to be sought.
11. **PREVENTIVE METHODS:** Minimize exposure by enclosure of process. Thoroughly remove fumes by downward exhaust if cold, upward exhaust if warm. Avoid contact of body or clothing with the liquid. When entering contaminated spaces, use fresh-air respirator, life line and vapor-proof lamp.
12. **REFERENCES:** Benzol Committee, National Safety Council.
    U. S. Bureau of Mines.
    Dr. Hamilton, Kober & Hayhurst's "Industrial Health".

---

1. **SUBSTANCE:** Lead **Poisonous Compounds or mixtures:** (a) Nearly all compounds (b) Lead alloys
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: No **Liquids:** Yes **Gases:** No **Dusts:** Yes **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** Yes **Skin:** Negligible
4. **MINIMUM TOXIC QUANTITIES:** 10 mg. per day for several months
5. **ACTION cumulative or non-cumulative:** Cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Variable with personal hygiene. Greater in females.
7. **ACUTE SYMPTOMS after brief severe exposure:** Abdominal pains, constipation, vomiting.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Constipation, pallor, weakness, loss of weight. Blue line on gums. Paralysis of constantly used muscles. e.g. wrist drop in painters. Abnormal blood cells.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Coincident with above symptoms, repeated finding of lead in urine.
10. **MEDICAL TREATMENT:** Restore digestive functions to normal. If exposure is to continue, require high personal hygiene and good meals before work, including milk. Unless symptoms are severe, increase lead elimination by dosages of phosphoric acid or potassium iodide. Electric baths (?).
11. **PREVENTIVE METHODS:** Exhaust all dusts, fumes and dross. Minimize contamination of body and clothing. Provide adequate wash rooms and lunch rooms and enforce high personal hygiene. Give physical examinations. Use dust respirators. Use wet sandpapering. Avoid dry sweeping. Moisten powders to lessen dust
12. **REFERENCES:** Harvard School of Public Health, Jour. Indus. Hygiene.
    Hutton's "Lead Poisoning", Ontario Board of Health.
    Kober & Hayhurst's "Industrial Health".

---

1. **SUBSTANCE:** Carbon bisulphide
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: No **Liquids:** Yes **Gases:** Yes **Dusts:** No **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** No **Skin:** Yes

4. **MINIMUM TOXIC QUANTITIES:** 0.1% in air considered dangerous.
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Variable, greater in alcoholics and nervous persons.
7. **ACUTE SYMPTOMS after brief severe exposure:** Talkative, out of senses, intoxicated. Dizziness, pallor, vomiting. Breath and urine odorous.
7. **ACUTE SYMPTOMS after brief severe exposure:** Loss of consciousness.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Frontal headaches, upset digestion. Nervous disorders, disturbed vision. Mental instability, loss of sanity.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Above symptoms with history of exposure.
10. **MEDICAL TREATMENT:** Acute; Administer oxygen, preferably containing 5% carbon dioxide (a respiratory stimulant). *If breathing ceases, apply artificial respiration by the prone-pressure method.* Chronic: Symptomatic.
11. **PREVENTIVE METHODS:** Enclose all vats, process-tanks, etc. with auxiliary piping, valves, pumps, etc. located out of doors as far as possible, since leakage is difficult to wholly prevent. Exhaust all escaping fumes, downward if cold. Avoid contamination of body and clothing and enforce high personal hygiene.
12. **REFERENCES:** Thompson's "Occupational Diseases". Du Pont Fibre Silk Co.

---

1. **SUBSTANCE:** Hydrogen sulphide
2. **DANGEROUS FORMS OF EXPOSURE:** **Solids:** No **Liquids:** No **Gases:** Yes **Dusts:** No **Fumes:** No
3. **MODE OF ENTRY INTO BODY:** **Respiration:** Yes **Mouth:** No **Skin:** No
4. **MINIMUM TOXIC QUANTITIES:** Subacute; *0.005%-0.06% in air breathed a few hours.* Acute: 0.06%-0.10% in air breathed for one minute.
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Unknown
7. **ACUTE SYMPTOMS after brief severe exposure:** Muscular spasms, irregular breathing. Loss of consciousness. If there is apparent recovery, edema of the lungs may follow 8 to 12 hours later.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Excessive saliva, inflamed throat, dizzy. Eyes inflamed and pained by exposure to light. Edema of lungs may follow.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Above symptoms with history of exposure.
10. **MEDICAL TREATMENT:** Acute; Prompt administration of oxygen (preferably containing 5% carbon dioxide, a respiratory stimulant). Application of artificial respiration if breathing has ceased, using the manual prone-pressure method. Keep patient quiet and under observation for possible edema of lungs. Chronic; Keep patient in dark and treat eyes and throat. Watch for possible edema of lungs.
11. **PREVENTIVE METHODS:** Ventilate thoroughly all processes that generate the gas. Where odor of rotten eggs is present at work in excavations, sewers, marshes, tanks, etc., require use of adequate gas masks, life lines and vapor-proof lamps, especially when the soil or liquid has to be stirred.
12. **REFERENCES:** U. S. Bureau of Mines. Kober & Hayhurst's "Industrial Health".

---

1. **SUBSTANCE:** Anthracene residue
2. **DANGEROUS FORMS OF EXPOSURE:** **Solids:** Yes **Liquids:** Yes **Gases:** No **Dusts:** No **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:** **Respiration:** ? **Mouth:** ? **Skin:** Yes
4. **MINIMUM TOXIC QUANTITIES:** Unknown
5. **ACTION cumulative or non-cumulative:** Non-cumulative (?)
6. **SUSCEPTIBILITY variable or non-variable:** Unknown

7. **ACUTE SYMPTOMS after brief severe exposure:** Spreading skin inflamation or rash that may prove fatal.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Unknown
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Unknown
10. **MEDICAL TREATMENT:** Bathe parts of body affected with lysol. Use hot vinegar to remove contaminations from body (?).
11. **PREVENTIVE METHODS:** Avoid contact of body and clothing with the poison. Enforce high personal hygiene.
12. **REFERENCES:** Syracuse Safety Council.

---

1. **SUBSTANCE:** Toluol
   Trinitrotoluol
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: Yes **Liquids:** Yes **Gases:** Yes **Dusts:** Yes **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** Yes **Skin:** Yes
4. **MINIMUM TOXIC QUANTITIES:** Unknown
5. **ACTION cumulative or non-cumulative:** Cumulative (?)
6. **SUSCEPTIBILITY variable or non-variable:** Variable
7. **ACUTE SYMPTOMS after brief severe exposure:** Rapid pulse, headache, vomiting. Blue lips, dizziness. Loss of consciousness.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Bitter taste, frothy vomiting, bloody urine. Blue lips, weak heart action: "jaundice".
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Above symptoms with history of exposure.
10. **MEDICAL TREATMENT:** Acute: Give caffein (coffee) or other heart stimulant. Administer oxygen (preferably containing 5% carbon dioxide, a respiratory stimulant). Apply artificial respiration if breathing has ceased, using the manual prone-pressure method.
    Chronic: General eliminative treatment such as hot baths, fluid diet, milk, stimulants.
11. **PREVENTIVE METHODS:** Exhaust all dusts and fumes. Minimize soiling of body and clothing. When entering contaminated tanks, etc., use life line, vapor-proof lamp and adequate gas mask.
    Test susceptibility of new employees prior to exposure. Enforce high personal hygiene, including complete daily removal of working clothes. Give physical examinations.
12. **REFERENCES:** Kober & Hayhurst's "Industrial Health".
    Manufacturers of Explosives.

---

1. **SUBSTANCE:** Trinitrophenol (picric acid)
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: Yes **Liquids:** Yes **Gases:** No **Dusts:** Yes **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: ? **Mouth:** No **Skin:** Yes
4. **MINIMUM TOXIC QUANTITIES:** 1.0 to 2.0 gm. considered poisonous
5. **ACTION cumulative or non-cumulative:** Cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Variable
7. **ACUTE SYMPTOMS after brief severe exposure:** Unknown (Similar to trinitrotoluol?)
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** From body contact, itching skin rashes, yellow staining of skin and eye lids. From dusts, cold in head, throat irritation and diarrhea.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Unknown
10. **MEDICAL TREATMENT:** Chronic: Remove skin contamination by sponging with alcohol. Apply boric acid ointment.
11. **PREVENTIVE METHODS:** Exhaust dusts and fumes. Minimize contamination of body and clothing. Enforce high personal hygiene.
12. **REFERENCES:** Dr. Pack. Journal of Industrial Hygiene.
    Kober & Hayhurst's "Industrial Health".

1. **SUBSTANCE:** Nitrous fumes.
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: No **Liquids:** No **Gases:** Yes **Dusts:** No **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** No **Skin:** No
4. **MINIMUM TOXIC QUANTITIES:** Unknown
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY variable or non-variable:** Somewhat variable.
   Probably greater in the negro race.
7. **ACUTE SYMPTOMS after brief severe exposure:** Suffocating cough, soreness of air passages. Apparent relief after removal from fumes but, after a time varying from a few hours to a day or so, there may develop severe edema of the lungs.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Usually none because of apparent hardening due to the exposure.
   Occasional cases found of aggravation of a latent tubercular condition.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Edema of lungs with history of acute exposure.
10. **MEDICAL TREATMENT:** Relieve acute symptoms by administering a spoonful spirits of ammonia with 15 drops chloroform in half glass water, given gradually. Watch patient for possible edema, keeping absolutely quiet. Give oxygen if necessary.
11. **PREVENTIVE METHODS:** Eliminate normal fumes by enclosure or downward exhaust. For abnormal fumes from "firing" of batch, train operators to rush away from exposure, using outside control valves, etc. Provide high-volume exhaust for emergency use in clearing out fumes. Adopt modern enclosed nitrating processes.
12. **REFERENCES:** E. I. DuPont Co.
    Kober & Hayhurst's "Industrial Health".

---

1. **SUBSTANCE:** Aniline
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: No **Liquids:** Yes **Gases:** No **Dusts:** Yes **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** Yes **Skin:** Yes
4. **MINIMUM TOXIC QUANTITIES:** Unknown
5. **ACTION cumulative or non-cumulative:** Non-cumulative
6. **SUSCEPTIBILITY or non-variable:** Non-variable
7. **ACUTE SYMPTOMS after brief severe exposure:** Blue lips, cold perspiration, pallor. Rapid pulse, later slow pulse.
   Loss of consciousness.
8. **CHRONIC SYMPTOMS after prolonged mild exposure:** Pallor, slow pulse.
   Upset digestion, general weakness.
   Brownish blood, sometimes bloody urine.
9. **CHARACTERISTIC SIGNS or proof of poisoning:** Unknown
10. **MEDICAL TREATMENT:** Acute; Give caffein (coffee) or other heart stimulant. Administer oxygen (preferably containing 5% carbon dioxide, a respiratory stimulant). Apply artificial respiration if breathing has ceased, using the manual prone-pressure method.
    Chronic; General eliminative methods such as hot bathes, fluid diet, milk, stimulants.
11. **PREVENTIVE METHODS:** Thoroughly exhaust all dusts and fumes. Minimize soiling of body and clothing and provide rinsing facilities of neutralizing solutions for instantly removing accidental spills or leaks on the body. Enforce high personal hygiene, including complete daily removal of working clothes. Give physical examinations.
    When entering contaminated tanks, etc., use life line, vapor-proof lamp and adequate gas mask.
12. **REFERENCES:** Kober & Hayhurst's "Industrial Health".

---

1. **SUBSTANCE:** Phenylenediamine **Poisonous compounds & mixtures:** (a) Dimethyl-para-phen. (b) Diethyl-para-phen. (c) Para-phen. (d) Meta-phen.
2. **DANGEROUS FORMS OF EXPOSURE:**
   Solids: No **Liquids:** Yes **Gases:** Yes **Dusts:** No **Fumes:** Yes
3. **MODE OF ENTRY INTO BODY:**
   Respiration: Yes **Mouth:** No **Skin:** Yes

4.	**MINIMUM TOXIC QUANTITIES:**	One teaspoonful of (a) on skin might prove fatal.
5.	**ACTION cumulative or non-cumulative:**	Non-cumulative
6.	**SUSCEPTIBILITY variable or non-variable:**	Non-variable
7.	**ACUTE SYMPTOMS after brief severe exposure:**	Rapid breathing, rapid pulse. Trembling, chilliness. Loss of consciousness.
8.	**CHRONIC SYMPTOMS AFTER prolonged mild exposure:**	Irritation of nose and throat. Skin rashes, upset digestion. Respiratory disorders.
9.	**CHARACTERISTIC SIGNS or proof of poisoning:**	Unknown
10.	**MEDICAL TREATMENT:**	Acute; Give caffein (coffee) or other heart stimulant. Administer oxygen (preferably containing 5% carbon dioxide, a respiratory stimulant). Apply artificial respiration if breathing has ceased, using the manual prone-pressure method. Chronic; General eliminative treatment such as hot baths, fluid diet, milk, stimulants.
11.	**PREVENTIVE METHODS:**	Minimize soiling of body and clothing, especially by (a). Provide 10% acetic acid as neutralizing solution for instantly removing accidental spills on body. Enforce high personal hygiene.
12.	**REFERENCES:**	Dr. Hanzlik, Journal of Industrial Hygiene. Kober & Hayhurst's "Industrial Health".

DISCUSSION

MR. WHITING: We are proposing and we wish your criticism and opinion on the scheme to issue from time to time single page leaflets on individual poisons. We must cut down the text to the minimum. We must sacrifice something of accuracy on that basis. We must condense into a single page a whole chapter perhaps of industrial poison, or a book, or a report such as the benzol report, containing some 20 or 30 pages. The object of brevity is to give something that can have very wide dissemination.

I have been impressed, in going over this work during the past few months, with the great amount of information that exists and maybe I am no criterion but I didn't know anything about it until I had made the effort to look it up. I think there are many places where that information will be of value on industrial poisoning prevention. The man who is busy, such as a plant executive, or the chairman of a safety committee, or a superintendent, will take the time to read it. He won't read a whole report of six or eight or a dozen pages but he will read a one page report. I doubt whether any of us would read these long reports in the hurry of our regular work but a man may be persuaded to read a single page and get the gist of it and, thereby, anticipate a condition in his plant that might lead to serious accidents of this type.

On that basis I shall run over, briefly, some of the particular items merely as an illustration. Remember these are not in final form. The committee members have not approved them. I have no doubt some of them will be disapproved in regard to detail.

You will note we put down the substance and if it is an element the various compounds of interest. Under two and three we attempt to give

some picture to the practical man of where that poison exists and how it gets into the body, so we list very briefly whether it is solid, liquid, gas, dust or fume and the way it gets into the body. By the mouth, for instance, what the doctors call gestation, such as eating or chewing tobacco. We consider anything breathed into the body under respiration. We put in the skin because some poisons have distinct power of absorption directly through the skin. Others are entirely negligible in that respect. The practical man should know that. If the skin is capable of absorption he should look out for that.

Next we go into the minimum toxic quantities, simply as a rough measure of the relative hazard of the material; whether it is cumulative or varies in susceptibility in different individuals. That is not important. You might omit that if you prefer altogether.

We give two sets of symptoms, acute and chronic. Doctors don't always agree as to the border line between these two extremes. If you are using chlorine, it is important to bring out the danger of exposure. The chairman said there is no danger from a slight exposure to chlorine, but we want everybody to realize that acute exposure may cause death as fixation. We want to bring in the acute symptoms so they will be recognized and they will give the particular treatment for that situation so as to prevent a fatal outcome.

We attempt under (9) to give wherever possible the characteristic signs or proof of poisoning, which is useful in handling the hazard.

Next we consider medical treatment. Sometimes we consider the acute treatment because that is of interest to the plant man. He must be organized to give that medical treatment for an acute case, whether it is oxygen or another special treatment. We also plan to give the information to the local doctors, who, of course, can find the information on medical treatment much better than this committee can, but who may not have it available and it will be no harm to give them an outline of what is the best practice.

THE CHAIRMAN: Do I understand, Mr. Whiting, it is the idea of your committee to have the industrial poisons committee continue a study on various industrial poisons, numbering from 10 to 50, not necessarily those shown on these sheets, and gradually develop sheets containing the information called for on your form that is known to be correct or felt positively to be correct and publish those in some form or other, perhaps in the *National Safety News* and distribute them widely among the industries so that they may get into the hands of the persons coming in contact with these poisons?

MR. WHITING: You are.

MR. S. H. KERSHAW (Hercules Powder Company): I think to put the matter on a concrete basis, I would make the motion that the committee be permitted to continue with this work and that the members be given the full support of the officers and membership of the section. (The motion was seconded and carried.)

REPORT OF NOMINATING COMMITTEE

MR. KERSHAW: Your nominating committee wishes to report the following nominations for officers of the section: A. L. Watson, chairman; M. F. Crass, vice-chairman and I. D. MacNaul, secretary.

Executive Committee

I. V. Kepner, Pennsylvania Salt Company, S. E. Whiting, Liberty Mutual Insurance Company, S. H. Kershaw, Hercules Powder Company, L. A. DeBlois, DuPont Powder Company, M. L. Fellmer, Monsanto Chemical Company, C. E. Rice, Dow Chemical Company, B. J. Slater, Eastman-Kodak Company, J. L. Kistner, Chemical Warfare Service, E. C. Rogers, Grasselli Chemical Company.

(The report was accepted by unanimous vote.)

CORROSION AND ITS RELATION TO SAFETY IN CHEMICAL PLANTS

By J. H. Shapleigh, Technical Division, Hercules Powder Company, Wilmington, Dela.

Corrosion is a deteriorating process and results in replacement or repair of the parts attacked. Accidents occur not only during such replacement or repair but are often incidental to the unsafe conditions caused by corrosion prior to repair. Hence, corrosion and repair are closely allied and with the reduction of each safety conditions will be realized. It follows that plant practices and trends of development are of much importance. Before considering these phases, however, it is desirable to explain what corrosion really is.

Frequently, corrosion is visualized by its after-effects; for instance, by the sharp thin edges of a hole in a tank or by iron sulphate or other corrosion products which signify need of attention. It is more rare to think of corrosion in terms of unsafe conditions or by the mechanism by which it proceeds.

When dealing with acids, corrosion results from a reaction between the acid and the metal. When does the reaction stop and what accelerates or inhibits it?

Corrosion is a cyclic phenomenon. A trace of acid in contact with metal and air will theoretically cause corrosion until all of the metal is attacked. The oxygen serves to regenerate acid thus completing a cycle. If acid is spilled upon a metal surface, corrosion proceeds and salts form not until the initial acid has combined with the metal but just as long as oxygen and moisture are available for decomposition of the salt with its resultant regeneration of acid.

Corrosion is due to action of hydrogen ions. Acids and salts of an acidic nature increase these ions and hence tend to accelerate corrosion.

Alkalies and alkaline salts tend to decrease hydrogen ions and hence inhibit corrosion. Neutral salts above certain concentrations may also inhibit corrosion.

In cases where excess of acid exists, the common solution of metal predominates but if no excess is present, oxygen and moisture convert the corrosion into its cyclic nature and it proceeds continuously, altho slowly.

Galvanic action illustrates another form of corrosion. When two metals, electrolytically dissimilar, are in contact with each other, and with an electrolyte such as acid, corrosion of one of the metals will be accelerated. An example is a cast iron flange on a piece of wrought iron pipe. Another example is a piece of metal that is not homogeneous. Such metal may actually constitute a multitude of these galvanic cells and the result is a pitting of the metal which is very common. Strains within metal are said to cause local galvanic action.

Porous metals absorb acid and if exposed to the weather corrosion proceeds. Washing the surface of such a metal does not wash the traces of acid from the pores. There may be pushed out from a pore a constantly increasing jagged growth of salt. An aggregation of pores will block a pipe or fill a vessel with these growths. This is true corrosion and means taken to prevent oxygen from reaching the surface of metal in contact with the salt will inhibit it. Salt solution has the power to prevent hydrogen ion formation and corrosion is arrested by such means.

It follows that acceleration of corrosion is caused by increase of hydrogen ions, by the presence of oxygen and moisture, by agitation, by non-homogeneity of material and by temperature.

Inhibition of corrosion is caused by decrease in hydrogen ions by the addition of alkali, by the exclusion of oxygen and moisture, by elimination of agitation, and by low temperature. Silicon in duriron renders the metal acid-resistant but is itself oxidized by certain acids which results in expansion and the cracking of the material. Silicon in cast iron acts similarly. This emphasizes the need of proper selection of the material adapted for the intended duty.

Sulphur in metal is usually classed as an accelerator of corrosion due to its susceptibility to oxidation and its subsequent acid nature. Its compounds tend toward non-homogeneity and hence act as producers of galvanic action. It is, hence, a constituent preferably avoided.

It is self-evident that for corrosion to continue, the corrosion products must be removed. Conversely, corrosion products in hard scale formation are of a protective value if undisturbed. When, however, chipping occurs, local areas of reaction are set up and pitting follows.

The solubility of the formation is also quite important, the insoluble coating acting as a protection. An example of such is the carbonate coating present on zinc roofing which has been subjected to weather.

Four common metals subject to corrosion by alkalies due to the formation of double salts are aluminum, lead, tin and zinc. Silicon

is also subject to solvent action by alkalies and hence metals containing silicon as an alloy are not alkali resistant.

The selection of homogeneous materials tends to eliminate corrosion, but such selection can be realized to only a moderate degree. It would be difficult to always specify the chemical composition of a desired grade of iron although many times this is very desirable.

Corrosion in the Chemical Plant

The chemical plant is a ripe field for corrosion due to its everpresent host of hydrogen ions and it follows that it should also be a ripe field for safety measures.

Corrosive liquids, gases and fumes unless kept properly in hand, menace safety. Corrosion leaves in its wake residues, sometimes gases, possibly explosive or poisonous in nature; sometimes mud saturated with corrosive agents. The handling of mud often consists of simply washing tanks which contain it, and the mud mixed with water finds its way to the sewer. If two such muds, one acid and the other, for instance, sodium sulphide are washed into the same sewer, what happens? The poisonous gas hydrogen sulphide is liberated and may find its way into various buildings. Hence, there is not only a problem of direct corrosion but also its relation to safety through the by-products of corrosion.

If all corrosion was external, it would be visible and subject to easy correction. Even corrosion on exterior surfaces very often has too little attention. While a neatly painted surface may be deceptive of strength, yet the attendant general conditions of cleanliness and outward appearance go far to dispel such fears. Corroded external surfaces exemplified by growths of iron sulphate, iron chloride, or rust, do not usually run singly. On the contrary, where such conditions exist it is usually general and indicative of the immediate supervision of such a plant.

Sometimes, there are points of continual abuse, where practically only constant attention will make conditions safe. For instance, in the use of large tanks as blow-cases it is necessary to do considerable sampling. This is done by means of a thief or by a sample cock. Both have objections, the latter in the chance of the connection to the tank having corroded to the point where a slight pressuure would break it; and the former due to the drip attendant while removing the sample. The latter can be remedied by providing a saucer either portable or fixed for purposely catching drip from a thief. Such saucers can be cast of convenient size to fit the tank opening whereby drip is returned. Externally the drip is confined to the saucer thereby limiting corrosion. Sampling cocks are preferably attached to tanks by means of hydraulic pipe where recourse must be had to drilling the tank wall. In general, the fewer tank openings there are, the better.

These are samples of external corrosion. [illegible] corrosion is less self-evident. If apparatus is to be used under hydraulic pressure there are standard ways of testing. But it often happens that where a piece of apparatus has been tested by the department and pronounced fit for definite service, subsequent use by another department extends the conditions to suit its needs. Such cases do occur and it is only through co-operation and careful check-up that safe conditions are procured. Examination of all such apparatus should be made frequently as to maintain a generous factor of safety.

Sometimes, the life of a piece of apparatus is known in which case it is a wise policy to replace it before the border line is reached.

More concern is given to the larger aspects of corrosion, its close connection to repair, the benefit to be derived through quality of workmanship, through development of a plant spirit, and through improvements in plant practices and equipment. The latter are of particular interest.

Hazards Caused by Corrosion

Corrosion in the chemical plant involves the safety o fits personnel in the two following divisions:

1. Building corrosion wherein supports are attacked weakening structures such that conditions are unsafe.

2. Apparatus corrosion such as occurs in tanks, towers, presses, filters, heaters, boilers, retorts, pans, electrical appurtenances, valves, pipe lines, pumps and eggs.

Safety from apparatus corrosion is deriving benefit from developments of chemical engineering. Air has long been resorted to as a means for transferring liquids, and is a practice always attended with liability of accident. In the past, it has satisfied the need for delivery of liquids over relative long distances or against considerable vertical lift, and was preferable from the operator's view, considering the inefficient means of pumping then available.

In recent years there has been a development of acid resisting materials and their use in pump parts; also a development of small compact open type impellor pumps that deliver liquids against relatively high heads in a practical way. There are pumps that can be placed on the top of tanks and which will pump out tanks without any need of side or bottom outlets. The use of air in moving corrosive liquids should be abandoned and the trend is in favor of centrifugal pumping. With such developments tanks need no side or bottom connections that are always susceptible to leakage, and while it may not appear practical to abandon the old type of tank, yet there are many places where a change would prove advantageous to safety and at the same time to the operation, particularly so where corrosive liquids are in continuous circulation.

Another improvement which will foster safety is that in vaive manufacture. Today, valves can be had that are relatively free from leakage, that can be kept in continuous service in a workable condition, that are relatively free from packing gland difficulties and which can be had in corrosion resisting materials suitable for almost any service.

In this connection, there are conditions prevailing which do not foster safety, i. e., a lack of understanding of certain properties of cast iron, duriron and other alloys porous in nature and containing silicon. Such materials and particularly ordinary cast iron and duriron are not adapted to use on fuming sulphuric acid and mixed acid. In these cases, the acid or fume enters the pores, oxidizes the silicon and cracks the material. If a valve cracks it is frequently condemned as being of poor make whereas the fault is in the valve being of the wrong material for the purpose.

Choose Suitable Materials

If care is shown in the choice of materials both as to quality and adaptibility to the prevailing conditions considerable will have been done not only in fostering safety but in securing efficiency of operation. Again, if corrosive liquid, gas or attendant fume is kept confined properly and hence away from air and moisture, corrosion will be retarded. On the other hand, if corrosion has taken place immediate attention will still render benefits to both safety and efficiency.

Factors affecting corrosion and safety are: Temperature, Agitation, Activity of substance, Moisture, Dissolved gas, Vaporization, Expansion due to temperature, oxidation or sulphating, Free space distribution.

Of the above factors, temperature is very important. Chemical reactions are accelerated very markedly by temperature increase, and it follows and is widely recognized that much of corrosion is caused by excessive heat. In how many operations are facilities provided for adequate removal of heat? Many times it is due to lack of appreciation of true conditions, and quite often only corrective measures need be applied to existing apparatus.

In all cases, the effect of temperature upon corrosion should be known, and steps taken to maintain proper removal of heat.

Agitation is necessary for corrosion to maintain its action. In the handling of liquids in pipe lines or tanks agitation is present. In pipe lines, there are not the seams, rivets, nozzles, etc., present on tanks, hence, the material available is quite serviceable. In tanks where there is appreciable agitation, corrosion may be very severe, especially under high temperatures. In such cases, it is best to look into the need of agitation and reduce it to a minimum. If agitation in a tank is carried on as a mixing process, there are safer less expensive mixing units available.

The activity of the substance whether it is liquid or gas is dependent upon its nature and the material with which it is in contact. Properties of materials are quite well known and with proper application correct instaliations may be had. Often, however, plants are found installing materials not fitted for the purpose intended and such unsafe practices can only be eliminated by proper technical supervision.

Moisture is essential to corrosion. Hydrochloric acid is safely handled in steel when dry. When diluted with water it corrodes steel rapidly. Sulphuric acid does similarly. Moist gas is usually corrosive, sometimes due to condensation produced, at other times due to the formation of special corrosive conditions.

The problem of eliminating moisture may be one of drying as in the case of gas, or it may simply be proper placing and control of water spigots. It may involve the elimination of air as a mixing agent, which is undesirable in any case.

Dissolved gas in liquids, especially if chemically subject to reduction, may readily cause corrosion if transported in materials susceptible to oxidation. Naturally, by choosing materials which are not readily oxidized, this type of corrosion is eliminated.

The vaporization of dissolved gas or volatile liquids is frequently the cause of corrosion through leaking joints, gaskets or even open pipes or manholes. The successful confining of such gas or vapor tends not only to improve safety conditions but is a well taken step in the improvement of yields. In most cases, leaks are visible by color, by sound or by corrosion of adjoining parts.

Expansion is a source of constant repair. It may be due to temperature, oxidation, sulphating and the like. The latter two are distinctly corrosive qualities, and combined with temperature have costly results.

It is not uncommon to see a cracked tower caused by the original expansion space being completely blocked with corrosion products. The corrosion of seams is accelerated by the expansion of a steel shell. Similarly, rivets are corroded and loosened resulting in leakage. Sometimes, tank and tower linings are forced away from their walls very often started by expansion due to temperature and followed by expansion due to corrosion.

Free space distribution is often overlooked even though it is recognized that some reactions will not stay confined. The bursting and cracking of lines perhaps partially weakened by corrosion is often caused by inadequate provision of free space. In vented systems, the vent constitutes a free space. It is very susceptible to corrosion and requires constant attention. In systems susceptible to sudden ebullition, not only free space but strong walls must be maintained.

The items which have just been considered constitute factors constantly open for study and improvement and which are allied with safety in its relation to corrosion. They are of the chemical type or directly allied thereto.

General Plant Maintenance

Corrosion and safety bear a close relationship but where there is corrosion there will be repair. Hence, repair is an outcome of corrosion and brings in another field for safety application.

In every appropriation for replacement of corroded apparatus there is provided an item covering possible accident. Is it not desirable that the works maintenance department should recognize the cause of its very existence and make special effort to correct causes of repair?

The following items are suggestive of maintainance work.

The opening of lines blocked with corrosion products.
Repair of leaks in tank walls, piping, valves and particularly at flanges.
Broken gaskets.
Thin threads.
Flanged wrought iron pipe, poorly made.
Weak supports and scaffolding.
Weak chains, linkage, and flooring.
Faulty pipe fitting.

Of these. some deserve mention that are flagrant and persistent causes of trouble. In pipe lines corrosion causes the replacement of an entire length of pipe due to leakage at the threads. It is frequently more economical and certainly far safer to replace the pipe by cast material thus doing away with the thin metal at the threads.

Very often in using wrought iron pipe with cast iron flanges, the pipe end is not made flush with the flange, such that when the pipe is in place the wrought ends do not butt. At such a joint, the material flowing is in contact with wrought and cast iron which are in contact with each other and a cell is formed, the result usually being the rapid corrosion of the wrought pipe. By butting the pipe so as to make a good joint, this difficulty is largely overcome.

In the handling and manufacture of corrosive liquids, we see cases of faulty pipe fitting. Joints are poorly made, pipes are pulled into place leaving conditions of strain constantly open to danger. The only cure is insistence upon good workmanship.

The following list covers the elimination of certain features and the inclusion of others which tend toward greater safety.

The elimination of readily corroded materials, excess materials, excess lengths and size of materials. excess bulk of products, excess valves. spread out plant, compressed air as propulsion power. high pressures. high vacuum, high resistance, idle equipment, fragile equipment, belts. undesirable condensation, local reactions, impurities and air agitation.
The use of corrosion resisting materials, economic pumping, proper purification, forethought in installation, records of repair.
Simplification of apparatus. proper strength of materials, economic

size of equipment, low temperatures, protection where agitation, agitation where mixing, cooling where mixing, constant use of paint, accessibility to apparatus, plenty of light, good ventilation, good drainage, use of every day advances of the art and constant supervision.

Safe condtions and practices are subject to the actions of each one in the plant organization. It particularly falls upon the executive staff to instill into each member a sense of importance in doing his share to promote safety. The quality of work done in the maintainance of the plant coupled with modern development will do much toward this end but attention to detail will be most fruitful.

HOW A MEDICAL DEPARTMENT MAY CONTRIBUTE TO SAFETY IN THE CHEMICAL INDUSTRY

Dr. B. J. Slater, Eastman Kodak Co., Rochester, N. Y.

Perhaps the greatest single contribution which any citizen has ever made to safety work and the most stimulating health enterprise which was ever planned was the work of William C. Gorgas who was Surgeon-General to the American Army during the War. His conception of safety was so broad and so inclusive and so successful that it enabled the completion of the Panama Canal. It was his warfare on yellow fever which made the canal possible.

There was a time when a physician in industry played a very inconspicuous part. His major job was the care of minor injuries. He was not linked up with the general plan of production and accident prevention. Such an arrangement was never a credit to the medical department nor to the industry itself. The modern conception of industry is that it makes the physician an integral part of the production and safety program. This program is much more ambitious than was formerly thought of and means a larger personnel and a larger equipment to carry it out.

If the chemical industry or any other industry expects to get returns from its medical department it must have a department of sufficient personnel and equipment to undertake real medical problems. There must be plenty of office room, dispensary room, an operating room, and an x-ray laboratory properly equipped to take care of all medical problems which arise.

It was once thought that a careful interview and a few leading questions would enable a carefully trained person to select applicants for employment and place them in departments to do work for which they were physically and mentally equipped. We know now that if our efforts are to mean anything that we need a much more thorough study. Of all of the aids to the work of the medical department I look upon the work of the x-ray as the greatest. It solves, to my mind, more problems than any other single piece of apparatus in a hospital.

The gospel of safety should be preached to the employee the moment he enters the factory for employment. He should be given a careful psysical examination and a careful history should be taken of the diseases from which he has suffered in the past. If there has been a history of coughs and colds, asthma, pleurisy or tuberculosis, there should be an x-ray examination of his lungs at once. If his teeth or his nose or his lymphatic system show that he suffered or may have suffered from syphilis, a Wasserman test should immediately be performed. If there is evidence of aenemia, malnutrition or underweight, special blood studies should be inaugurated to determine as nearly as we can the exact physical condition of the applicant. You will appreciate at once that this covers far more ground than the ordinary routine examination. It means nothing less than bringing to the new employee the very best that modern science has to offer in medical diagnosis. All the most recent advances in medicine should be brought to bear upon the applicant's condition so that he may be properly placed in industry.

No Place for Misfit

The chemical industry, by and large, is no place for a physical misfit. Those of you who work around acid and fumes know the great effect that fumes have on the popular mind and we know how common it is to have the doctor who is not associated with the industry attribute every single disease which a person may have to the fact that he is working in fumes. Whether or not the fumes have anything to do with the chronic illness it is safe to say that the employee will always feel that it has and if he is suffering from Brights' Disease or from syphilis or from tuberculosis or any other single disease that you might mention it is safe to say that if he is exposed to acid fumes that he will attribute his disease to the condition under which he is working.

We recently had a man with a blood pressure of 190 who suffered from nose bleeds. His physician told him that the cartilage in his nose was eaten away by the fumes in which he was working. and the man believed it. As a matter of fact his blood pressure had never been taken and an adequate survey of his physical condition had never been made. From observations made he was finally convinced that there was no causal relation between the fumes in which he was working and the condition in his nose.

We had a young man who was going blind. He suddenly lost the use of one eye and the partial use of the other. An examination by our eye department showed characteristic retinal markings and a syphilitic hemorrhage. A Wasserman reaction showed that he was suffering from syphilis. Under "606" he promptly returned to practically normal vision. Co-operation between the chemical plant and the medical department frequently saves the annoyance of reporting accidents which are never anything but disease.

Another employee complained of a sore finger. On presenting himself to the medical department it was his only complaint. A careful physical examination showed that he had advanced tuberculosis. While in this particular case the question of accident was not involved it is easy to see how the slightest accident might easily have aggravated the pre-existing tuberculosis. He was removed to a sanatorium and, after six months, discharged improved. It is obviously of the greatest interest to other employees to have this type of man removed from close association with them as a part of the general safety program. It is equally important to the industry that men who are dangerously ill with a chronic disease be promptly placed under proper care that their illness may not be aggravated by a mishap that would give no concern to a man of normal health.

Everyone is familiar during the spring and fall with the frequent occurrence of epidemics of cold. It is of the utmost importance that foremen in a chemical industry in so far as they are able have men who are sick report promptly to the medical department. If a man is coming down with a cold and has a little temperature and something unusual happens in his department such as leak in an acid line the man who is really sick already is quite apt to be more sick and is almost certain to attribute his entire illness to some incident which would have been of no consequence had he been in good physical condition. During the epidemic seasons, and, as a matter of fact, at all times, foremen should be instructed to have cases of sickness reported promptly to the medical department for prompt treatment and to be sent home when they should be at home; secondly, in order that the disease from which they are suffering may not be aggravated by some incident which may take place in the works.

During the past year one of our chemical workers had not been feeling well for a couple of days. He had taken a long ride to Niagara Falls and has greatly overeaten. Returning to work on Monday morning he was exposed to an unusual amount of gases, through a leak in an acid line. He, however, received no more than four or five other men who were working with him and he said that he had frequently inhaled more fumes than he had at this particular time. However, on the following day his temperature was 105 and his pulse was 140. He was deeply cyanised and all of the doctors who were taking care of him practically despaired of his life. He did, however, recover. This is a case in point of a man who was not in good physical condition who received a little more than the average amount of acid fumes and who almost died and whose case was considered an accident. Had the fact that this man not been feeling well been taken into consideration and had he reported to the medical department before returning to work I seriously question if we ever would have had an accident of this particular type.

As a final word of caution to all workers in the chemical industry, especially where acid fumes are concerned, be particularly careful in

reporting the cases of illness in order that men whose physical condition is impaired may be sent home to take proper care of themselves and their disability not be aggravated by conditions on the works. Not a single employee of the four or five who were working with the individual just named had any idea at the time that anything unusual would happen from it. Not one thought that there had been an accident in the commonly accepted sense of the term and yet an accident was claimed and readily admitted because the employee had really been exposed to an abnormal amount of acid fumes though it was only slight.

Accident is Greatest Safety Instructor

If one were to ask what is the single greatest aid to accident prevention this answer would be found in the accident itself. There is no single instructor which is as powerful and as convincing. The accident will always be our greatest teacher. Just as serious diseases have frequently been preceded by symptoms of apparently inconsequential nature so practically all serious accidents are preceded by trivial accidents which if they were properly interpreted would mean the prevention of the more serious accidents.

A headache may be the beginning of Brights' Disease, may be the beginning of syphilis or it may be a tumor of the brain. It also may be the beginning of one hundred other things. A brick may fall from a building; it may fall safely to the ground and hit no one, or it may break a man's back or it may set off an explosion of powder or there may be a hundred other things that it may possibly do.

The medical department should be familiar with every single accident which happens on the plant in which there is any injury however small to any of the workmen. When the workman gives an account of what has happened to him the account may be the forewarning of a more serious accident unless dangerous conditions are corrected. Just in proportion as we utilize the trivial accidents of our plant to point out dangerous conditions so do we contribute to the safety program. The medical department is the logical place to find out about the trivial accidents and the safety department should be as solicitous about the smaller accidents as it is about the larger ones. We all know that when a serious accident happens in the plant there is a conference of foremen and superintendents and all the details are carefully gone over. It is our custom to hold an inquest in the case of minor accidents. In some factories no such precautions are taken and yet, as before pointed out, there is not a single minor accident no matter how trivial it may be which does not point the way to a more serious accident, and we should to the largest extent possible, utilize these trivial accidents as teaching material in order to avoid the more serious ones. I would emphasize this as the single greatest contribution which this paper may be to you gentlemen today if properly valued and applied.

In our medical department we act on the general rule that it is never our duty to censure a workman because of an accident. No matter

if he may have violated all of our safety rules we feel that our business is the care of the accident and that any censure or discipline which may be properly directed to the injured man must come from someone else. This removes what might be a possible source of irritation to the workman who is seeking treatment rather than advice. We always advise the injured man that it is the company policy that the safety department must be notified of his injury and proceed to notify the safety department as quickly as is practicable. When the workman has learned that this is a company rule; that there is nothing personal about it; that the information is forwarded simply in order that the working condition may be checked up, he will come to undestand that we ourselves are under orders and that the orders are a part of a large, general, company policy and bears no relation to our likes or dislikes in the matter.

Workmen Need Overhauling Once a Year

In a general way I feel that all workmen in a chemical industry should have a general overhauling at least once a year. This overhauling would include x-rays of the lungs, Wasserman reaction, urinanalysis and careful inquiry as to their general health. Following the safety conference which was held in Buffalo last year we had made a complete physical examination of all benzol workers every three months. This included a red blood count, white blood count, differential count, coagulation time and complete physical examination. While to date, we have found no evidence of benzol poisoning we have found that the men show the greatest appreciation of this type of service on the part of the medical department. Instead of spreading alarm among them that they were working under dangerous conditions it has done much to inculcate in their minds a feeling of safety and it has brought home to them the fact that we are anxious to have them working under the best conditions. It has been explained to them that if they develop any symptoms of poisoning that those symptoms should be reported and a special examination will be given at any time. This close co-operation on the part of the medical department, chemical plant, and the worker, has done a great deal to reassure the worker that industry is doing all that it can to make working conditions satisfactory.

Summarizing the contributions which a medical department may make to plant safety in the chemical industry we would say that every effort made to produce better hygienic conditions of work is an effort to promote safety. Secondly, with a complete laboratory, x-ray department and adequate personnel a medical department may be expected to answer for industry all questions regarding health that an individual may ask of a doctor. Third; a thorough study of applicants for employment with a knowledge of their physical limitations is of the greatest service in placing men in the industry. Four; such a study must necessarily mean that many applicants will not be employed because their general health is not such as to warrant their employment

in a chemical plant. These include cases of Brights' Disease, asthma, tuberculosis and all other chronic lung infections. Five; those employees who are actually sick may do harm to themselves by employment and certainly are a greater risk to the chemical industry. Their condition should be diagnosed; they should be separated from their labor until cured. In this manner the workman is not running any chance of injury to himself and the industry will not suffer because a claim may be made for exaggeration of an already pre-existing disease. The justice of this can be readily seen more particularly in those industries where the employee draws pay for sickness, not due to accidents. Six: there should be such a close co-operation between the safety department and the medical department that all cases of even minor injuries will be made available by the medical department to the safety department. These minor injuries are to serve as lessons in the promotion of safety. The medical department being advised of all such injuries and having a record of them is the logical place to effect the greatest co-operation with the safety department. Seven; an annual complete physical examination of each employee of the chemical industry and such other special examinations as are necessary where there is special hazard will furnish a close check up of the physical condition of the employees and will be a great contribution to the plant safety. This gospel of the annual physical examination will have an additional good effect in that the tendency will be for the employee to check up in his family the customs which he learned in the industry.

Results of Health Work in E. K. C.

In the particular instance of the Eastman Kodak Company our intensive health work has brought very promising results. Not all sick people lose time and not all employees who are sick visit our department. It is thus impossible for us to make an exact appraisal of all employees who have a chronic illness. It is safe, however, to say that in a case of acute illness that we see at least 75 per cent of all acute illnesses in the very beginning. That is, people who are sick are expected, before leaving the plant, to report to the medical department.

We feel in the case of chronic illness that our efforts have uncovered more than one half of the chronic illnesses. Our proof is that, on informing an employee that he has a certain illness, we are informed that he did not know it and what is more important that he is not receiving treatment for it. We are certain that we have been responsible for the diagnosis in at least 75 per cent of all tuberculosis cases which cause absence from employment. We believe that we have diagnosed at least 50 per cent of Brights' Disease, 75 per cent of Diabetes and 85 per cent of all the syphilis on the plant. That is to say, that of a hundred people having syphilis, 85 per cent would not be under the care of a physician or institution and would later come to receive appropriate treatment through our efforts. In all of our health work

our greatest contribution we feel is that we are catching diseases before they have come to the incurable stage. We are certain that many of them without our assistance would have gone on to invalidism and early death.

Of six perforating ulcers of the stomach occurring on the plant, not one has died. This abdominal tragedy usually carries a 50 per cent mortality under the best conditions. Only one case of appendicitis had died within the last five years and that employee was operated on two hours after the time when the initial symptoms began. Not a single finger has been lost through infection which has been treated through our department in the last five years. No patient has lost his life through infection in the last five years. In view of the number of employees this seems a rather remarkable record, and must show that when there is close co-operation between the industry and the medical department that there must be a great saving of life and a great prevention of disease as well as accidents. We know that the two are closely associated and that efforts spent in the prevention of disease and the early diagnosis of disease are the wisest kind of safety measures.

DISCUSSION

MR. I. V. KEPNER (Pennsylvania Salt Company): How many employees have you?

DR. SLATER: Thirteen thousand.

MR. CARSON (Pittsburgh Plate Glass Company): Do you permit any men to go to work before they are examined, or must they be examined before entering the shop?

DR. SLATER: Examined before entering the shop. We find that there is not much antagonism to the physical examination, very little under the conditions under which we do it, especially as we are so frequently able to help as in the cases pointed out. I think the whole problem of medicine in industry is creating an atmosphere of sympathy, helpfulness and kindness to the employees. If you have done that and made a reputation for trying to play the game squarely and render a service, a great many of your difficult problems will take care of themselves. That is particularly true, we believe, where employees are paid for hospital time. Employees who have been with us over five years get three-fourths of their pay while away. They must understand that we are not sending them home sick to pay them unless we felt it was to their interest. I think that has been a great help.

MR. WHITING: Can the doctor suggest any practical means of establishing effective supervision in plants too small to have a medical department?

DR. SLATER: Of course the way to do that is to have an industrial clinic, being subscribed to by all of the industries wishing to take advantage of it. It would be too costly to have a big equipment in each plant.

MR. M. L. FELLMER: I would like to add a little. Our plant is not large. In two plants we have 1,000 employees. We insist on a full medical examination of our entrants and we render all the service necessary to promote and better the health of our employees. We are doing it by having at each plant a physician in attendance for two hours every morning and having a dispensary fully equipped for the physician to perform small operations, if necessary, and the employee is made to feel free to submit to us any question at all of his personal health and so forth and so on, and we are getting the most excellent results. The plant is small. I have taken quite a bit of instruction in first aid work and I am the nurse and the men appreciate that very much. They see me running through the plant. They say, "I want this and that." "Well, come over to the office." On urgent cases a horn is sounded and I come on the double-quick. The men appreciate that. There is closer contact between the medical and safety departments than can be established in the large plants. I think assistance of that character will help to bring about the conditions we want.

Attitude of Labor Organizations

MR. HUBBARD: (New York): I think we can state most confidentially and, at the same time, most fairly the attitude of labor in our organization at New York City in the Department of Public Health. The first opposition we had was the opposition of labor.

I simply want to say that labor is on record in convention as being opposed to physical examinations. Labor will not consider that nor will it permit the publication of figures. Labor will not permit representatives to be heard on this proposition so that, until we can educate labor, these examinations will be made in confidence that our records are secret, that the work is between the man and physician, as it is with the family physician. We cannot get labor to go on record and do this.

Last year we examined 200,000 men in the city of New York. These physical examinations cannot be tabulated and the records given to the public because we have promised the labor unions these would be kept secret.

If we could take the examinations made in the plants, as the previous speaker said with 13,000 employees, and make the records public, if we could make these examinations year after year of people engaged in a certain line, it would go a long way in solving this problem.

I hope this section will go on record and make an effort to endeavor to get labor to co-operate with plant physicians and others to co-operate in getting these physical examinations annually made.

DR. LEONARD GREENBERG: There is just one thing we must do and that is to treat labor fairly and show them that we are treating them squarely and bring them to our viewpoint.

The value of all this work is absolutely not open to question. It is one of the greatest factors, perhaps, in bringing about the close of some of these early deaths in the middle-aged group.

Shortly after the war we analyzed some 35,000 accidents and we found one of the startling things was a case of 400 girls inspecting cartridge shells, work requiring minute supervision and the best eye sight, and not one of those girls had taken an eye examination.

After all, everybody is paying the price of this. The consuming public and the employer are paying for this, and such a thing should come to an end. If you go into a union shop and try to sell them your viewpoint, they feel you are making physical examinations to rule out the unhealthy people. The only thing to do, perhaps, is to examine the men and make the best use of the data. Keep all the men in your employ. Shift them from a hazardous occupation to one that is not and respect every confidence that they have in you.

I must say in our eight years of experience in Connecticut that we have gained admittance into every plant around there because we have respected every confidence they have imposed upon us. We haven't published the names of any plants in our investigations. In that way we have had an open door to every plant in Connecticut. We conducted work in some plants for four or five years, turning a whole plant into a research laboratory. We published these in government reports.

The whole background by which we are going to further the work is by keeping that trust imposed in us and never betray it. Always treat them fairly and squarely. If we do anything not intended we make every effort to see we do it with everybody's approval. Only in this way will we get around the question of this union objection to the use of the physical examination in industry.

ADJOURNMENT

Joint Meeting of Chemical and Rubber Sections

September 30, 1924

A. L. WATSON, Chairman, Chemical Section
Personnel Director, Hooker Electrochemical Company, Niagara Falls, N. Y.

C. F. HORAN, Chairman, Rubber Section
Manager, Safety and Hygiene, Hood Rubber Company, Watertown, Mass.

THE CHAIRMAN: The first item on our program this morning is that of a report from benzol poisoning committee, which was appointed some two years ago by the Chemical Section and upon which a great responsibility has rested, and I am proud to say that that committee has done a most remarkable piece of work and a creditable one and one which is going to be of real, genuine value to industry.

Professor Winslow, chairman of this committee, expected to be at the meeting to deliver this report but it was impossible for him to come and he is therefore having the report submitted by a most able assistant, Dr. Leonard Greenberg.

SECOND PROGRESS REPORT OF THE SUB-COMMITTEE ON BENZOL OF THE COMMITTEE ON INDUSTRIAL POISONS, NATIONAL SAFETY COUNCIL, CHEMICAL SECTION

Discussion of the problem of benzol poisoning at the eleventh annual meeting of the National Safety Council (1922) aroused so great an interest in this subject that a special sub-committee of the industrial poisons committee was appointed in the spring of 1923 to study and report on the health problems involved in the use of benzol in industry. At the twelfth safety congress held in October, 1923, the benzol committee rendered its first report.

This report presented a general discussion of the problem of benzol poisoning in industry, based largely on the replies received by the committee to a questionnaire sent to 324 industrial establishments in

those industries which were thought to be using benzol. Out of the 324 questionnaires sent out the committee received 140 replies, indicating that 84 organizations made use of benzol while 56 did not. The analysis of these returns indicated to the committee that the firms canvassed had experienced some 15 cases of poisoning, 42 of the 140 replies indicated that the organizations are making use of protective and preventative measures. The committee made tentative recommendations regarding precautionary measures as a means of preventing benzol poisoning, but was of the feeling that the problem required further study. During the present year it has been possible, through the courtesy of the Hood Rubber Company and the Massachusetts State Department of Labor and Industry, the U. S. Public Health Service and with the generous financial assistance of the National Bureau of Casualty and Surety Underwriters, to carry the work forward on a more intensive scale. At a meeting of the committee on May 2, 1924, it was decided to accept the kind offer of the Hood Rubber Company of Watertown, Mass., to donate to the committee the services of a physician (Dr. J. Newton Shirley) and of the Massachusetts Department of Labor and Industry to donate to the committee the services of a factory inspection expert (Mr. John R. Dexter) for the period of the study, traveling and living expenses to be paid out of a grant of $1,500 appropriated by the National Bureau of Casualty and Surety Underwriters for the more intensive examination of the problem of benzol poisoning.

Extent of the Benzol Hazard

The committee pointed out in its earlier report that acute and fatal cases of poisoning due to benzol are of such a striking character they usually attract the attention of officials in whose plants they occur. The chronic poisoning case is, however, often completely overlooked, especially in those plants not employing a physician, until some acute exacerbation takes place. This condition applies to the greater number of plants using benzol in open processes and your committee was of the feeling that the study of this phase of the problem might do much to delineate the hazard and point the way to protective measures.

It is impossible at this time to determine exactly the extent of the benzol hazard in industry for no reliable body of statistics for industrial diseases is at present available. During the progress of our studies we have, however, compiled a table of cases and deaths in the various industrial plants from which information could be obtained. This list is not complete, for in many cases information was wholly lacking or was found to be very indefinite, but it is at any rate considerably more extensive than the list presented in our report of a year ago. It may be noted that the data obtained from our 1923 questionnaire are included with those newly discovered in Table I so that the total of 15 deaths and 83 cases of sickness covers a period of several years. In preparing this table we have preserved a distinction between the cases due to the temporary exposure to large volumes of benzol through accident and those due to the more or less constant exposure to smaller concentrations.

Methods of the Study

In its 1924 field work, the committee has attempted to study conditions in certain plants using benzol with the object in mind of learning the amount of benzol used, the method of using the benzol, the ventilation used to remove the vapors, the actual concentrations of benzol vapor in the air, and the effect of the inhalation of this vapor on the workers as determined by symptomatology, physical findings, and particularly blood findings.

For recording the physical examination data we have utilized the card reproduced in the accompanying figure. It will be observed that certain plant and occupational data are called for followed by a list of the usual symptoms of significance. The reverse side of the card is prepared for the findings of the medical examiner, laboratory notes, and personal and family data. We have found this card to be well suited to the purpose at hand.

Our plant inspection notes have been taken on the mimeographed form reproduced below.

It will be observed that under heading No. 1 certain plants and building data are listed. Heading 2 deals with the ventilation in use. Headings 3 and 4 deal with the fumes and vapors in the atmosphere and the shop conditions, which serve to bring about the presence of vapors in the atmosphere.

TABLE I.

Deaths and Illness Due to the Use of Benzol in Industry

Plant No.	Accidental exposure to heavy concentrations		Habitual exposure to lower concentrations	
	Deaths	Illness	Deaths	Illness
3			4	
6		1		
7				1
8				44
9	1			
11				1
12				Several
15			3	Several
16				1
17		1		1
20				2
23				2
27				2
48	2			1
50				1
59				2
61				2
62			2	7
67	1			
76				1
78			2	3†
83				1†
84				7
95				2
Total	4	2	11	81

Under heading 6 we have grouped certain data which yields a rather general job analysis. Heading 6 provides for notes on fatigue, the purpose being an attempt to clarify the relation between heavy or light labor and the incidence of benzol poisoning. And lastly, item 7 is for any remarks not provided for elsewhere and of value to the investigator. In addition to filling out this form our investigator has prepared a series of notes on each of the plants studied, in greater detail than our form permits, and covering all those factors which may have a bearing on the problem in hand.

Determination of Benzol in the Atmosphere

A portion of our study was devoted to the determination of the actual benzol content of the atmosphere of the workrooms studied. For this estimation of benzol we have utilized a method employing activated charcoal, a substance which possesses the power of absorbing solvent vapors from the air passed through it. Since activated charcoal also absorbs a certain amount of moisture, we have been forced to take suitable precautions to render the sampled air moisture-free before passing it into our charcoal absorption tube. The finished apparatus consisted of a carrying case 14x5x15 inches, provided with a series of clamps for holding three tubes, the first two of which were 10x1 inches and the last 6½x⅝ inches. The first tube was filled with soda lime for absorption, of acid vapors, the second with calcium chloride for absorption of the water vapor and the last tube was filled with 7 grams of 8 to 14 mesh activated charcoal.

Before filling the absorption tubes, the charcoal was dried over night in a constant temperature oven at 105°c. and kept in a tightly stoppered dry glass bottle. We found it advantageous to cover the retainer plate of the charcoal tubes with a piece of fine mesh copper gauze which served to prevent any large grains of charcoal from falling through the plate. The tubes were then clamped in position beneath the stem of a small funnel and the lower end of the tube connected to a large bottle (7 liters capacity) by means of a piece of rubber tubing. The charcoal was then dropped by means of a spatula into a funnel from which it fell to the tube. After filling the tube in this manner the stopcock between the tube and suction bottle was opened and closed several times. This procedure serves to remove the fines from charcoal tubes. The charcoal tubes were never "tapped" during the process of filling. The foregoing method is the standard procedure recommended by the U. S. Bureau of Mines for the preparation of activated charcoal gas absorption tubes.

We found it also necessary to equilibrate the charcoal tubes before use. This consisted in connecting six charcoal tubes in parallel by means of a manifold made of glass tubing, and connecting the manifold to the outlet side of the calcium chloride tube. We also added a tube of cotton wool in the air chain in front of the soda lime tube. Compressed air

was then passed through the chain which to reiterate was composed of the following: cotton wool tube, soda lime tube, calcium chloride tube, manifold and six charcoal tubes. The compressed air at the rate of approximately six liters per minute was allowed to flow through the chain for one and one-half hours, and on the completion of this step the charcoal tubes were desiccated over calcium chloride and later weighed. After our tubes were equilibrated in this manner we found that the aspiration of ordinary room air through our sampling chain failed to produce any significant change in the weight of the charcoal tubes.

The method which we finally selected for the sampling and estimation of benzol in air is the most accurate field method at hand at this time. We have attempted to determine its accuracy and obtained a yield of 92 per cent of a weighed amount of benzol passed through the apparatus when sampling was conducted at a rate of 1 liter per minute. This means that our observed results are to be considered as approximately 8-10 per cent lower than the actual existing conditions. A difference of this amount is, however, not significant from our point of view. Essentially, we are not interested in learning whether there are 90 or 100 p.p.m. of benzol vapor in the air but rather are there 50, 100, 200, 300, 500, 1000 etc., p.p.m. present. When one bears in mind the fact that under plant conditions, particularly in the summer season when windows are open and natural ventilation is great, the benzol vapor concentration in the workroom is subject to great and almost continuous variations, errors of 10 per cent are obviously of no serious significance.

It should, of course, be understood that in this absorption method the charcoal takes out not only benzol but other solvent vapors as well. In the table which presents our data (Table VI) we have indicated whether other solvent vapors were or were not present. In the mixing room of plant 23, in plant 27, in plants 60, 61 and 75 our results, therefore, include all solvent vapors present. For our purposes, however, these results serve as a reasonably satisfactory measure of the efficiency of ventilation procedures.

Prior to going into the field a sufficient number of charcoal tubes were prepared and placed in the rack of the carrying case provided for this purpose. At the selected point of the workroom the sampling apparatus was set up and the outlet end of the absorption tube connected to a 7-liter aspirator bottle, previously filled with water, which, when allowed to flow from the aspirator bottle drew air through the gas chain. After a sufficient volume of air had been sampled, usually 200 liters, the charcoal tube was removed from the chain, stoppered at the top, plugged at the bottom and returned to the rack. On returning from the field the tubes were desiccated, dusted with a camel's hair brush and weighed, the increase in weight being taken to represent the approximate amount of solvent vapors in the atmosphere sampled. In those plants using benzol as the only solvent, this increase in weight represents that due to benzol vapors only, (plant 23, core making, plants 59, 78, 91, 95).

Industries Using Benzol and Plants Investigated

Benzol is encountered chiefly in the following industries arranged in descending order based in a general way on the quantity used.

1. Distillation of coal and coal tar in the production of benzol.
2. Making of motor fuels.
3. Chemical industries, e.g. oil extraction, dye and dye intermediates, manufacture of paints, varnishes and stains, and of paints and varnish removers.
4. Rubber industry, as a solvent and adhesive agent.
5. Artificial leather manufacture.
6. Sanitary can manufacture.
7. Dry cleaning.
8. Use of paints, varnishes and stains and paint and varnish removers.

Examination of this table reveals the fact that plants here listed may be divided into two groups based on the nature of their use of benzol. In the first group we may place those industries included in the first three classes of the table above. Here benzol is used or handled in very large quantities, but the very nature of the industry demands that it be kept in a closed pipe line system, any openings in the system representing a loss of valuable vapors and making the system an inefficient one with a correspondingly large financial loss. In this group of plants chronic benzol poisoning may be expected to play but a minor role whereas acute cases due to breaks in the piping system of the plant may take place with little warning. It is obvious that our study could glean little from plants of this type and we have only investigated one such plant (No. 58).

In the second group of industries represented by Nos. 4, 5, 6, 7 and 8 tabulated above, benzol is used chiefly as a solvent or a vehicle and as a part of the process in use it must be removed so as to leave the originally dissolved substance in place. The method of removal of the benzol is usually to permit it to evaporate; in most cases this is done in the cold, in some, however, the compound may be warmed, a procedure which naturally removes the benzol with greater rapidity. The vapors arising when benzol is thus permitted to evaporate in the workroom atmosphere constitute the principal cause of benzol poisoning. It is chiefly in plants of this type that we have carried on our studies.

In planning the field work of the present study we forwarded questionnaires to many industrial organizations and finally obtained information from 104 organizations representing 125 plants in which benzol was used to greater or less extent. Of the 125 listed plants our field investigators visited 94, the remaining 31 being omitted for various reasons. Some visits, for example, would require too extended travel, in other cases it was our opinion based on information at hand that valuable data would not be available. Of the 94 plants visited we were permitted to inspect 78 in order to form an opinion as to the desirability of conducting more

detailed studies; in 16 cases we did not receive permission to make plant inspections.

Many of the 78 plants inspected were not using benzol at the time of our visit, or we were using so small a quantity as to constitute no measurable health hazard. In only 14 plants of those we were permitted to study did we find conditions satisfactory for our investigation, that is an exposure of several or more workers to benzol vapors which might be expected to produce harmful results. In these 14 plants we have made medical studies, atmospheric studies, or both; the following summary table indicating the detailed studies conducted.

TABLE II.

Summary of Studies Made.

Plant Code No.	Industry	No. of Med. Exams. and Records	No. Chronic Cases as Indicated by Blood Count	No. Clinical Cases Previously Recognized	Air Samples
5	Rubber	1	.....	4	No
9	Rubber	4	.....	1	No
15	Paints and varnish remover	1	.....	3	Yes
23	Rubber	44	4	2	Yes
27	Artificial leather	4	1	2	Yes
56	Artificial leather	1	.....	.....	No
58	Benzol recovery plant	5	.....	.....	Yes
59	Rubber	6	1	2	Yes
60	Rubber	5	.....	.....	Yes
61	Electric wire insulating	9	4	2	Yes
75	Artificial leather	.....	.....	.....	Yes
78	Sanitary tin cans	.....	.....	5	Yes
91	Sanitary tin cans	1	.....	.....	Yes
95	Dry cleaning	3	2	2	Yes

Medical Findings

In all we have collected the medical findings on 84 men employed in the 14 plants under study. In most cases these findings were obtained on examination of the worker by Dr. Shirley; in a few cases where the records of the plant under study were sufficiently complete they are based on the records of the plant physician.

It is now generally agreed that the white blood cell count is the most important early diagnostic sign of benzol poisoning and we have applied this as a criterion to the cases under consideration, using the accepted normal count of 7,500 as our standard and a deviation of 25 per cent from this standard as probably suggestive of benzol poisoning. On this basis, we have selected twelve cases as being definitely suspicious cases of poisoning; one additional case being selected on the basis of slightly lowered white blood cell count and a low hemoglobin and making thirteen in all.

In Table III below we have tabulated the blood findings of the workers considered on this basis as showing presumptive evidence of benzol poisoning. In this table will also be found the blood cell counts usually accepted as normal for adults.

TABLE III

Plant Code No.	Hb.	W.B.C.	R.B.C.	Polys.	Lymphocytes	Large Mono-Nuclears	Eosin	Trans.
23	65	5300	4,376,000	58	36.5	3.5	1.5	0.5
23	75	5200	4,400,000	55	39	3.5	2.0	0.5
23	.....	4100	.....	.....	.....	.....	.....	.....
23	.....	4800	.....	.....	.....	.....	.....	.....
27	55	4667	4,304,000	55.5	36.5	5	1	2
59	70	6140	5,424,000	47.5	47.5	3.5	0.5	1
61	85	4450	.....	.....	.....	.....	.....	.....
61	50	4000	.....	.....	.....	.....	.....	.....
	40	3600	1,736,000	.....	.....	.....	.....	.....
61	75	2850	.....	.....	.....	.....	.....	.....
	80	4200	1,736,000	.....	.....	.....	.....	.....
61	23	3000	800,000	.....	.....	.....	.....	.....
83	27	1450	1,055,000	58	36	5	1	0
	41	.....	.....	.....	.....	.....	.....	.....
	30	2100	2,100,000	.....	.....	.....	.....	.....
	29	2200	1,365,000	44	49	6	1	0
95	55	3100	3,193,000	50.5	39.5	1.5	7	1.5
95	70	3600	4,968,000	47	41.5	0.5	8	3
Normal Males	90-100%	7500	5-5½ million	65-70%	20-30%	1-2%	1-2%	2-4%
Females	50-100%	7500	4½-5 million	.....	.....	.....	.....	.....

Distribution of White and Red Cell Counts by Classes

In Table IV we have summarized the distribution of white and red blood cell counts by classes.

TABLE IV

White Cell Counts

2-3000	3-4000	4-5000	5-6000	6000-6500
1	5	4	2	1

Red Cell Counts

-1 million	1-2 million	2-3 million	3-4 million	4-5 million	5-6 million	Unknown
1	3	.....	1	4	1	3

It will be observed that while of the 13 cases considered as suspicious, all but one disclosed counts more than 25 per cent below normal, of 10 cases in which the red cell count was obtained only 5 disclosed counts more than 25 per cent below the normal. It is impossible to determine from our data which of the blood cell counts is first depressed by benzol, but it seems evident from the analysis above that the depression of the number of white blood cells is proportionately greater than that of the red blood cells.

In the right side of Table III are tabulated the differential blood counts of our cases. A study of this portion of the table discloses the fact that in all of our cases there appears to be a decrease in the percentage of

polymorphonuclear leucocytes and an increase in the percentage of lymphocytes. In this latter finding our results concur with those of Teleky (2).

It seems to us somewhat significant that out of 84 men employed in processes involving more or less continuous exposure to benzol fumes 13 or about 15 per cent should have shown a blood picture strongly suggestive of benzol poisoning. This would appear to confirm the conclusion of our previous report that the benzol hazard in industry is a real but not a sensational one. In one dry cleaning plant, however, 2 out of 3 men examined showed this condition and in an electric insulating plant 4 out of 9 were thus affected.

Physical Findings and Symptoms

We are able to prevent physical findings and symptomatology for only 9 cases out of the 13 showing suspicious blood counts.

TABLE V

Symptomatology and Physical Findings in Cases Considered Positive

Case Number	1	2	3	4	5	6	7	8	9	Total
Anorexia								†	†	2
Gastric disturbances								†		1
Constipation	†									1
Headache				†					†	2
Dizziness	†			†	†				†	4
Nosebleed								†		1
Pallor	†	†			†	†	†		†	6
Spongy gums					†				†	2
Ruddy		†						†		2
Fair	†		†	†	†					4
Pale									†	1
Well nourished	†	†	†	†				†	†	6
Not well nourished					†					1

It is our feeling that this analysis (Table V) yields little of value except perhaps that it indicates that chronic benzol poisoning may proceed for a considerable length of time and may produce marked changes in the blood cell concentration of the patient before subjective symptoms begin to appear. It will be observed that of the symptoms, dizziness appears most frequently and pallor is the most usual physical finding.

Ventilation Findings

It was pointed out earlier in this report that in certain industries benzol becomes a hazard only in case of an unusual and unforeseen set of conditions, namely accident. This holds true for certain recovery and chemical plants, most of which use benzol in a closed system and, therefore, cannot meet their benzol hazard with ventilation. We have obtained ventilation data for 31 plants where a benzol hazard might be considered to exist as a more or less constant feature of the processes involved.

Of 33 workrooms studied in these 31 plants 11 had no artificial ventilation provisions, 10 used local exhaust ventilation only, 6 used general artificial room ventilation only, and 6 both local exhaust and general room ventilation.

The correlation between cases of illness and death due to the absorption of benzol, and the quantity of benzol vapor in the atmosphere is not a simple one; in considering the one factor of the concentration of benzol vapor in the air alone, it must be remembered that this must vary between wide limits depending on the quantity of benzol in use, the kind of benzol (whether 100 per cent or less), the atmospheric conditions, the season of the year, etc. All of our benzol vapor samples were taken in the summer months, and it is our feeling that these represent a condition very close to the minimum concentration to be found. In the colder months of the year when as a rule factory windows are closed, the concentration of vapors would undoubtedly be higher. It seems fair to us to assume that there must exist a cyclical variation in benzol vapor concentration in the atmosphere of the workroom with the temperature. This would, of course, not be the case with well ventilated workrooms or exhausted processes.

The problem of the correlation of medical data and air analyses is further complicated by other variables. We find, for instance, in certain processes where the benzol concentration is comparatively high that the workers do not remain in the atmosphere continuously, but rather work for only a few minutes at a "spell" and then spend some time out of doors or at work at a place where no benzol vapors are to be found. The factor of personal susceptibility must undoubtedly play some role and lastly, the previous occupation serves to complicate the findings. One cannot fail to be impressed with the difficulty in correlating medical findings and atmospheric conditions if all of these factors are borne in mind.

With such qualifications we present the data of Table 6 full well realizing their shortcomings. For a list of 17 workrooms in 10 plants we have data showing the type of ventilation in use, the number of workers showing a low blood count suggestive of benzol poisoning, the nature of the process, the solvent or benzol concentration in the atmosphere, with remarks concerning the use of other solvents. The benzol used in these plants was in all cases of the grade called 90 per cent or better.

This table indicates that of the six plants or processes in which definite or suspicious cases were found, five possessed no means of artificial ventilation and 1 made use of general ventilation. All of these cases were found in processes where the nature of the work was continuous, and the concentration of solvent vapors in the air was found to be between 53 and 4,140 parts per million. It is interesting to note that in intermittent processes where 2,645, 77, 465, 280, 395, 626 and 1,989 parts per million of solvent vapors were found no cases of poisoning were discovered.

TABLE VI.

Summary of Plant, Medical and Benzol Sampling Data.

Plant No.	Process	Nature of work	Local Exhaust	General Ventilation	Adequacy	Other Solvents	Conc. of Solvent Vapors in Air p. p. m.	Percent Workers Showing Blood Count Suggestive of Benzol Poisoning	No. Clinical Cases Previously Recognized
15	Paint Mix	Continuous	†	0	†	No	.....	0	3
23	Core painting	Continuous	0	0	.....	None	106,341	33	2
	Mixing	Intermittent	0	0	.....	50 percent naphtha	626,1989	0	.....
	Misc.	Continuous	0	0	.....	None	.....	.....	.....
27	Slicker room	Continuous	0	†	.....	Naphtha and denat. alc.	892,594	0	2
	Mixing cement	Continuous	0	0	.....	Naphtha and denat. alc.	113	50	.....
59	Tire making	Continuous	0	0	.....	None	161,136	20	2
	Bead dipping	Intermittent	0	0	.....	None	405	0	.....
60	Cement mixing	Continuous	0	0	.....	Naphtha	105,190	0	0
61	Insulating wire	Continuous	0	0	.....	Ethyl acetate m. acetate	53-214	50	2
	Mixers	Intermittent	0	0	.....	Benzol	2645 hot mix, cold mix, 77	40	.....
75	Spreading on art leather	Continuous	†	†	†	Denat. alc. 50 percent	28	.....	.....
	Mix dope (enclos. system)	Continuous	0	0	.....	Denat. alc. 50 percent	105	.....	0
78	Coating room	Continuous	†	0	†	No	57,53,114	.....	.....
	Mixing	Intermittent	0	0	.....	No	280,305	0	5
91	Coating room	Continuous	†	0	†	No	160,17,360	0	0
95	Dry cleansing	Continuous	0	†	.....	None	1030,4140,231	66	2

In general, the data of Table 6 may perhaps be summarized as follows:

Out of 17 plants or processes more or less intensively studied, there were four, (plant 61, mixers; 59 bead dipping; 78, mixing; 23 mixing) in which exposure to benzol fumes was intermittent. None of these had any provision for ventilation and in all considerable amounts of solvent vapors were detected in the air (280-2645 p.p.m.); yet in no case were symptoms of poisoning observed. Next we have a group of 4 processes (plant 75, spreading; plant 15, paint mixing; 78, coating; 91, coating) with continuous exposure but with provision for local ventilation. Out of 7 solvent vapor determinations made in such rooms 4 showed less than 100 parts, 2 between 100 and 200 parts and 1 showed 360 parts. No symptoms of poisoning were observed. Next we have two processes (plant 27, slicker room, plant 95, cleansing) with continuous exposure and general ventilation but no local exhaust. Benzol figures were high (231-4140) and symptoms of poisoning were observed in one plant but not in the other.

Finally we have 7 processes (plant 60, cement mixing; 61, insulating wire; 59, tire making; 27, mixing cement; 75, mixing dope; 23, core painting; 23, miscellaneous) with continuous exposure and no ventilation. Two of these plants showed benzol concentration of over 200 parts, both with apparent cases of chronic poisoning, four showed low benzol figures (under 200 parts) but two out of the four had cases of poisoning, as did the last plant where no air analyses were made.

It appears from these observations that, as an indication of danger to the worker, the amount of benzol present in the air at a given moment is of little significance, particularly in the summer time when windows are open, unless the amount be very large or analyses frequently repeated. On the other hand, the correlation between blood tests and ventilation conditions is somewhat striking, and though our data are few they are so concordant as to suggest with some force that any process in which the worker is more or less continuously exposed to the fumes of benzol without the protection of artificial ventilation is likely to result in a considerable proportion of mild chronic cases of benzol poisoning, of the type indicated by a marked diminution in the white blood count.

We are inclined, therefore, to urge again even more strongly than last year that benzol vapors should be carefully and completely removed from the workroom at their point of origin. To accomplish this in the simplest manner, the use of down draft exhaust air currents is to be recommended, the exhaust to be applied as close to the surface of evaporation as possible. If the vapors are arising from a warm object or one heated in any way, the application of upward exhaust ventilation appears to be the most desirable method. And lastly in some cases it is necessary because of machine construction to exhaust the fumes from one or the other side of the worker. It is obvious that the best method to use for a given process depends in general on the conditions outlined above, but it must be borne in mind that benzol vapors are not so unduly

heavy when cold that if necessary in any particular instance they cannot be drawn vertically upwards without any great power expenditure. That the greater portion of benzol vapors can successfully be removed in this way is our opinion. While it is to be borne in mind that local exhaust ventilation is in itself a positive method of general room ventilation, general room ventilation is to be recommended as an adjuvant to local exhaust ventilation. As a means of decreasing the benzol hazard, it is in itself scarcely an adequate substitute for local exhaust ventilation in most cases. Our opinion in this point corroborates that of the leading continental students of the benzol hazard (2).

Summary and Conclusions

1. The studies of the present year have confirmed the previous view of the committee that benzol poisoning is a very real industrial hazard. Our investigations have disclosed a series of 15 deaths and 83 more or less series illnesses occurring as a result of industrial benzol poisoning during the past few years.

2. Out of a group of 84 workers exposed more or less continuously to benzol fumes in varying concentration 13, or 15 per cent, showed a white blood cell count so low as to be strikingly suggestive of chronic benzol poisoning, indicating that besides the obvious clinical cases there exists in industry a considerable amount of mild undetected poisoning of this type.

3. We have found it possible, by the use of the carbon absorption method to determine the amount of benzol and other solvent vapors in workroom air with an accuracy sufficient for practical purposes and we have recorded values ranging from 28 to 4,140 parts per million. The variations in benzol content which occur from time to time are, in summer at least, so great as to militate seriously against the interpretation of any but a large number of such tests; but we have generally found values of less than 200 parts where an efficient system of local exhaust ventilation was at work.

4. Local exhaust ventilation at the point of origin of vapors appears to be a highly efficient procedure for avoiding benzol poisoning, no abnormal blood counts having been observed in workrooms provided with this protection.

5. We would reiterate but more strongly, in the light of the new evidence obtained the nine tentative recommendations made in our report of a year ago. We plan, if the subcommittee is continued to complete our work during the coming winter by observations which we believe we can arrange to have made in a few selected plants to test the conclusion that a low benzol content and freedom from symptoms of chronic benzol poisoning can be effectively maintained in practice by adequate exhaust ventilation.

References

1. **Williams, R. C.** *Preliminary Note on Observations Made on Physical Condition of Persons Engaged in Measuring Radium Preparations.* *Public Health Reports, Vol. 38, No. 51, Dec. 21, 1923, p. 3007-3028.*
2. **Teleky, L. and Weiner, E.** *Uber Benzolvergiftung. Klinische Wochenschrift, Vol. 3, No. 6, Feb. 5, 1924, p. 226-228.*

J. W. S. Brady
L. E. Weber
W. S. Paine
C. F. Horan
H. Bradshaw
J. M. Weiss
A. C. Fieldner
L. Greenburg, Vice-Chairman
G. E. A. Winslow, Chairman.

Medical Form

Name ..... Plant ..... No. .....
Industry ..... Occupation .....
Duration in industry ..... Previous occupation .....
Substances used .....
Chief complaint .....
Onset .....
Anorexia ..... Pallor .....
Nausea ..... Cyanosis .....
Vomiting ..... Dyspnoea .....
Distress, p.c. ..... Hemorrhages (Note place) .....
Burning .....
Pain ..... Menstrual disturbances .....
Constipation ..... Nose and throat .....
Diarrheoa ..... Eye .....
Loss weight ..... Numbness .....
Headache ..... Tingling extremities .....
Dizziness ..... Paronychia .....
Fainting ..... Chills .....
Muscle weakness ..... Fever .....
Paresthesia ..... Chilly sensations .....
Paralysis ..... Skin eruptions .....
Changes of disposition ..... Frequency of urination .....
Irritability ..... Nocturia .....
Forgetfulness ..... Bloody urine .....
Lack of concentration ..... Infections .....
Remarks .....

Field Investigation. Benzol Study

No. .....
1. City ..... Establishment ..... Date .....
Type of building ..... Room ..... Location .....
Size ..... Crowded ..... Ample .....

2. Ventilation. Natural _____
   Artificial _____
3. Fumes and gases noticeable_____
4. Specific posions. Benzol. How long used_____Amount used_____
   How received_____ How stored_____ How distributed_____
   Nature and description of use in the particular process_____
   _____
   Type of container used_____
   Number_____ Size. Make sketch_____ Open_____ Covered
   _____ Portable_____ Fixed_____
   What precautions are taken while cleaning tanks or receptacles?
   _____
   What other solvents used?_____
   Is room separated from other processes of manufacture?_____
   (Plant form)

Air Test for Benzol

1	2	3	4	5	6
Test No.	Tube No.	Date	Wt. of tube Start	Finish	Gain in wt.
7	6⅞	9	10	11	12
Vol. of Air Sample	Mgs.–Liter	8 x 313 P.p.m. Benzol	Temp. Dry Wet	R.H.	Test Point

5. Employees

Occupation	Work Day or Piece	Exposed to hazard Male Female	Hours per Day	Rest Period	Medical Examination

6. Fatigue
7. Remarks

5. Employees
6. Fatigue _____
7. Remarks _____

DISCUSSION

THE CHAIRMAN: I am sure, ladies and gentlemen, you will agree with me that Dr. Greenberg has most ably presented this report of the benzol poisoning committee and that it contains something of real value to the chemical industries and rubber industries and others that are interested in the handling of benzol.

We sincerely hope that nothing will prevent the carrying on of this work which the benzol poisoning committee has started. It is a most valuable piece of work and I am sure some arrangements will be made to permit the committee to do its work.

MR. S. H. KERSHAW (Hercules Powder Company): In view of the extraordinary work done we ought to show our appreciation to the committee and to those companies that have made this possible. I therefore move that we extend our appreciation to the committee and the companies for their co-operation. (The motion was seconded and unanimously carried.)

MR. M. F. CRASS (Grasselli Chemical Company, Cleveland, Ohio): I move that this committee be continued. (The motion was seconded and carried that the benzol poisoning committee be continued for further investigation of this work.)

To Include Allied Solvents

MR. C. F. HORAN (Manager, Safety and Hygiene, Hood Rubber Company, Watertown, Mass.): The question came up in the committee meetings along this line that we might, or some one might, say to you as members of industry that benzol, under certain conditions, is dangerous and then you come back with the statement: "Well, suppose we use toluol or zylol. These are substitutes less dangerous than benzol. The committee thinks if they are to proceed with this study some laboratory work, (perhaps the Bureau of Mines could help) should be done on the dangers of toluol, zylol and benzol. If you don't want to use benzol you should be able to determine whether zylol or toluol is the one to use. At the present time we have done no work on zylol or toluol.

MR. S. E. WHITING (Liberty Mutual Insurance Company, Boston, Mass.): I feel, very distinctly, that this same committee should take up the subject of allied solvents which Mr. Horan suggests because they are equipped to handle them. I make a motion that the committee take up any solvent in rounding out their report on this general subject.

(The motion was seconded and carried that substitutes for benzol could be included in the report.)

DR. MECHLING (Legislative Committee of the National Organization of Dryers and Cleaners): We have in the neighborhood of 2,000 firms. We employ a great army of people who work all day, possibly at this time of the year from 12 to 18 hours day in the atmosphere of gases of benzol or gasoline and when you come to our plants, unless they are properly ventilated, you will find the employees more or less intoxicated. They are dull and laugh at almost anything and at six or eight o'clock at night you find them hilarious and they will not recover from that condition possibly for three or four hours afterwards. Many of our employees develop gastritis, acute and chronic. Therefore, gasoline gases are serious in this connection.

DR. LEONARD GREENBERG: It is usually assumed the white blood count normal is 7,500 per cubic millimeter. We, however, have not used that as normal in computing this 25 per cent. We reduced 7,500 to 7,000

and said 25 per cent below that is indicative of poisoning. The pathologic picture of blood poisoning is different from anemia. It has a picture of its own called plastic anemia.

We didn't do any work in coagulation time. We feel the industry isn't interested in making blood counts and doing work on employees—that is secondary to keeping industry running properly, which is as it should be. We felt the making of coagulation tests took too long and too much blood from a workingman.

Now I realize you can do a microbe-coagulation test if you want, but that is a skilled and technical proposition. We feel that the white blood cell count has a sufficient diagnostic value and is so much more readily and easily accomplished that we have cut out the coagulation test.

Recommendations of 1923 Report

Mr. Horan suggests I refer to the recommendations in our earlier report. This earlier report was published in 1923 and the recommendations are as follows:

1. The use, where possible, of enclosed apparatus for the handling of benzol.

I should say the committee would add to that the substitution of a non-injurious product for benzol, but so far we don't know of any.

2. The use of special exhaust ventilation where employees are exposed to the fumes of benzol:

(a) Where benzol is evaporated at room temperatures, air removal by general room ventilation with down draft is recommended, although in certain enclosed processes where negative pressure can be applied, direct ventilation (from the enclosure) with upward draft may be indicated.

(b) Where localized heat is applied in the evaporation of the benzol, hoods or enclosures should be provided with up-draft. This draft should be sufficiently intensive and applied so closely to the point of origin of the evaporating benzol to insure the complete removal of all of the benzol before the heated surface is removed from the hood or enclosure. This recommendation deals with specific processes where sufficient upward air movement is created by the heated surface to overcome the natural density of the benzol vapor.

3. The use of special exhaust ventilation for tank cars and other containers together with the use of special protective breathing apparatus in the cleaning of tanks and other enclosed spaces where benzol may constitute a hazard. The committee does not recommend the use of ordinary commercial respirators as a means of preventing the absorption of benzol fumes.

4. Physical examination of all new employees with the subject of excluding from benzol processes applicants suffering from:

(a) Organic diseases of heart, lungs or kidneys.

(b) Hemorrhagic tendencies.

(c) Anemia or any unusual blood picture.

5. Frequent re-examinations of all employees exposed to benzol and the temporary exclusion from benzol processes when examination reveals the presence of:

(a) Hemorrhages from the mucous membranes of the nose, mouth or other organs.

(b) Decrease of more than the following from the employee's normal blood picture (normal conditions will be obtained from previous examinations of the individual employee):

(1) White cells, decrease of 25 per cent; but in no case should an employee with a white cell count of less than 5,000 be continued in benzol processes.

(2) Red cells, decrease of 25 per cent.

(3) Hemoglobin, below 70 per cent.

That may be different, of course, in the case of females. They have a lower hemoglobin.

6. Investigation of absences from work by persons familiar with the symptoms of benzol poisoning.

7. Detailed record of the results of physical examinations, duration of symptoms and treatment of illnesses.

8. The employee should be made acqainted with the symptoms which demand early medical attention.

9. A liberal policy of inter-department transfers for employees presenting minor symptoms of acute benzol poisoning.

We feel, in general, after another year of experience and work on this, that those nine recommendations are sound. We have made some minor changes.

Making the Blood Count

DR. MECHLING How often would you make a blood count?

DR. LEONARD GREENBERG: I don't know. We can use the experience of some organizations. One or two make blood counts every month. I think the benzol concentration is high and continuous. I don't think once a month is too frequent by any means and in that connection I must say I shouldn't wait for a decrease of 25 per cent before I ruled a man out of his occupation. I should be inclined to change his occupation at the very first sign of benzol poisoning. If his white blood count shows a good decrease after you have examined him for some time, you have kept that on record and know this man is running down. If he started at 7,300 and after a time drops down to 6,800 or 6,500, I think it is time to be on the watch and put him in a different occupation.

THE CHAIRMAN: We are honored to have Mr. Lewis DeBois, our president, speak to us.

MR. LEWIS A. DE BLOIS, (DuPont Company): I am talking for the DuPont Company now. Our experience with industrial poisoning of all kinds, of which we have had a broad experience, indicates the existence of sick men walking around who don't know they are sick. I think every occupational poisoning involves the breaking down of the blood. It is not an unusual condition at all. That simply means two things:

(1) A thorough examination of your employee so that you know what he is when you get him, and

(2) The constant medical surveillance, which may take the form of periodic examinations or the constant circulation of the doctor to the plant—through the plant working processes, or both.

In other words, you cannot depend upon the man himself, no matter what you tell him, to let you know when he is sick. Now, in one case, we had a great deal of trouble with poisoning. It became necessary to put in a supervisor, charged with nothing but safety and health work. In other words he is a representative of the plant safety department who keeps his daily check on the men and sends them up for physical examination if necessary.

Labels for Solvents

The other point I wanted to make was with reference to labels for benzol or other solvents. Bear this in mind, gentlemen, the solvents in most paints and varnishes, I believe, are not simply benzol, toluol, zylol or something else, but they are very carefully worked out and rather complicated mixtures. I am not a chemist, but I know that all those solvents have different effects as dryers and as carriers of the pigment and today most of these varnishes are made up of combinations, so that you are not really dealing in those cases with benzol or zylol individually but have a composite body having a variety of toxic effects—toxicity.

I think it is very important that the work of this committee should go on in zylol and toluol. It may have to go even further. Even after that I doubt whether it is possible to label a paint can or varnish can in a way to show the degree of toxicity of that material. I think you are going to get into a complicated problem there. I think the only way around it will be the labeling of the percentages of the solvents and couple with that the toxicity of the solvents used in the chemical manufacture. I thank you.

MR. W. S. PAINE (New York): The motion has been made to thank the committee for their splendid report. I want to include the names of the National Bureau of Casualty and Surety Underwriters, the Massachusetts Department of Labor and Industry, the Hood Rubber Company, also the United States Public Health Service. Dr. Greenberg has done splendid work. (The amended motion was seconded and carried.)

PREVENTION OF LEAD POISONING

ROUND TABLE DISCUSSION

MR. S. E. WHITING (Liberty Mutual Insurance Company, Boston, Mass.): I want to go through my outline rapidly. I shall necessarily speak of dollars. I don't do that from an inhumanitarian standpoint but as a rapid way of measuring disability.

Here is one: $120.00 on a small case in lead cable sheeting; four or five others from $120.00 to $130.00. They don't evade those cases of liability. Something in the situation needs to be corrected. I want to know what that something is.

Another one: A bath of molten lead to which the man is exposed. None of these are fatal but, similarly, exposure does result in serious conditions.

Another case in a newspaper plant. Lead poisoning reported; no blue line, no wrist drop, slight trace of lead in the urine. They claim lead poisoning. An insurance man would question that when he would not question a mild case. In this case it turned out that the man had a perforated duodenal ulcer, but normally he had lead poisoning.

There are several places where you wouldn't expect lead poisoning at all. An electric plant using a yellow ink, probably litharge. There were three or four cases, most of them mild, but one of those patients had to have all the teeth extracted and, through industrial exposure was responsible, we denied liability and we felt that the necessity for removing the teeth was due to pyorrhea and not lead poisoning, and so far we have gotten away with that decision.

Another case—a painter—had the usual symptoms of chronic constipation and maybe a blue line, if his teeth were clean enough and if the doctors agreed on the blue line. That case or one quite similar to it went to a hearing. Our own doctors agreed with the sick man's doctors that the man had lead poisoning; everybody agreed on it. The impartial physician agreed on it and our lawyer didn't seem to have any defense. This man was a sprayer. After everybody had agreed that the man had lead poisoning, due to this red paint, our man put the chemist of the plant on the stand and he testified this red paint had been tested by him for years and had no lead whatever. It was red paint of course but it was iron oxide instead of lead. That threw the case out, although our doctors agreed it was lead poisoning.

Here is another case in a newspaper plant. A man worked 18 years as a linotype operator. He had no trouble at all. Suddenly he began to lose weight and complained of lead poisoning. He probably went to his local doctor and his doctor asked where he worked. He said: "I work in a newspaper plant as a linotype operator." If he had worked in a brass foundry the doctor would have said brass poisoning. I am

talking about the old family physician who doesn't know anything about the subject. We settled that case for $400.00. The man wanted to go to the country and get well and we settled. We don't know whether it was C. O. poisoning or not.

Here is one in a chemical plant. A case costing $900.00. This man was grinding and cooking soda arsenate of lead. He was exposed to some dust. First it was called arsenoic poisoning. It came on after he had been working overtime—16 hour runs. He was probably exhausted and was poisoned from that long exposure. He had pains in his feet and hands. A faint trace of lead in the urine was found. The doctor mentioned lead and arsenic. The doctor made the statement: "I could tell better if I knew more about the working conditions." That is, if he found other poisoning—chromium for instance—he could have added some other kinds of poisons to his diagnosis. That case cost us $900.00.

Turpentine Poisoning

Here is one about a motorcycle manufacturer. You know motorcycles are painted red. That was an easy case for the doctor. This man got sick and in spite of the fact that several urinalysis tests showed no lead whatever, they called it chronic plumbism. His kidneys were deranged. The hospital analysis completely changed the picture. It was called intermittent nephritis. That case cost us $27.00. We finally got rid of that because the chemical analysis showed that was not red paint, but some other, probably turpentine poisoning. The man used turpentine in the paint and used it very freely to wash his hands with.

Here is another case which cost us $2,100,000—a large steel plant using a lead bath to temper steel. It looked like a serious case and it involved partial paralysis and we disputed it. He had trembling, weak extremities, but his bowels were normal. The lead line was hard to determine because of pyorrhea. Now it happened that man had sleeping sickness before, in his past history, so the final result was the lead was only temporarily aggravating the effects of the sleeping sickness. The doctors couldn't agree whether there was a lead line or not. The hospital said there was none. It went to the board and the board suggested a compromise. They thought there was evidence on both sides. They didn't think it was a clear case and they suggested a compromise because two impartial physicians had reports directly opposed to the board's findings. That was settled for $2,300 after we had "Jewed" them down from $3,100. These figures are not the only consideration. It shows there was a serious disability for that man who was working near a molten lead bath. Many of you have that same exposure where men work year after year and are not disabled but if any of your men had sleeping sickness instead of laziness, you want to look out for them because they may cost several thousands of dollars.

Here is one of an enamel plant, employing six or eight men, enameling casings for stove linings. We found 30 or 40 per cent of lead in

it. Two men in that plant died of tuberculosis and it was ruled finally the insurance carrier was partially liable for those deaths. The exposure wasn't very severe. One of the most prominent poison experts went to the plant and didn't make any radical recommendations for improving the conditions. He didn't think the situation was very bad. These men died of tuberculosis. They had been discharged from the war, fairly young men at the end of the war. They went into this plant and quickly developed tuberculosis. One had an operation for appendicitis and there seemed to be something in the intestinal tract that didn't heal up and so his local doctor thought of lead poisoning right away to aggravate the failure to heal up. He was sleeping with his brother and he developed tuberculosis and died. There are six or eight employees with two deaths from tuberculosis where a finding on a compromise was based on the aggravation of the lead exposure to the tubercular condition. Those same men were exposed to dust. Maybe that was the cause of it. Anyhow that came out of a clear sky without any warning, and it cost about $3,000 dollars. It would have cost more than that if both men had been married but only one was married.

Other Sickness Entering into Case

Here is another case in a paint manufacturing establishment, in Chicago, making calcimine. It is a harmless substance but the kindling of the calcimine involves one-half to three per cent of lead. That cost $400.00 or $500.00, $275.00 for medical attention and the rest of it went to the man. I cannot go into the details. He had weak legs and loss of weight. He said he felt sick in his hands—whatever that means. It is an expressive way of describing it. There was dust there and a small percentage of lead in the dust. The doctor said there was some wrist drop and peripheral nephritis. There was no pallor because he was an Italian—he couldn't get pale. He didn't have a lead line because he took care of his teeth, he said. That case was finally settled, although we felt there were other elements that came into it because of the total disability. We didn't feel the exposure to lead could be the only reason. There must have been some sickness.

There are other plants where they recognize the lead hazard. A battery manufacturer. They may run through 30 or 40 cases in a few years. That means the cases are not serious. They do get hold of them and prevent their developing into permanent disability or death.

The last case I want to mention is one that came out of a clear sky. A very small carriage painter out in the country. This manufacturer had been going on for years painting carriages. He took on a middle-aged Russian and put him to sand-papering the spokes of the wagon and he made some dust in using the lead. That man began to have disabling symptoms. He went to a clinic and they found on examination that there was a lead line, although his teeth were in bad condition. They found lead in the urine, in the excreta and various symptoms;

that man is disabled and the doctors are trying to find out what is the matter with him. He would go to the hospital and get fixed up and he would have to go back again in a short time. He had no hernias to begin with but in six months he developed a double inguinal hernia and that was operated on. The doctors had made a Wasserman Test because they suspected it was a case needing a Wasserman Test but all the time the primary cause was the lead poisoning and we eliminated them because of necessity. After they removed the hernias the man still complained of pains and the doctors weren't sure whether they were the cause or not. He later developed two more hernias. I don't know whether they were higher up or not. That poor man couldn't talk English and yet the medical report gave diseases he had in Europe. He couldn't talk English and he wouldn't know the list of diseases if he could have talked English. I should like to have the doctors tell us how to save suffering and disability.

A Hunt for Lead

WALTER S. PAINE (Research Engineer, Aetna Life Insurance Company). The committee has requested that we bring before you a specific type of lead poisoning case, somewhat out of the ordinary, and that we extend our findings on this case to a general conclusion by covering the subject in a broad way to aid in "round table" discussion. The writer was aided by his colleagues, Dr. Alexander Prince and L. W. Ferguson, engineer, in these findings during the study of specific lead poisoning cases.

The case before us was incited because three brass workers, employees of a New England corporation, developed signs of chronic lead poisoning. The operations of this plant consist of smelting, moulding, cleaning, grinding of brass castings, babbit metal lining and mill-boring. The metal manufactured contains from five to 20 per cent of lead.

Although the spacious room used for smelting was supplied with ventilation through plenty of door and window space, supplemented by two 36 inch roof stacks and eave windows, it was not effective enough to carry off the fumes arising from three 42 inch and one 60 inch furnaces located in the center of the room. Because of the lack of hoods over these furnaces, there was projected about the room and roof products of combustion contained in the heavy clouds emitted by the furnace. Thus the lighter fumes were taken off by the stacks and eave windows while the heavier fumes ejected by the unhooded furnaces condensed and contaminated the room air with metallic dust.

Two of the three cases of lead poisoning among the employees occurred in the room described above. A review of these spcific cases may be of interest:

Case A:

Mr. ————————, colored, 40 years of age, engaged as a laborer in

the Smelting Room, aided in building and operating the Smelting furnaces. It is stated that this man was a heavy drinker.

The subject became ill, complained of severe abdominal colic, constipation, marked weakness and neuralgic pains, particularly in the forearms. According to the Doctor's report the temperature of the patient was normal and he exhibited a definite gingival lead line and symptoms typical of lead colic. The possibility of appendicitis or cholecystitis were readily excluded. The blood was not examined. The symptoms gradually abated under the administration of potassium iodide and saline purgatives and the subject returned to work a month later.

It is understood that this patient while engaged in the same occupation developed similar symptoms a year previous and was compelled to give up work for seven weeks.

Case B.

Mr. ————, white, 24 years of age, was employed as a furnace operator in the Smelting Room for a period of about six months. The subject became ill and his symptoms were progressive weakness, constipation and abdominal pain. In spite of his illness the subject continued to work although on several occasions he was compelled to abstain from work for a day at a time.

Later medical attention was given and he was transferred to the hospital where he complained of severe intermittent abdominal pain typical of lead colic, neuralgic pains in the arms, and general weakness. His temperature was normal. The gum margin presented an irregular mottled bluish gray pigmentation. The abdomen was generally tender but there was no evidence of a surgical abdominal condition. Examination for wrist or foot drop was negative but the right grip was found much weaker than the left (the subject is right-handed).

The patient appeared anemic. A red blood count had not been made. A blood smear examined later showed basophilic degeneration of the red blood cells.

Cleaning and Grinding.—These operations are conducted in a room having approximately 600 square feet of floor space. This room adjoins the Moulding Room and is ventilated by means of windows on the northern exposure and under the roof eaves.

The brass parts are brought into this room and subjected to rough cleaning by rolling in slatted steel barrels known as, dry and wet "Rattlers." These devices are located in the south-western corner of the room. Particularly in the dry rattling process a considerable amount of dust is desseminated into the room. In the wet rattling process the dust is kept down by a water spray. A worker in this room engaged in the wet rattling operation developed symptoms of lead

intoxication, and it is worthy of note that dust from the rafters located above the post of this worker contained almost one per cent of metallic lead.

Two grinding wheels are located in the south-east corner of the room, 8 or 10 feet away from the "rattlers". These wheels are well hooded and equipped with an exhaust system for the removal of abrasive and metallic dusts. The efficiency of the exhaust system is not entirely adequate, as dust collected from the upper external surface was found to contain large quantities of lead, copper, etc. The presence of particles of emery and brass in the hood dust indicates that this dust is not entirely derived from the rattling process.

Without question, the lead hazard in this room arises from the inadequate removal of metallic dust. The possibility of intoxication resulting from the direct handling of the metal also deserves consideration.

The three cases of lead poisoning occurred under the conditions described above, and Mr. ————————, 39 years of age, was operating a wet "rattler" in the grinding and rattling room, where he was employed for two years and three months. He had the reputation of being a heavy drinker. The subject's symptoms were sharp pains in his "stomach", particularly when he bent forward. He believed he had strained his "stomach" in the course of his occupation.

Later the subject complained of abdominal pain relieved by pressure, pain in the forearms and legs and shortness of breath on exertion. Until treated by his physician he was markedly constipated. The subject had lost weight, had no fever, his teeth were in poor condition and the gum margins present definite pigmentation. There was also external evidence of anemia. A blood cell count had not been made. A blood smear revealed marked basophilic degeneration of the red blood cells.

The three cases given above shows a definite history and present typical symptoms of lead intoxication. As some of the brass alloys manufactured in the plant contain as high as 20 per cent of lead, attention was at once called to the possibility of intoxication by direct handling of the metal. On the other hand, the fact that the intoxicated workmen developed symptoms during the winter months, not only in their present but in their previous attacks, leads one to suspect that the lead is absorbed in the form of condensed fumes or dust. It therefore appears that the preventive measures should be direct chiefly toward finding means for the removal of dust and fumes.

Analyses of dust samples were made to prove this condition. These analyses may be of interest to the reader:

Analysis of Dust Samples

Samples of dust were collected from various parts of the plant and tested for the presence of lead. Two samples, one obtained from the Smelting Room, the other from the Grinding and Rattling Room, were

analyzed quantitatively for lead as it was in these two locations that three cases of lead intoxication developed.

The dust was collected by brushing off accumulations on rafters, window sills, etc.

The following analytical procedure was adopted: A weighed quantity of dust was boiled in nitric acid. The nitrates were then converted into sulphides with hydrogen sulphide and the lead separated from the copper by conversion to the insoluble sulphate. The lead sulphate in the quantitive analyses was dried and weighed.

Sample.

1. Dust from rafter in center of Smelting roof, 8 feet west from the 60 inch furnace.

Weight of dust sample	5.	grams
Lead recovered as Pb SO	0.0256	grams
Metallic Lead (by computation)	0.017	grams
Percentage of metallic lead in sample	0.35	per cent

2. Dust from rafter immediately above wet "rattler". (The machine operated by one of the intoxicated employees).

Weight of dust sample	5.	grams
Lead recovered as Pb SO	0.062	grams
Metallic lead (by computation)	0.042	grams
Percentage of metallic lead in dust	0.84	per cent

(See Exhibit card, Group B).

3. Sample from rafter 25 feet from west wall of Moulding Room near center.

1 gram of dust: distinct trace of lead.

4. Sample from window sill, south wall of Molding Room.

1 gram of dust: distinct trace of lead.

5. Sample from upper external surface of hood on grinding wheel. Grinding and "rattling" room.

This sample was not analyzed quantitatively because of the presence of microscopic particles of brass. It naturally contained large quantities of lead. (See exhibit card, group A).

6 and 7. Two samples, one from the Babbitt metal furnace hood and the other from a rafter between this hood and the counterboring mill, showed distinct traces of lead.

While the dust samples represent the accumulation of the last two years, the results of the analyses demonstrate the presence of lead dust in the shop rooms and at the same time, give a rough index of the lead contents of the dust disseminated in these rooms.

As far as could be determined no cases have been reported from the Molding and Babbitt metal lining Room where the lead was found only in traces.

Because of our findings, the following recommendations were made:

1. That the unhooded, rotary furnaces in the Smelting Room be equipped with hoods and stacks for the removal of metallic and other fumes.

2. That the dry "rattlers" in the Grinding Room be equipped with an exhaust system for the removal of dust generated by the operation, unless a wet process can be substituted.

3. That the efficiency of the exhaust system on the grinding wheels be increased so as to furnish a more adequate removal of metallic and abrasive dusts or that the grinding wheel operators be requested to wear respirators. (If these are used, they should be frequently cleaned).

4. That a ventilated hood be placed over the Babbitt metal lining tables. The Babbitt metal lining operation is not considered very hazardous but it will be kept in mind that absorption of lead in minute quantities over long periods may endanger health.

5. That the dry method of sweeping be abandoned and that sweeping with wet sawdust or other sprinkling be substituted. The sweeping should be supervised.

6. That the washing facilities be increased so as to enable all the employees to wash before eating or leaving the factory.

7. That the lunch period (at present, one half hour) be increased so as to give the employees an opportunity to wash thoroughly before eating.

8. That the employees be supplied with soap and towels, if this is at all feasible.

9. That additional shower baths be installed.

10. That no one be permitted to eat in the shop rooms.

11. That the employees de directed to supply themselves with work clothes and to change their clothing on leaving the shop.

12. That an educational program be adopted so that the employees may be informed on the subject of lead intoxication and its prevention.

The following instructions to employees were suggested:

Instructions to employees compiled from circulars adopted by the New York State Department of Labor and by the Ohio State Board of Health

Lead is a poison. It enters the body mainly through the nose and mouth. It may be inhaled as dust or in fumes. It may be swallowed with food or saliva.

When lead gets into the body it leads to indigestion and lead "colic", to diseases of the blood vessels and kidneys, or to a form of paralysis known as "wrist drop".

Lead acts on the body slowly and insidiously. Without knowing your danger you may be getting some lead poison into your body every day. If you are working with lead in any of its many forms, you must therefore use great care to protect yourself.

Looking at the subject in a general way, lead poisoning is accumulative for it is generally due to the constant entry of minute particles of lead or its compounds into the system until it amounts to a sufficient quantity to give rise to signs of poisoning.

In general, lead enters the body through several avenues:

(1) The respiratory tract,

(2) The digestive tract,

(3) Through the skin (to a lesser degree).

Poisoning is usually caused by dust and fume particles which enter the system through the mouth and nose. Fine particles may be breathed into the lungs where absorption may occur, but many of the lead particles inhaled probably lodge in the mouth and are swallowed. The dust may also be conveyed to the mouth by unclean hands, contaminated food and chewing tobacco. This lead, which finds its way to the stomach, is dissolved by the gastric juice and the poisonous compound formed passes into the system. The amount of lead which may be absorbed through the skin, especially the unbroken skin, is probably very slight.

In following up the symptoms, lead poisoning is essentially a chronic disease marked by acute attacks. The development of the symptoms is usually slow and insidious and by the time the malady has become acute, the workman has absorbed a quantity of the poison.

The first symptoms usually noted are a peculiar pallor, loss of appetite, a metallic taste in the mouth, indigestion, loss of strength, constipation, insomnia, and headache. Frequently a blue line appears upon the gums near the base of the teeth. An acute attack is usually accompanied by constipation and agonizing colic. Weakness of the muscles, mental confusion and even loss of consciousness and convulsions are frequently noted. A slow chronic change takes place in the system leading to hardening of the blood vessels and alterations in the kidneys, liver and heart resulting in premature old age and often paralysis of the forearms and ankles known as "wrist drop" and "ankle drop". Where well marked brain symptoms develop, epileptic attacks, insanity and fatal convulsions may occur.

Our instructions relative to the general subject of lead poisoning in industry forwarded our assured have been issued in the following form:

Efforts to reduce the number of cases of lead poisoning in industry naturally fall into three divisions.

1—The use of substitutes for lead.

2—Shop sanitation.

3—Personal hygiene.

The Use of Substitutes for Lead

The most effective method of combatting lead poisoning, in any industry is, naturally, the elimination of the metal and its compounds in processes where such action does not lower the quality of the product. Considerable progress has been made by manufacturers and hygienists in providing substitutes for lead and a number of examples of successful substitution are here given:

(a) A number of paints have been compounded with zinc, iron, aluminum and manganese to take the place of lead and for certain work such paints have proved satisfactory.

(b) It is claimed that lead may be dispensed with in cutting precious stones while for file cutting a tin block may be substituted for the lead block with equally good results.

(c) A mixture of zinc chromate and Prussian blue may be used as a non-poisonous green for artificial flowers and zinc chromate may take the place of lead chromate for dyeing thread.

(d) Tin and other metals are used successfully for weighting silk in place of lead.

(e) Authorities claim that a mixture of borax and barium salts is an excellent lead substitute for enameling porcelain.

Such substitution of innocuous substances is the surest means of preventing plumbism and when equally effective but harmless compounds may be introduced the use of lead should not be tolerated.

Shop Sanitation

Shop sanitation includes all engineering principles and apparatus that may be designed to protect the worker from exposure to lead poisoning incidental to his work. A number of these general principles are here given:

(a) Lead dust and fumes should be removed by forced ventilation. It is especially important to place hoods over all vessels emitting fumes since these fine particles cannot be excluded by means of a common respirator. In all cases of dust and fume removal advantage should be taken of the tendency of the material to go upward or downward. To make the system most effective the hood should be placed as close as possible to the source of material to be removed. A high velocity should be maintained in the ventilating system because of the high specific gravity of the lead dust. A bag house should be provided for the collection of exhausted dust.

(b) The reduction of dust production by wet processes, enclosed and automatic machinery, and the thorough cleaning of department floors, walls, work benches, window sills and other surfaces by wet processes is essential. When wet processes cannot be used a vacuum system has proved effective but all dry cleaning should be forbidden during working hours.

(c) Lead scrap and trimmings should be caught in receptacles and not allowed to lie around the floor.

(d) Dry rubbing of lead paint and scraping or brushing of dry lead glaze are dangerous operations and should be abandoned in favor of less hazardous processes whenever possible.

(e) Double lockers should be provided for workmen so that work clothing will not contaminate street clothing.

(f) Adequate washing facilities and showers with plenty of hot water, towels, and soap should be provided.

(g) Respirators should be supplied workmen engaged in operations where lead dust is evolved. However, too much trust should not be placed in these devices since the ordinary respirator will not remove all dust and probably but a small amount of lead fumes. Adequate forced ventilation and plant cleanliness are the real solutions. In some industries, such as pottery works, workers often find rubber respirators annoying and discard them at the first opportunity. It is claimed that face cloths saturated with ammonium sulphide may be substituted in such cases with satisfactory results. The ammonium sulphide transforms the lead dust and fumes into insoluble sulphide of lead, an innocuous plumbic salt.

h) A special lunch-room should be provided so that food will not be taken into the work-rooms or eaten in an atmosphere contaminated with lead dust.

(i) Frequent medical inspection of exposed employees, suspension of work in case of sickness and re-examination before returning to work should be enforced.

(j) Tobacco and like substances which may become contaminated with lead and carry the poison to the mouth should be prohibited during working hours.

(k) The management should educate workmen to the dangers of lead poisoning and in methods of combatting the poison.

Personal Hygiene

In order that the worker may effectively safeguard himself against plumbism it is necessary that he cooperate with and supplement the efforts of the management by observing specific rules of personal hygiene which experience has shown to be necessary.

(a) Overalls should be worn fitting tightly around neck and wrists to prevent the particles permeating the clothes. These overalls should be removed at the end of the work period and washed frequently.

(b) The hair, nails and beard should be kept short.

(c) The hands and face should be carefully washed and the mouth and nose rinsed out before eating or placing anything in the mouth.

(d) A warm bath at the end of the working period and a change of clothes is desirable.

(e) Workers should eat a substantial meal before going to work. They should drink plenty of milk and water, but should guard against drinking from a water supply in the plant which may be contaminated with lead.

(f) Workers should make certain that all respirators worn fit contour of the face and are clean and in good order.

(g) Workers should not work with any open sores exposed to lead.

(h) Constipation should be guarded against and a doctor consulted in case of sicknes.

MR. K. E. ROOF (Welfare Director, Willard Storage Battery Company, Cleveland, Ohio): In the past seven or eight years the subject of lead poison in the industries and its prevention has been awakening increasing interest, due not only to the fact that industry, itself, is becoming more humane but also that the government and the various states have been carrying on considerable investigation along these lines. Several states have already passed lead laws and occupational disease compensation laws, and it has reached the point where real constructive work in lead poison prevention must be done or the general public may demand the abolishment of the use of lead in industry, a statement which may seem radical and far-fetched, but not so dreamlike either when we consider that in 1921 at the International Labor Conference at Geneva, a resolution was introduced, to abolish the use of white lead in paint.

The basis of our lead prevention work is our periodic medical examinations of men working in or about lead. The frequency of these examinations should be governed by the degree of exposure of the men, but should be at least once a month, and should include besides, the men regularly employed at lead work, millwrights, machinist repairmen, inspectors and any other men who might only occasionally be exposed to the dust or fumes.

This subject of medical examinations is nothing new but they serve as a barometer of the working conditions in the shop. Not only are we able to prevent plumbism from developing beyond the first symptoms when a little personal attention easily eliminates the trouble, but they show us in just what department and on what operation the men are getting sick. If at any time our examinations show that lead symptoms are developing among the men, a committee composed of the medical director, the plant engineer, the safety inspector and myself go to the department and study the particular operations involved and investigate until we have found the cause of the men getting sick. With the different view points of three or four men in entirely different lines of work, all working on the same problem, it is surprising how easy it is, as a general rule, to locate the cause of the trouble.

A brief example of how this works out:—Some time ago the doctor reported that men were developing symptoms of lead absorption in the dry tank room of our forming department. This is a room filled

with tanks in which wet battery plates are packed so as to allow free circulation of air. The plates are thoroughly washed and then hot air is blown into the tank from the bottom until the plates are thoroughly dried, after which they are removed from the tank and taken away. The aforementioned committee went to this room and watched every detail of the operation for several hours and found that the men were not waiting for the whole tank of plates to dry, but were taking out the upper layers which were dry while the hot air was still blowing in and blowing lead dust into their faces all the time. We also found that the tanks were not cleaned out of lead sediment after each washing, which increased the amount of dust blown around. After these conditions were corrected the men no longer developed lead poison symptoms.

The rest of this paper will be somewhat rambling as herein I will take up various subjects connected only by the fact that they deal with the prevention and treatment of lead absorption. I will not take up the usual methods followed in lead prevention work, the suction systems and proper ventilation, the flushing of floors and equipment, the sanitary facilities and cleanliness of workers, as it will be taken for granted that most of us are doing those things, but rather will I take up a few points that might be somewhat unusual or that might be overlooked by the men who have not had the time or opportunity to go into this prevention work very deeply.

In the first place we wish to say that we believe in and encourage tobacco chewing by our lead workers. Realizing that this is contradicting one of the time honored, moss grown rules of lead prevention, I believe a further explanation is due. Lead is taken into the system through the mouth and nose. When a man is chewing tobacco he is constantly expectorating juice and with it any lead dust that enters his mouth. Also any tobacco chewer will tell you that a small amount of saliva gets back into the throat and every so often he will clear his throat and spit out this accumulation of tobacco juice and with it goes a large part of the lead dust that has been breathed in through the nose and settled in his throat. We do however ask the men who chew tobacco to make little packages of tobacco, enough for a chew in each package, before they start to work and when they want to take a chew, to open up the package and take the tobacco directly off the paper with their mouths. But even if they do not do this, but take tobacco with dirty hands, we feel this small amount of lead that may enter the mouth is almost immediately spit out.

Taking Employees Into Confidence

Another subject I would like to bring up is the taking employees into your confidence to help solve your lead troubles. When you ask for their help and show that you appreciate their suggestions and take quick action on their complaints, you make of each one of your employees a watchman who not only is careful about himself in following

the rules laid down for lead prevention, but also watches over his fellow employees and the new employee who may not be so careful. One also gets valuable suggestions from them relative to improving methods of preventing lead dust. When our men complained about respirators being too heavy, making their faces sore, and producing skin troubles we designed and made on that eliminatd these and other objectionable features and also gave improved breathing facilities. When our employees showed dislike for taking epsom salt physic, we put a tank and pump in the medical department, made a solution of sodium phosphate, lemon extract, sacharine and a slight amount of phosphoric acid, charged it with gas, cooled it by running it through a cooling coil, and delivered it through a soda fountain spigot.

After that we had no trouble getting the men to take a cathartic. In fact it got too popular and we had to control the dispensing of this pleasing drink by issuing permit cards as shown below.

Permit To Drink

W. S. B. Co.'s. Special

Mineral Soda Water

Issued .....

Clock No. ..... **Name** .....

Report .....

Dr. .....

Besides that, it proved to be a much better lead preventative than the traditional epsom salts.

For home use and for more obstinate cases the plant physician also concocted a cathartic composed of epsom salts, rhubarb and licorice which is not only pleasing to take but has after several years experience proven very satisfactory in removing lead from the system.

Another subject I wish to take up is the use of potassium citrate in the treatment of plumism: Two years ago Dr. Wood read a paper before the National Safety Congress, showing the superiority of potassium citrate over the old potassium iodide treatment.

He contended that it was the potassium that had the dissolving power and that the potassium citrate could be given in much larger and more frequent doses than the iodide. I merely wish to state that two more years of experience strengthens our belief that it is the best treatment so far found. Used separately or in conjunction with our cathartic of epsom salts, rhubarb and licorice, it gives quick relief and eliminates the lead from the system in a very short time.

The final point I wish to bring up is a warning not to overlook the unloading docks, the roofs of the buildings and the yards where lead dust may accumulate and later be blown into the air and inhaled by workmen. One time a janitor whose duty it was to sweep the driveways every day, developed lead symptoms. We analyzed some of the sweepings and found it contained 12 per cent lead. Since then we flush the driveways. In unloading oxides from the freight cars, one always will get a certain amount of leakage from the kegs which is deposited on the docks. The roofs of the buildings also seem to be good places for lead dust to settle if there are any lead processes carried on inside. In other words while cleaning up the inside of your plant don't forget the outside of it.

You may think that some of the points brought up in this discussion are minor details, but I believe that no details should be overlooked in this prevention work and I do know that lead poison can be prevented to a very large extent by constant observation and perseverance.

DR. LEONARD GREENBERG: I was called in o na case in New Haven Connecticut: a plant in which they were making a rubber compound for the tops of automobiles, and it developed after examination, after blood examinations, that there were six positive cases of lead poisoning. I don't think they employed over 25 men all told. We went to the plant and looked it over and found, much to our chagrin, that from the mixing of the compound there was a great deal of dust in the air. The compound batch was mixed up and put in a box. One man shoveled a little in the mill, then another, and it was mixed 10 or 15 times before it was finally put into the rubber. They were using litharge and petrolatum.

For this particular type, where they use litharge and petrolatum, it might be a good idea to take them out into a barn or a place out in back of the plant and have one man mixing up litharge and petrolatum in given proportions so that in weighing out a certain amount of these the proper combination would be had in the final batch. We did that. We found we could mix 10 parts by weight of litharge to one of petrolatum. This man who was provided with a respirator, mixed them and then the batch was brought into the mill room in the form of a substance looking like a salve or butter. When he added that to the compound he took a metal scoop and weighed out a certain amount of the mixture. By this method it could not be distributed into the air and we found that got around the lead hazard in that plant. We

published that in the weekly reports of the United States Public Health Service some time in June. We realize that this will usually apply where petrolatum or some similar substance is used.

Dr. Wright on Lead Poisoning

DR. WADE WRIGHT: (Assistant Medical Director, Metropolitan Life Insurance Company, New York City): The problem of the prevention of industrial lead poisoning doesn't seem to be a difficult thing in spite of the fact it is constantly the cause of a great deal of trouble. It is expensive trouble.

You are dealing with the problem of a source of lead and, also, with its reception into the body of an exposed workman, of how you can abate the source, and if you can, by using the best available knowledge, carefully supervise the exposed worker the prevention of lead poisoning becomes a relatively simple thing. The control of the source of lead is essentially an engineering problem, as a rule. That is, it is a mechanical problem. Lead, practically speaking, is taken into the human organism by inhalation or by ingestion—you breathe it or eat it. Some of the lead you breathe gets into the upper respiratory tract which combines with the alimentary tract and is swallowed, but some of the breath which is breathed in reaches the lungs.

Though it has been more or less acrimoniously discussed by the medical profession as to whether lead by ingestion or inhalation is the more dangerous, I don't think there is any doubt that lead is more, much more, dangerous, more quickly absorbed when inhaled than when ingested and that is important in lead poisoning. Lead taken in by the gastro-intestinal route is transported quickly to the liver.. That has been demonstrated by a very painstaking research in recent years. It is transported to the liver where it becomes bile, and is eliminated with the faeces. Some of it slowly reaches the blood stream and it is the lead in the blood stream which does the damage. If lead is stored one place in the body it is harmless for the time being. Lead inhaled is quite quickly sent into the circulating blood. From the circulating blood much of it goes to the bones and skeleton of the body. That has a very important practical bearing—it isn't a matter of laboratory research.

I don't believe that most of us have ever realized, even though we have read about it, how toxic lead can be. Traditionally, the minimum toxic dose is somewhere between one and two milligrams a day over a period of several months at least, sometimes of shorter periods.

I made a study about a year ago on lead poisoning from domestic water supply and we were dumbounded to find that, in questions of lead poisoning, it was produced in many people who were ingesting one-tenth of a milligram a day over fairly long periods, up to say three years, and if that analysis can be carried into industry, granting that lead in water is in a different form and taken under different cir-

cumstances, it leads one to believe that small amounts of lead can, in susceptible individuals, sooner or later prove toxic. Lead can be taken in in small quantities, be stored in the bones and subsequently, owing to one factor or another, be released and put into circulation and there exert its toxic effects.

The factors bringing about the release of lead from its storing places in the skeleton are not thoroughly understood but it seems it bears a definite relation to the calcium metabolism, and with the outflow, putting it rather figuratively, lead is carried out.

Old Milk Treatment Theory

It is quite interesting in this connection to realize that the old traditional treatment of the lead poisoning of drinking milk really increases the flow of calcium toward the bone and while it didn't do the thing we thonght it did, neutralize the hydrochloric acid in the stomach, it produced the toxic effects at the time over which the milk was taken in. What brings about that release is difficult to tell. We can release lead from its storing place in experimental animals and experimental human animals, by pushing up the hydrochloric content of the blood through phosphoric acid or through giving ammonium chloride or sodium bicarbonate and withdrawing lead in large quantities through the excreta. You can push it up by giving milk and binding the lead. So you can release or bind it at will.

I wish to emphasize also the matter of individual susceptibility. It is a nice blanket term covering ignorance of subtle factors which make one individual susceptibile and another apparently immune. It may be that is closely identified with dietary habits. It is possibly related to a great many other habits.

The problem then is twofold: (1) The control of dust at its source, the control of lead in any form at its source, and (2) the medical control of the individual. There seems no justifiable reason why physical examinations conducted by men who have endeavored to acquaint themselves with the early manifestations of lead poisoning cannot detect most slightly poisoned individuals very early in the course of the disease.

The period, the interval at which periodic examination should be conducted, can be determined in each establishment. A rough statement would be, intervals of two weeks, and if that is excessively often it might be lengthened out.

The value of an initial examination in relation to this is in order to have a base line, in order to have a starting point.

The individuals to be examined in any large plant, employing men in various departments, should be examined quite carefully, bearing in mind the question of exposure. Quite often, in the establishment, men who are not actually engaged or are considered to be free from

exposure are endangered. They may be working adjacent to lead and be as exposed as the men who are handling it.

For instance, in a rubber establishment the calenders are in the same room with the mixing mills. A very interesting case was that of a man using a churn. The place was orange with litharge. The insurance man said this man was not handling lead at all and that was perfectly right. The question of whether there is any poisoning from compounded rubber is a difficult question to decide. Practically speaking, it is certainly of little importance.

Scientific Honesty in Medical Diagnosis

There is one element concerning the medical profession upon which I shall dwell for just a moment and that is scientific honesty on the part of the physician concerning his criteria for lead poisoning. I have encountered physicians who will say, "Oh, yes, this fellow has constipation and cholic—I don't call that lead poisoning." The man has to writhe on the floor before he has lead poisoning. It is very important to recognize that a man is poisoned though he may not be exceedingly poisoned. Only as you admit he is poisoned can you act in the interest of that individual. If a lead poisoned workman can be put under competent treatment, it is rarely necessary to transfer him from the work he is doing provided the work does not present a gross hazard.

In other words, a man under treatment can eliminate lead and stay in the work he is doing without injury. I have not recommended men transferring in these cases and these men have done exceedingly well.

I don't know whether you are at all interested in the question of diagnosis but I shall very hurriedly mention the outstanding diagnostic features of lead poisoning as they come to my attention. The first one is pallor, which is characteristic. It is a peculiar greyish pallor which is disproportionate to the hemoglobin. Loss of weight is quite striking; loss of appetite, a general loss of punch. A man says: "I have not been feeling right for the past two months." He knows something is wrong with him. He may have a backache, low lumbar pain; pain in his muscles along the spine above the secrum. He may have muscular pain in the arms or legs, about the joints—it is a peri-arthritis. Headaches are common. An interesting symptom is the dulling of mental faculties, an early loss of memory. A man may make such an expression as this: "I found when I went to the store I forgot what my wife told me to get." Constipation, of course. That is a common complaint. Belly pains are exceedingly characteristic in lead poisoning and I should like to call that to your attention. If you ask a man with lead poisoning about pain in his belly he will say: "Yes, I got pain in my belly," and he will bring his hands down to his abdomen. There are few conditions which cause that pain and it is

exceedingly lead poisoning. In cases where you do not suspect lead poisoning you will find the workman suffering from belly pains. Epigastric pain is found associated with vomiting of an acute type. Vomiting is not common in lead poisoning and neither is loss of appetite although they are put down in the list. I don't think it is striking as an early symptom. Muscular weakness is a very common occurrence and weakness of the extensor muscles of the forearm is found in a great many cases, long before typical wrist-drop comes on. You can learn how to judge it as you look at his physique and determine how strong his muscles should be. It isn't difficult, you soon learn to size a man up and you learn that a slender man who is a lightweight couldn't possibly have the power that a big husky type has—it is a crude determination, but it is very helpful.

I don't question you can get a dozen doctors that swear about the lead line but a lead line has to be sought for carefully. You cannot take a man and say, "No, he hasn't lead poisoning, he hasn't a lead line," you have to crawl into his mouth, as it were. You cannot say he hasn't got it until you examine his gums. You must have a good light and then, often, you will find where the lead line was quite invisible to your eye that it is perfectly discernible. You know there is no question about it. It is either my hand is up there or it is not and so it is with reference to the lead line. You can say what it is in every instance if you have a lens and a good light.

Some Results of Diagnosis

In a study of seventy-five cases out of six hundred and twenty-five definite cases of lead poisoning, sixty-four per cent had muscular weakness, seventy-three per cent had a lead line and sixty-six per cent had stippling. Stippling in the blood can be found by carefully searchin. In two-thirds of the cases of lead poisoning, the presence of lead in the stools is of great importance in following these cases and getting confirmatory evidence of an objective character. In cases in which it was found, lead was found in the stools.

Lead may have a through ticket from the mouth, but it is probable the lead was taken up by the liver and subsequently created with bile to pass to the blood stream.

The question of control at the source I can only touch upon and others could do it vastly better than I. It is very often a question of exhaust plus other mechanical devices such as shoots. It warrants the most elaborate construction possible. The use of bag separators is important where dust is in abundance. Downward exhausts may be used. Respirators are of enormous value. The respirator used by Dr. Wood at the Willard Storage Battery Company I certainly commend to you. I believe it to be the best respirator I have ever seen. It uses gause pressed between two forms and that gauze is frequently changed.

The use of clean clothing, the frequent changing of underclothing are, of course, things which commend themselves to you in extra hazardous processes. I would advise you that you can't lay too much importance on the finger nails of the working men. They should wash their hands before eating and they should have a place to eat apart from the workroom. This is important, he should not be permitted to eat in the workroom.

I don't like the idea of chewing tobacco. I have a recollection of a man covered with litharge who put enough lead into his mouth with the tobacco to last him for two months.

The important question I think you will find comes down to the medical control of your exposed worker and if this is done carefully and thoughtfully and sympathetically the workman will not be antagonistic, he will like it.

Regarding the disposal of compensation cases, I should like to publicly proclaim they should be adjusted on their merits. Many, many a bad precedent is set because it was cheaper to settle than fight it out.

The lead fumes problem is a difficult one and here again is a case of snap judgment, which is condemned. What is a fair case? Lead oxide draws about lead pipes and is very common. It is dumped on the floor and in a short time lead oxide is flying in the air.

The question regarding the men using a yellow ink could be settled by a careful consideration of the facts in the case.

I missed somewhere in my notes a statement which I wanted to point out with regard to all these questions of lead poisoning, and that is the possibility of lead poisoning from some other source. You spoke of the spray painter who was using an iron oxide paint and said he had lead poisoning. He may have had lead poisoning, the lead was charged, but we don't know who did it. Lead poisoning is quite common. This is true where lead pipes are used for domestic purposes, you find lead poisoning in considerable amounts.

Lead in Home Made Liquor

Lead from hootch which is distilled by Poles or Lithuanians using a lead coil instead of copper. You find large quantities of lead in these cases. You find them in making homemade wine. The first sample showed 160 milligrams of lead per wine glass. Litharge was used to stop the fermentation of the wine and it may be that lead in some form is being used. It may be that tartaric acid is acting on the lead in the enamel.

Be that as it may, there are scores of cases of lead poisoning from hootch or wine. That should be included. If you would throw the fear of God into your patient you could overcome this condition but if you do not stop him he will continue to poison himself.

Of course I don't know anything about the question of the linotype operator. That isn't an uncommon thing. I know they skim the dross off the floor with the diminutive shovel and sweep up the little pile of lead oxide while passing from one machine to another. Arsenate of lead does produce lead poisoning and sometimes very quickly because of the dust around where they are packing it.

I will not take up all of these questions. All I can do is guess, but they do distinctly illustrate the possibility of bringing perfectly definite, concrete facts to serve the company. Most of them can be settled. Sometimes they will be settled with an element of injustice, but after all the best we can do under compensation insurance is to make a crude administration of the justice, giving the benefit of the doubt to the worker.

A man sandpapering wagon spokes in a wagon paint shop had lead poisoning. The evidence was accepted. He was a Pole. He could speak English. I have talked with him for many hours. I said, "How are you, John?" He said, "I feel like Hell." I had to drag him in behind closed doors before he continued. He said, "I feel like Hell," as one word. This man had lead poisoning. He had a pre-existing hernia. The only work we could give him would require an operation. He was in no condition to be operated on. However we did rehabilitate him. We taught him other work. We taught him to stitch for a year or two. I had a nurse working for me who had taken care of this man. She was having her tonsils extracted in another hospital when who should fall through the window but John Bonvitsky, taking in the awnings. She had spent two years trying to rehabilitate him.

The question of wet sandpaper is being received enthuiastically by the painting trade. The painting code was passed in Massachusetts a few weeks ago. The master painters said, "dry sandpaper should be prevented." They are all for it.

Referring to the matter of treatment for lead poisoning, I should like to mention active bowels are important, active kidneys are important. After considerable experimental evidence in the laboratory we found epsom salts did not clear out the lead. The most efficacious agents we have found so far are phosphoric acid, ammonium chloride, and much more completely, sodium bicarbonate.

ADJOURNMENT.

Construction Section

September 30 and October 1, 1924

W. F. AMES, Chairman
Manager, Insurance Department, McClintic-Marshall Company. Pittsburgh, Pa.

C. H. ALMSTEAD, Secretary
Personnel and Safety Department, Dwight P. Robinson & Company, Inc., New York City

TUESDAY MORNING SESSION

CHAIRMAN AMES: We will now have the report from the chairman of the bulletin committee, Mr. E. C. Harding of the Ferro Concrete Construction Company, Cincinnati, Ohio.

MR. E. C. HARDING (Ferro Concrete Construction Company, Cincinnati, O.): We have had at least one and sometimes two Construction Section bulletins in the *National Safety News*. Some of them have been very good, and some not so good. I want to say for the benefit of the new chairman of the bulletin committee that the members of the section ought to co-operate with that committee because it is very hard to find suitable material for photographs, sketches, or whatever medium is used.

We had an outline worked out for, perhaps, 30 subjects for bulletins. Of that 30 I know it was impossible for me to get photographs or any sort of pictorial matter for the bulletins. It would be a very good idea for the new chairman of the bulletin committee to send out his subject matter to the membership-at-large and ask their co-operation. I think we will get more of a variety of bulletins perhaps than we have had in the past.

CHAIRMAN AMES: I think Mr. Harding's suggestion is a good one. Any one who has had experience on the bulletin committee knows what sort of a job it is. It is the hardest thing in the world to get members of the section to submit ideas and photographs suitable for bulletins. I want to ask any of you if you have any ideas, any photographs or anything that can be used, make it a point to send them in to the new chairman, or to the chairman of the section, or the chairman of the program committee when he is apointed. You certainly will be giving a lot of help if you will do that.

ADDRESS OF WELCOME

J. L. Obier, Building Inspector, Louisville, Ky.

Thirteen years ago a few people gathered together and conceived an idea they could benefit their fellow-men by the interchange of safety ideas. It was thus that the National Safety Council was formulated. Today, we who have benefited so much from their work have come together to carry on the great work they started.

We are not here so much to give honor to the organizers, however much we respect and revere them, as we are to express our belief in the ideas they believed in and have struggled for during the last 13 years.

The seed planted in the first Congress has not only sprouted but it has reached maturity and now is bearing fruit. The principle was so sound and logical it spread like wild fire, until today we find everyone from kindergarten children to miners down deep in the bowels of the earth reaping the results that were sure to follow from such an undertaking.

It gives me much pleasure to welcome you here to Louisville for this grand occasion, and you can be sure that the keys of the city are placed in your hands during your stay here.

Louisville has become nationally known in the last few years for her conventions and hospitality, and we want you to feel that anything is yours for the asking while you stay with us.

SAFETY NO LONGER A MATTER OF CHOICE

William F. Tubesing, Wm. F. Tubesing Company, Milwaukee, Wis.

The safety movement in our city is no longer a matter of choice, it has developed into team action of the keenest minds of all the industries of Milwaukee. It has developed to the point where an operating board meets regularly each month, developing the best methods of procedure to be used in our general monthly meetings and working to a climax to our annual banquet. Any person seeing 5,000 foreladies and foremen gathered to urge each other on to greater things in safety work would be stimulated with a fervor for this work that would never leave him.

Inspired by this enthusiasm to do work for my fellow men brings me here so that I can instill in you gentlemen an enthusiasm in this wonderful work.

It may not be possible for me to make the blind see, the crippled walk, or to restore the human being invalided through gasses or poison fluids, but may I not urge you to renewed efforts both for accident prevention and the reduction to a minimum of occupational diseases, so that your fellow co-laborers may be spared forever the pangs of any of these calamities.

There is no longer a choice in the safety movement; I believe the men doing their mite to make the safety work successful are in it for the love of keeping homes free from sorrow.

We are doing in our little way what Jesus did for all of us and if we are just a little bit more successful in keeping Molly or Kate or John or Bill on the job we have reason to feel a divine joy.

But the results of safety work are not only fewer disabilities. My friends, the crying need of this country today is economy. If we will do our share in accident prevention we will contribute to the economic welfare of our fellow men.

Savings Effected Through Safety Work

As a concrete example of this work I wish to present a few salient facts developed by our mutual companies, which show that safety work is not a matter of choice, but a vital necessity in construction economy.

In 1916, before all contractors were bending their efforts to keep down accidents, the compensation rate on carpentry was $2.00 per hundred dollars of payrolls.

Now in 1924 when everything is costing you twice what it did in 1916 your compensation cost is less.

In 1916 the death claim was $3,000. Now it is $5,800, but in spite of this the rate on carpentry today is $2.36 and so it is in all the other classifications of the construction industry.

In our state in 1920 there were 16,246 accidents; in 1923, there were 20,941. Medical aid amounted to $569,571 in 1920, and to $924,032 in 1923. Total indemnity was $1,970,513 in 1920, and $2,794,998 in 1923.

Now what would this mean, if you could reduce this by one-half through able safety work?

The sum of $1,397,499 would build 20 four-room schools in your state, lay 60 miles of concrete roads, give 400 men a home of their own to live in, start 40 average community factories, or build five of the best State Normal schools.

You owe it to the well being of your family to be in the safety work. You owe every effort you can put into it to your fellow workers. You owe your community through organized effort a newspaper free from columns of accidents each day. You owe your Maker a prayer each night to keep you steadfast in this great work.

Managerial Interest Saves a Life

But let us get closer to home. In my own company I know of three men whose lives I helped to save; here is one of them:

Julius Priegel scratched his hand, just a small sliver scratch. On my visit to the job I asked where he was? My foreman answered

that he was at home on account of his hand. I immediately went to his home; Priegel had gone to the doctor near his home, the doctor had made a casual examination, told him to go home and put the hand in hot water. But what happened to Priegel? He had passed a night of torture; the poison was going up his arm. His family, when I told them he must go with me, at once got up in arms against me. With all this occurring I confined myself solely to Priegel. I told him if he wanted to lose his arm or cash in, he could stay where he was. He finally decided to go to the hospital with me. We had a hard time saving his life, but the treatment of the company's doctor finally won out.

Here is an instance to show how persistent we must be in this work. Here is the best argument why your men should be treated by the company's doctor. Here are the cold facts that the best first aid is the cheapest for you. Control of these things will lessen fatal accidents and bring about lower compensation rates.

It would not be well for me to pass this subject without calling attention to the salient money getting features.

1. Increased efficiency of the men.
2. Promotion of loyalty and co-operation.
3. Reducing labor turnover to a minimum.
4. Increasing production.

The obtaining of any of these four is worth the effort.

When the protection of the mechanical equipment on the job has been thoroughly done, when the scaffolds, ladders, and ropes have been properly inspected on each job, when all openings are properly barricaded, when the foreman has instilled in each workman the value of safety work—then shall you all reap the fruits of this work in lower rates and the personal satisfaction that you have done something for the other fellow, for, in the long run, the other fellow is very close to you and your happiness depends on his happiness.

MUST WE BE FORCED TO ADOPT SAFE PRACTISES?

C. C. Hieatt, President, General Construction Company, Louisville, Ky.

We established years ago a safety program of our own, which was a matter of educating the superintendents, foremen and carrying it on down to the employees. Our accident record is way below that of any other contractor in Louisville, doing the same amount of business. I am not saying that boastfully, but just giving you the information my superintendent gave me. We have had a very splendid accident record. We have had only one death in the last 12 years, which was a case of a carpenter who fell off the roof of a house. It developed he had some infection of the heart. It was fair to assume he probably had had an attack which resulted in his falling.

We have had only one case in the last five years growing out of a claim of defectiveness. That was the case of a negro employee who had climbed up on a concrete mixer and caught his foot in the gear. Our accidents have been decreasing every year and we are very well satisfied with the record.

This is the first time I have had the pleasure of attending a Safety Congress, and I want to assure you men that the program yesterday was full of inspiration for me, and it was full of suggestions, and I certainly am glad there is an organization of this size and this scope which is pushing forward the safety program.

Why is this program of special importance to our business, to the Construction Section? Construction pays the highest rates of any industry. Construction, in my thought, is just now at the beginning of an era of expansion and prosperity that will lay in the shade any period through which we have passed.

There is every reason why the construction business should take sharp thought on the safety program and on this safety problem. The problem is not the problem of the big contractors, but the problem of the small man who can not employ a safety engineer, but must do the work himself. He has a thousand and one other things to think about and it is difficult to get his interest, but if you can get the story to him I think he can very easily be sold on the idea, that if he does not adopt safety it is only a question of time until somebody else will have his business. Just let's draw a picture of two woodworking establishments in the same town making the same products, selling to the same line of customers. One is in an old frame building, 40 or 50 years old, with loose floors, antiquated machinery which they are trying to wear out. They have an accumulation of offall and shavings. They are penalized in fire insurance, and they pay a rate of seven or eight per cent. There is another factory with modern fireproof structure, with all up-to-date machinery and equipment, blower system and everything they need. They get a low insurance rate of maybe one and one-half per cent.

Safety Undersells Indifference

The one concern pays the maximum liability rate and the other gets credit on their rate, probably paying one-third or one-half what the other one pays. Who is going to get the business? Who is going to be able to undersell? Why, it is as plain as day. The concern without the equipment finds out the business is going down, and it would like to lay off some men. It hasn't got enough business and it wants to lay off the worst men, but it finds it has to keep the worst men because the best men are going over to the other factory where they have decent conditions under which to work. So the process is multiplied. The loss has become greater and the concern has to go out of business.

Is there any essential difference between that business and the contractor who does not keep his equipment up, who does not keep the

working spaces cleaned up, who does not educate his superintendent or foremen, who does not drill his men on the essentials of safety, and the contractor who does give thought to those things, whose men appreciate the fact he is taking care of them? Who has the choice of the best and efficient workmen?

Isn't it just as sure as anything in the world that the man who does not pay any attention to that will reach the time when he can not successfully compete with the other man? I say that those economic laws that work with terrible exactness will drive the man out of business, who does not make the working place safe for the workmen. All we have to do is get one concern in the town which will practice safety along approved lines, and their practice of it, I think, will in the course of time either make all other contractors practice it, or will put them out of business. We should not wait until laws are passed compelling the adoption of safety codes and safety principles. We owe it to the men who work with us, who are partners in the building of our fortune to see that these things are done, as a matter of common sense and common right rather than as a matter of compulsion under the law.

This matter of safety is not a new thing. although I have often thought it was. Self-preservation was the first law of nature. It was a strange thing. The science of safety is one of the newest which we have. But old Solomon who lived a good many years ago said, "Happy is the man that findeth wisdom. and the man that getteth understanding: For the merchandise of it is better than the merchandise of silver, and the gain thereof in fine gold. My son, let not them depart from thine eyes: Keep sound wisdom and discretion: then shalt thou walk in thy way safely, and thy foot shall not stumble."

We all know that no accident is intentional. Ninety-nine per cent of them are the result of sheer carelessness. Eternal vigilance is the price of safety in the work, but the men who employ, the men who manage are the men who should initiate safety, the men who should see that it is carried out to the farmost ranks of the organization, and should see that it is kept at so insistently and persistently a man cannot forget it is his duty not only to protect himself but those who work around him.

Workman and Manager

I have a couple of short verses here which I think fairly illustrate the point I am trying to make of the duty of management. I started to say a while ago that the safety proposition is a young one. We should not lose hope because so few contractors in Louisville particularly, I believe. have any regular safety program, because I am always cheered when I think of my own shortcomings, and I think of how short I fall from the things I planned in the accomplishment. There is a lot of wisdom in the saying of the man who said, while we are green we grow; when we ripen we are rotten. If we realize we have problems we are going to work to meet them. We are going to accomplish something.

I am going to close my talk with these two verses:

"Work!
Thank God for the might of it,
The ardor, the urge, the delight of it—
Work that springs from the heart's desire,
Setting the brain and the soul on fire—
Oh, what is so good as the heat of it,
And what is so glad as the beat of it,
And what is so kind as the stern command
Challenging brain and heart and hand?"

"Back of the beating hammer,
By which the steel is wrought
Back of the workshop's clamor
The Seeker may find the thought—
Back of the motor's humming,
Back of the belts that sing,
Back of the boilers drumming,
Back of the cranes that swing,
There is the eye which scans them
Watching through stress and strain,
There is the mind which plans them
Back of the Brawn—the Brain!"

There you have on one hand the workman and, on the other hand, the manager. When you get them to join hands and work in harmony you have solved the problem of the present day. And I say there is no phase in the relationship between capital and labor, there is no point of contact between the manager and the men that will bring them together in a finer spirit of harmony than this safety program which lets the workman know that the man up above is interested in their well being. He wants things to be right for them, and he wants them to have a chance to do their work under proper conditions and to achieve that happiness which is due them.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN AMES: I will appoint as the nominating committee: Mr. L. D. Woedtke, Fred T. Ley & Company, Springfield, Mass., as chairman.

Mr. C. H. Almstead, Dwight P. Robinson & Company, New York.

Mr. F. L. Hurlbut, Patent Scaffolding Company, Chicago.

THE VALUE OF COMPARATIVE ACCIDENT STATISTICS

Round Table Discussion Led by C. H. Almstead

MR. WOEDTKE: I will say this on the matter of statistics; you fellows who don't take the time and trouble to keep your records on this uniform

standard basis we have adopted for the past several years are losing a big bet. You may think you know what is going on in the company, and you may think you know all about the accidents, but I am going to tell you you don't. And I defy any man in this room or any man in these United States who doesn't keep accident statistical records to show me how many accidents he has had and how serious they were. He would say, "Sure we had a man killed four or five months ago and a couple of years ago a fellow got his foot fractured." But if he goes and asks the insurance company he will be amazed to find out what is going on in the business and what is costing him his money.

Getting away from the angles Mr. Almstead has set forth in his paper and coming back to the all-important matter of keeping a foreman and superintendent intercsted in accident prevention, I find each month when we compile these statistics and put them on paper, if we send a master sheet of all the attendance on one sheet and send a letter with it to the superintendent along these lines: "There is no need of praising you or censoring you for what you have done. The sheet herewith speaks for yourself. Look up your own records."

If he happens to be a tough egg who won't pay attention we call his attention to his own record of the past month, past three months or past year. About every three or six months I generally frame up a letter and have the head of the concern sign it, where he tells him he has come to the point. in judging the value of the superintendent of the company, he. the head of the concern is now weighing the accident record along with the production record of the superintendent. As soon as he gets that letter he will come in with red in his eyes and fight in his fists and demand to see the record. "I am not as rotten as all that."

"You go get the reports and fight it out."

He will say. "You won't find me down at the bottom of the list next month."

I don't want to use any more time, but I do want to say it has been my experience that one of the best things we can do outside of bulletins there are one hundred and one other stunts we can use. I think the best thing to do is to show the man exactly where he stands every month, not at the end of the year. and if it will be of any help to you I will be very glad to send you a sample set of the forms we use. They are different from the standard forms we adopted two or three years ago.

CHAIRMAN AMES: The uniform accident statistics for the construction companies are issued by the National Safety Council now and are available for any member of the Council.

MR. WOEDTKE: The A. G. C. is working with us on this problem.

The regrettable thing from my angle is there are so few contractors keeping the record. It isn't enough for me to know my outfit is better this month than they were a year ago. It isn't enough for me to know that. What I want to know is how good or rotten we are compared with

our competitors and other contractors in the game. I send my stuff down to Almstead of Dwight P. Robinson & Company.

If you will look in the *National Safety News* about twice a year they run the combined boiled down results of the statistics which come in by section, and they have key numbers so you don't know what firm it is. You know your own number. All we have been able to get compiled for the last two or three years is about six or seven contractors' results. Some of you fellows here maybe are afraid to go into the thing because you think it is too much work. Perhaps you think you have to hire a statistician expert or safety engineer. You don't have to do any such thing. Any bookkeeper or clerk who has average intelligence, in your outfit can take the records and compile them. You have to have the accidents reported. You have to report the accidents to the insurance company or keep the information yourself. If you simply follow out the rule of thumb in the safety pamphlet, which is nothing but the plan we have adopted for this section, you will get in line, and it will give us a chance to compare you with us and us with you.

MR. PARIS: (General Builders' Association, Detroit, Mich.): I might go a little bit farther than what Mr. Woedtke has said and say anybody who has the forms which have been adopted within the past seven or eight years by the National Safety Council and the A. G. C. can turn those over to the person in the office who takes care of the accident reports and simply post them up accident report by accident report in the proper column, and at the end of the month it is all done. If that can be sent to the big boss' desk he will soon get the idea of safety because he will realize if he doesn't look after it it will choke him to death.

MR. WOEDTKE: Mr. Chairman, you fellows who keep records have arrived at a bogey for severity and frequency. Some of you have probably gotten to the point in following up the cement bags being worth ten cents apiece, you keep a check on the job and if the superintendent has an abnormal shortage you give him the air. After you have done it a while you probably decide you ought to allow the superintendent four per cent of the cement bags. You call it a bogey. Any of you fellows who keep records have gotten to the point where you have arrived at what is a reasonable bogey, or permit the superintendent to have a certain per cent for frequency and severity.

MR. PARIS: We have done that for eight years. A bogey is 1000 with us, just the same as it is in the baseball score. We print and distribute to each member of the General Builders' Association two scores, a severity score and a frequency score. The nearest he gets to 1000 is good.

MR. WOEDTKE: How much are you willing to allow him? You can't depend upon them not having any.

MR. PARIS: We let them be as nearly perfect as they can and work to the point. Perfection is what we are trying to get and the closer we get the better we are satisfied and have closer co-operation.

MR. WOEDTKE: I will cite an instance in my own case: I have on the walls of my office a master sheet for the year. I have been doing that each year for the last several years. I take the whole group and go over all the jobs and man's working hours. Suppose I arrive at the fact there is three per cent severity per thousand working hours and one and one-half per cent frequency, then I can say to the men, "You are running way above the average," or "You are down below and doing well." Have you fellows gotten to any point where you have decided what is the average frequency or severity rate of accident you are willing to allow the men? If you haven't, that is one of the things you can work out.

We carry an average in each monthly report, a total average for the year, and the man looking at his monthly report can see whether he is above or below the average. Of course, the average varies from month to month. We can't very well have a fixed average.

MR. W. F. AUSTIN (W. E. Wood Company, Detroit, Mich.): I don't think you can make allowances on frequency reports. A frequency report is simply the number of accidents which occur as indicated by the report. To put any premium on the frequency or make allowances on the frequency, would be very apt to choke up the reports. In other words, if you set up an average that was allowable for frequency it would be very easy for some time-keeper or some clerk, in order to hold to the average, to avoid reporting some accidents, which is one of the hardest things we have to contend with, the delinquency of the men on the job in reporting minor accidents which, in their opinion, may never amount to anything.

I wouldn't advocate at all making any allowance for putting any premium on the least number of accidents reported.

MR. SMITH (United Casualty Company, New York, N. Y.): I think one of the big points you people haven't brought up yet in the value of the statistics is the effect on your insurance. I know from the insurance standpoint one of the best ways we can judge the effectiveness of your safety organization work is through your statistics. Many of you larger firms are self-insurers. Many of you probably carry with other companies, stock companies and mutuals. But in experiencing a risk it is absolutely necessary that the statistics of the previous insurance carrier or the statistics of the assured, themselves, must be considered.

If we go to companies and they can show us actual records for the past three or four years we are better able to determine what their rates shall be. I know your Construction Section has been trying for two or three years now to have your risk merit rated, the same as factories. Up to this time it has been unsuccessful. Perhaps when the new code is completed it can be done. You have always been experience rated. Accident statistics are of more value to the insurance company than anything.

MR. MCMULLEN: The way we have tried to operate, particularly this year 1924, is to take our 19 members and call on the two or three

who have the poorest score each month and say, "What do you think is going to happen to the insurance rate unless you get back in line?" Of course, the other man doesn't need any encouragement. Instead of establishing a par or allowing them so many accidents it is a proposition with us of jacking up the man who is at the bottom, trying to get him up in line.

MR. AUSTIN: Right on the subject of the standardizing of statistics, I wonder if it wouldn't be well to have everybody understand that work has all been done by the National Safety Council and it is part of the service that the National Safety Council has to offer to its members, and I think it should be emphasized because that is probably the most important part of the service we have.

MR. M. C. GOODSPEED (General Electric Company, Erie, Pa.): A large part of our work is manufacturing. We also maintain a force of constructors. We have about 300 men altogether and we do some of our construction work as well as maintenance work.

The study of the minor case hasn't been touched on here this morning. I have been making a little study of it, and I believe it means more than we thought it did. We have been studying mainly the major cases which caused so-called lost time, but I believe if you will study your minor cases from the scratch up to the cut which still allows the man to go back to work but maybe incapacitates one arm, but is called a minor case because he goes back to work, you will eliminate potential serious cases. A minor case is potentially serious and you will be able to eliminate them before those serious cases actually occur. I believe the study of the minor cases by groups and departments will be very profitable.

WEDNESDAY MORNING SESSION

HOW CAN I ESTABLISH SAFETY?

W. F. Austin, President, W. E. Wood Company, Detroit, Mich.

We have heard of the necessity and the desirability of this work from the previous speakers on the program and assuming that the "I" in the topic assigned refers to employers in the construction industry, we may proceed by considering the matter from two different angles with the earnest desire that what we shall do here and what we shall say will be of value in establishing safety work more generally in the construction industry.

First: To establish Safety it is necessary to sell the idea to the principal and officials of your company. This has been done very largely and is being done by the National Safety Councils through their publicity, their Congresses and their campaigns in different cities.

Secondly: Because safety is a mental attitude and is a matter of instructions and education, eternal vigilance, and a matter of instinct versus reason on the part of those actually exposed to the hazards, let us review some of the things that can be done to educate, instruct and keep before our workmen this Safety matter. In other words, some of the things that can be done to keep the mental attitude as nearly right as possible.

One of the first suggestions that might be made in this connection is to try to get away from the word Safety. Safety is an absolute term, somewhat overworked and does not find favor with the old school practical hard-headed construction man whose experience and training has taught him that in construction work certain chances have to be taken. It might be better to label this activity "Accident Prevention Work." Construction work can rarely ever be carried on with total safety, but no one will deny that prevention of accidents on construction work is desirable and practical from every standpoint and your hard-headed practical foreman and sub-foreman, at least some of them, will listen to arguments in favor of accident prevention with more patience and less prejudice than to arguments on Safety.

Another requisite for the establishment of Safety or Accident Prevention Work is to get a report of each and every accident so as to be able to make a study of how accidents are caused and what they cost. These reports should be tabulated by the standard method adopted for this section and the whole council so that comparisons may be made. This matter of reports is important as they furnish the facts upon which a great deal of the work must be planned and done.

Third: Accident prevention work in the construction industry can be materially aided and very much exhilarated by close co-operation between insurance carriers and employers. There are innumerable ways in which the insurance carriers can help to reduce accidents. Posters, danger signs, and other placards supplementing those furnished by the National Safety Council can be gotten up by your insurance company and distributed. These, if used intelligently will constantly remind your employees and the public of certain specific dangers on your work as well as indicate generally to your employees the necessity of such matters as precaution in engaging men for construction work, accuracy in making reports, and other very necessary general requirements.

Accident Prevention Committee

Fourth: An accident prevention committee composed of your foremen, superintendents, time keepers, clerks and workmen is another requirement. This committee should meet at least once a month and discuss freely and openly all of the practical aspects of the work, should review the accident reports, make such comparisons as are desired.

Fifth: Some kind of a set of safe practices or code should be prepared, preferably by a group of constructors in your locality or in your

state. This code or set of safe practices should not be too technical, should not be mandatory, but should be very practical and should especially conform with those customs and conditions peculiar to your locality and cover those general requirements that will reduce accidents on construction work. In order to be effective this code should be distributed generously to all of those actually in charge of the operation after which questionnaires on the code should be sent out periodically to those having the work in charge which questionnaires would indicate when answered the familiarity or lack of familiarity with the code. In order to stimulate this activity prizes may be offered to the best answers to the questions on the questionnaire and awards be made to the men. This is one very effective method of compelling your men to think accident prevention.

Unless something of this kind is done there is very great danger that the code will not be read. And the construction industry must take the initiative in this matter before legislation will be passed in a great many of the states requiring a lot of impractical technical highly-detailed and costly measures that will only operate as an added burden to the construction industry and more or less questionably effective as accident prevention measures.

Sixth: Accident prevention work in the construction industry should include a careful periodic inspection by capable impartial trained engineers, usually known as a Safety Engineer or Inspector. This man must be peculiarly adapted for the work in that he must not incur the enmity of the man actually in charge of the operation but must demand his co-operation. His requests must not be arbitrary nor too insistent; for some time he cannot expect to get anywhere near 100 per cent co-operation or results but if he is the right kind of a man and if he has the support and backing of the officials of your company, a great deal of good will result and a great many accidents will be prevented without added expense, inconvenience or friction in your organization. This Safety Engineer or Inspector should be a member of the Accident Prevention Committee and should engage in all of its deliberations and activities and should have a very prominent part in the preparation and the making of the code or set of safe practices for your locality.

Investigation of Accidents

Seven: The more serious accidents and all of the fatal accidents on your work should be subject to investigation by a board of inquiry composed of a few members of your safety committee which board should review carefully and impartially the causes leading up to the trouble and report its findings only in such manner as will tend to prevent and avoid a repitition of the accident. This has been found to be of very great value in accident prevention work.

Finally: What the construction industry seems to require is the incentive or initiative to enter vigorously into this activity. We have

all acknowledged that it is woefully behind other industries in this work but we are very much encouraged by the interest and spirit and vigor of the last year and it only becomes necessary for those of us who know of the necessity and the desirability of this work to continue on and to work hard to convince others in our industry that they should become interested, yes—that they must become interested in this work.

The difficulty up to date has seemed to be to devise a plan whereby the average and the small construction firm can take an active part in this work. It being taken for granted that the larger concerns are able within their organization to engage to a greater or less extent in some kind of accident prevention activities, and it is most desirable that these larger concerns all should come into the construction section so that they may get the benefit of the exchange of ideas and the co-ordination between their work and the work of some other of the larger concerns which cannot be gotten in any other way.

Now as to the average or the smaller operator. It would seem after studying this matter for some years almost necessary that they join or affiliate themselves with some organization which can in turn function through the construction section of the National Safety Council. Let me suggest that in order to engage in this work that the smaller contractors affiliate themselves with some organization, either the Associated General Contractors of America, local chapter, the Builders' Exchange, the Master Masons Association, the local Chamber of Commerce or some other group as it has been demonstrated conclusively that this accident prevention work can be done very much better in groups than individually and the suggestions given here will readily be seen to apply more particularly to the group.

DISCUSSION

MR. D. H. THOMAS (Utah-Idaho Sugar Company): We have a problem out in our country in establishing this safety proposition, which I thought perhaps you folks would be good enough to help me solve.

We have a number of gangs of men in our construction department scattered throughout the two states of Utah and Idaho, and sometimes in the state of Washington. These gangs are sometimes as far apart as 200 and 300 miles.

We have 14 or 15 factories. Each factory doesn't have its gang but these gangs go all over. The foremen, themselves, sometimes are just temporary men working for four, five or six months. The difficulty I find is getting this safety work among these gangs constructing our various beet dumps and canal systems, and things of that sort.

If any of you gentlemen have small separated gangs, I would like to know how you put over the safety proposition with them.

SECRETARY ALMSTEAD: All of these men have to be paid off at a central location. That is where you want to establish a safety bulletin board.

MR. THOMAS: The foremen receive the checks from our office, and he is man who pays them.

SECRETARY ALMSTEAD: Just put a little slip on the check. Play the safety slogan just in the location where they are working.

We can realize your proposition. We have the same thing to contend with. Sometimes our construction project may cover a wide acreage, and we have to post various bulletins and safety signs throughout the whole plant or big operation.

MR. THOMAS: What do you do with the foremen, themselves, who are more or less of the come-and-go type?

SECRETARY ALMSTEAD: We try our best to instill safety into them too. Direct contact is the best there is with your foremen.

CHAIRMAN AMES: On the small jobs you at least have a shack or something of the kind for a time office. You can always post notices there.

MR. THOMAS: We have been printing the safety slogans on small slips which each man receives every day.

MR. H. H. MCGRAW (H. H. Robinson Company): I have exactly the same proposition as the gentleman from Utah. We have the small gangs applying sheets. They are not sheeters, but structural iron men. There may be 20 or 30 gangs working at one time, scattered from the Atlantic Coast to the Mississippi River, and the gang may consist of five men or fifteen. There is only one place they all meet on the job, and that is at the tool box.

The Foreman as Code Unit

MR. AUSTIN: It would seem to me the best suggestion we could make to the two gentlemen, or any one else who has the scattered condition of employment would be to suggest the code remedy, making the foreman the unit. Even though your foreman is a temporary man, even though he is a come-and-go proposition, you hire him at some time or other. You have some kind of contact with him, and at that time he can be handled or sent, or given a set of safety practices which you endorse. Then, from time to time, you can ask him questions by correspondence or otherwise that will develop whether he has read the code of safe practices. In that way, regardless of how widely scattered the foremen are, you can to some extent instill the accident prevention idea into his head, and if he is the man who actually tells the men what to do and actually handles the men, he is the fellow you want to instill with the accident prevention idea.

MR. F. L. HURLBUT (Patent Scaffolding Company, Chicago, Ill.): Safety, if you believe in it, gentlemen, is just as integral a part of your construction activity as efficiency, quality and productivity of the men.

If we grant that, the man to whom your foremen are responsible, whether he be general construction manager or chief engineer, is the man who is responsible for implanting the safety idea, and demanding safe results on the operation from those foremen.

MR. AUSTIN: We in Detroit got interested in the Safety Movement some years ago, and the mere fact that most of the executives in the group are active in the work is obvious for the men, but there is one particular thing on the questionnaire. W. E. Wood Company were about as delinquent in the replies on the questionnaire as any in the group a few months ago, and the man who handled that in our organization came to me and said he couldn't get very far for some reason or other. So the next time the questionnaires were sent out on the accident prevention code, I wrote a letter, myself, to each of the foremen and each of the superintendents the questionaires were sent to. That letter accompanied the questionnaire. It was a plea for them to get busy and show some interest in the work, and we had some answers to the questionnaire. In a general way, in our group, the workmen know, almost without exception, the executives of the company are the originators of the safety activities, and are behind it every minute, from the fact they are active on the safety committee and active all through the work.

Board of Inquiry

MR. BRAMMIER: I would like to ask Mr. Austin when his board of inquiry meets after the accident.

MR. AUSTIN: As soon as we can get them together. They meet at the scene of the accident. They give an opportunity to the foreman or the superintendent in charge to explain how it happened and tell all about it, and defend himself to the best of his ability. The whole procedure is not with any critical intention at all, but it is simply a constructive proposition. It is simply avoiding an occurrence of the same accident on the job.

MR. BRAMMIER: I believe you have a safety engineer working for the organization. Does he make the inspection of the jobs? If so, how often?

MR. MCKINLEY: It depends upon the size of the job. Some of the larger operations, about the time the job is being started, or when any of the jobs are serious enough, we visit them every day. Other jobs we visit once a week.

MR. BRAMMIER: I understand you are all in one insurance company.

MR. MCKINLEY: Yes, that is correct.

SECRETARY ALMSTEAD: Something has been said about lockers and washrooms on the various construction jobs. I don't see how that is practical on small jobs, especially at the inception of the job. You have material coming in on the job every day, and especially at the beginning, the place is in a muddled condition, and where are you going to put

the lockers and washrooms? Who is going to stand the expense? Is it going to be an expense to the safety program? I wonder if any gentleman here have had lockers and washrooms on any actual construction job.

MR. AUSTIN: I had in mind the larger jobs. I realize the impracticability on smaller jobs.

MR. CONNERY; I was referring to larger operations. We even go further in isolated sections by providing a dining room.

CHAIRMAN AMES: It seems to me that is an exceptionally good thought, wherever it can be put into practice. On the larger jobs it can be done, undoubtedly, without any great expense. On the medium sized job the question of expense would be more of a problem, but on large jobs I certainly agree it would be well worth while.

It would seem to me by simply enlarging the size of your temporary time office or adding to it, provisions could be made for washing and locker room. I know it could be done on numerous jobs we have without making it prohibitive, and I see no reason why the cost should not be a cost to the contractor.

MR. CONNERY: I would like to say that in one of the operations we had to provide parking accommodations for 350 automobiles.

CHAIRMAN AMES: Mr. Rosenthal who is on the program for the next paper is unable to be present.

ROUND TABLE DISCUSSION

MR. CONNERY: Safety can be brought about on any construction operation, no matter whether it is a five man proposition or a 1,000 man proposition. by having at least one of those men interested in that work. or who is operating in that work to be enthused with the accident prevention idea, and he. in turn, spreading that propaganda to every man employed in the operation.

That is not guesswork on our part. We know it can be done. On operations we make it a point to have some enthusiasts along the line of accident prevention. and from time to time those men get the other workmen on the operation together in a bunch and talk safety. At times we have noon day rallies.

MR. NEUBIG: (Hammermill Paper Company, Erie, Pa.): I believe some of the contractors when they begin a job don't make any arrangements with the manufacturer to care for any accidents that might occur on the job, or do they have medical attendants placed there to take care of accidents that should occur?

MR. WOEDTKE: The contractor is an ordinary concern and, in a matter of that kind, all he has to do is engage a doctor or hospital. A contractor

can not be expected to carry a doctor or hospital on the job unless it is a whale of a big job. There is no trick at all for any one to make arrangements with some doctor or some hospital, or any one who takes care of accidents *after* they occur.

The thing we want to worry about is preventing the accidents from happening. That is what bothers me. The question of first aid doesn't interest me in this Congress and it doesn't interest me back home.

CHAIRMAN AMES: That is all very good but accidents will happen. My experience has been that it is worth while to be prepared, and when an accident does happen to see that the injured employe gets the right attention promptly.

MR. WOEDTKE: What do you do, treat him yourself or have a doctor treat him?

CHAIRMAN AMES: On every job we start I send a letter to the foreman telling him before the job starts to arrange for medical attention in case of accident. If it is a medium sized job and we are working for a manufacturer in a plant, I suggest that probably the manufacturer has a doctor of his own and that the foreman arrange with the company to use the surgeon and their hospital. If the job is large enough to warrant it I go out myself and select the best surgeon I can get in the vicinity, find out what hospital he is connected with and arrange with the hospital and doctor. I have found it is worth while and worth the trip.

MR. PARIS: There are a great many ways of taking a situation like that. Our way is to have a weekly check-up of all the jobs under inspection and instead of waiting for a member of the association to notify the insurance company what jobs he has in operation and what jobs he contemplates, we reverse that and have the insurance company's inspection department write to each member once a week, and say "The jobs we have under inspection for you are as follows:" (naming them) and it is an easy matter to blue-pencil the list on any completed jobs, and add newly contemplated jobs that will be started next week, at the bottom, and the chief inspector gets on the job quickly, realizing full well, especially with the added names, an accident may occur on the first day, and when he makes the trip he goes provided with a first aid kit, and plants it on the job somewhere.

Safety As a Contract Requisite

MR. AUSTIN: When manufacturers and owners of buildings finally bring themselves to a point where they will consider not only the financial responsibility of the contractor and his experience in training and building, who will give one little thought to the matter of accident prevention, then the condition which the gentleman explains to us will be, to some extent at least, eliminated.

MR. WOEDTKE: In every community you will find the carpet bag contractor who will never spend a nickel. He won't play the game.

He won't join in, and he certainly doesn't know anything about safety, and if you look up his record he is knocking them off left and right. He is bruising and maiming workmen. That matter should be taken into consideration when hiring contractors. It isn't always a question of the last low dollar, but the character of the company.

MR. TUBESING: Mutual companies were created for the purpose of lowering the rates that we pay for compensation insurance, and it would surprise you how the one company sponsored by the master builders of the state of Wisconsin has grown and how it has reduced hazards and thus produced low rates so, as my friend from Louisville told us about his own company making such savings, probably more of you could get together and either, through a few companies and through your organization, form a mutual it will be one way of giving service, and also getting men to think the same way in your localities.

MR. J. W. DALZELL: (Ferro Concrete Construction Company, Cincinnati, O.): That brings up the question of what you are going to do with sub-contractors. If you hire a bunch of sub-contractors you have more or less control over them and you may require insurance from them and you may not. How do you handle the safety work with sub-contractors?

MR. WOEDTKE: We have a local contractors' organization and we had a swell time getting all of the sub-contractors to come in. The sub-contractors just naturally mistrust the general contractors. They think the general contractor has horns and hoofs and won't play the game square and they won't trust him.

We finally got all of the sub-contractors in the city in the contractors' organization and right now we are trying to get to the point (they have a part-time paid secretary) where they will have a full-time secretary and let him do some safety engineering for them. If we can begin to get them to pay some attention to us maybe we will get some results.

The Sub-Contractor

MR. AUSTIN: We have to be consistent. If we ask the owner and the manufacturer to consider the accident prevention item in deciding who shall be the general contractor, then we, as general contractors, must consider the safety or the accident prevention item in sub-letting our sub-contractors. We must differentiate between the man who is absolutely careless in the matter and the man who, at least to some extent, is amenable to suggestions.

MR. BUTT: (Brandt & Detweiler Company, Detroit, Mich.): We had a large wrecking job last spring. We wrecked one-half of the building and started building and then wrecked the other half. The first half we sublet to the wrecking contractor. When we sublet any contract, as it carries such a high premium rate, we specifically ascertain whether the sub-contractor is reliable as far as his insurance is concerned, not only for protection to his men but protection to our men.

On this job three or four different slight accidents happened, like a brick patch falling, or a piece of lumber and things of that kind, which grazed the men's heads and caused slight injuries. We stepped right after them and told them to be more careful.

It is a general rule in wrecking companies to pick up everybody that comes along. They might have one or two men who are familiar with operations of that kind, but the general run are transients. They don't know the business and are careless. There were two or three serious accidents.

In a case of this kind where you have a sub-contractor and a general contractor on the job, irregardless of whether the accidents are the sub-contractor's fault or yours, you are going to get the blame. It states it in the paper or the people around in that locality see to it that you get the blame.

As you know, Detroit has been practically a pioneer in safety practices. We have a group there, as Mr. Austin and Mr. Paris explained to you, of some 19 contractors formed into an association, all under group insurance which is carried by one insurance company, the General Accident Company, which has given us excellent service.

We have what we call a safety code originated under and devised in Detroit, compiled in regular book form under headings and it is for an advisory capacity rather than mandatory. We ask the men to read them. It increases their fund of general intelligence. It is just as good reading as a book on any professional subject. We have these little books in pocket form and we put them around on the job. We have a safety man for each job. His name is sent to the insurance companies, through to the safety committee and that man is held responsible for all safety work on that job. These questionnaires are passed out to foremen, sub-foremen, superintendents and time-keepers. We appropriate a certain amount of money during the year to divide it into four parts as prizes for answers to questionnaires which we send out. We figured we should take the thing slowly and take one thing at a time in order to see that the men read the safety practices and made themselves familiar with everything in it, and the only way to find out was to send out the questionnaire. We offer practical prizes of $50 anywhere down the line to say $15, $10, $5, $2 and $1, also for the best suggestions. If they have any suggestions or amendments to the safety code we issue we give prizes.

REPORT OF NOMINATING COMMITTEE

MR. WOEDTKE: Before reporting for the nominating committee I wish to advise you that, in accordance with the vote taken here yesterday, I sent a telegram to Fred A. Davidson at Chicago, in the name of this section as follows:

"Construction Section in assembly expressed deepest sympathy in your trouble."

The committee has met and considered the three offices to be filled and they feel that the slate you want to consider is for chairman, W. F. Austin, president of W. E. Wood Company of Detroit. Mr. Austin has been an old war horse with us for the last several years and has made quite a lot of contributions to the success of the Construction Section.

For vice-chairman we suggest the name of E. C. Harding, of the Ferro Concrete Construction Company, Cincinnati, Ohio. He, likewise, has given a lot of his time for several years in support of this section.

Against the wishes of the present secretary we talked it into him to stay on the job for another year. Mr. Almstead, as you know, is with Dwight P. Robinson & Company of New York, and has served us very well during the past year, and gotten to the point now where we feel it would be of great assistance to the new incoming chairman and vice-chairman if he would stay with us another year. (The report was accepted by unanimous vote.)

(Mr. Austin took the Chair).

MR. AUSTIN: I certainly appreciate Mr. Woedtke's remarks, not only the remarks but the spirit of the remarks, and I hope you gentlemen will take seriously what he has said because in work of this kind, where the meetings are annual only and most of the work must be done by correspondence, the heartiness of the response and the loyalty of the membership is very, very much of a factor.

I appreciate the honor you have bestowed upon me and I shall undertake to do those things which I can do, but to me this proposition seems to be a problem of extension. The construction industry is not properly represented in this Construction Section of the National Safety Council. There are some reasons for it. There are some sub-divisions that overlap perhaps, but when you give the matter serious consideration you can only conclude with me that the Construction Section meeting should be in a room not twice or three times but twenty times the size of this room, and with that thought in mind the contemplation of this work rather overwhelmed me, and I will need the support and cooperation and help of every one of you members.

MR. HURLBUT: Mr. Chairman, I think it is in order that we submit a resolution of thanks and appreciation to the retiring officers for the work of the past year, and if it is in order I move you that we do that.

(The audience gave a rising vote of thanks to Mr. Ames).

REPORT ON SAFETY CODE

MR. HURLBUT: As chairman of the national safety construction code that has been under preparation for three years, which seems like a woefully long time, I am afraid we are not going to be able to do what we did last year in Buffalo. We submitted the code to the

section in the nature of a public hearing with the idea of getting constructive criticisms and suggestions and not with the idea that the section had any authority to reject or amend what we had done. We took back to our committee, following that meeting, the suggestions and criticisms and our committee, through the year, has met on three occasions and acted on each and every one of the suggestions. The number of revisions which were suggested were quite numerous, and, in view of the lateness of the hour today, it would be perfectly foolish to attempt to review those revisions as I had hoped we might do. I can assure you that no action is to be taken on a code of such importance affecting as it does so large an industry.

It is not the desire of the committee or the sponsored body to endeavor to force down anybody's throat anything which will penalize them to the slightest degree. If we can't get up a code which is workable, which will permit of your industry to be carried on in a perfectly practicable way, we have no right to go further with such a code, and until we have had an expression of opinion from probably the largest represented body in the construction field, The Associated General Contractors of America, nothing is to be put forward in final form.

Through the efforts of several members of this section the aid and cooperation of the Associated General Contractors was solicited, and I am happy to say for the good of the future of this section they have seen fit to cooperate and take constructive action toward definite cooperation both with the National Safety Council and with the Construction Section to the end, I believe, over the next two or three years, this section's growth and its importance to the construction industry is going to be materially enlarged.

The committee, in short, has worked the code up to the best of its ability and we believe the final form is subject to the approval or disapproval of the bodies affected by it.

We acted on every single suggestion which was made. The majority of the suggestions, I am pleased to say, were favorably acted upon.

MR. HURLBUT: I might give you perhaps one more point in connection with the status, and that is, at the A. G. C. Convention in Chicago last year they saw fit to appoint a committee of their own body to work with the construction code committee with a view toward incorporating their ideas and feelings on the subject and that committee has just recently been presented with what we are permitted to call our final efforts to date, and I expect we will hear from them and meet with them certainly within the course of the next few months.

ADJOURNMENT

Education Section

OCTOBER 1, 1924

A. W. WHITNEY, Chairman
Associate General Manager and Actuary, National Bureau of Casualty and Surety Underwriters, New York City

F. E. RESZKE, Vice-Chairman, Cincinnati, Ohio

GEORGE B. MASSLICH, Secretary
Superintendent, Chicago and Cook County School for Boys, Riverside, Ill.

WEDNESDAY AFTERNOON SESSION

CHAIRMAN WHITNEY: The Education Section, as a part of the National Safety Council, is trying to push safety in education. Is it not true that safety is a state of mind and, therefore, peculiarly a matter for education?

Our work, since it has been actively financed, is about two years old. The first year we spent in trying to find out what ought to be done and how to do it. We were very much at a loss to know how to do it, how safety could be taught. We are now at the point where we are rather surprised to find it took so long to find how to do it. The first year was almost entirely a matter of experiment. Some of our people, the managers of local councils, for instance, in the various cities such as you have in Louisville, began to be impatient that we were not producing results. The time was well spent, however, before we apparently got on the right track. The last year has been a year of very real accomplishment, not, of course, due wholly to our efforts, although we have certainly played an important part in heading it up, but the progress is due largely to the rapid development of sentiment.

In fact, I feel like being a little more explicit and daring, in spite of the fact that this is a safety proposition, and say I believe it is a matter of just a very few years before every school that has any respect for itself will contain safety education. I have no doubt that a year from now we will have some backward schools not doing anything in safety, but I don't believe any up and coming school can afford not to have it in its curriculum.

We have pretty thoroughly demonstrated it has a proper place in the curriculum. The back of the problem is distinctly broken; that is to say, from now on it is quite definitely going ahead and cashing in on the work that has already been started. It is simply spreading the idea that has gotten over, and will be carrying the message further and further during the next few years.

We are operating now on a budget of $20,000 a year for this safety education work. We have a staff of three: Miss Arrowsmith, the executive secretary, Miss Idabelle Stevenson, the field secretary, and the stenographer and general assistant in the office.

Our work has been carried on along four general lines: the first is the establishment of actual work in the schools, because we don't want to talk about this thing without getting it actually going. We have come to the conclusion by experiment and actual trial that the best way to do that is not to try to put it into a city all over, but to get one particularly enterprising school with a principal that is really sold on the idea and to put the work in that school first in the form of a demonstration. Then all other schools in the city and in the neighborhood are invited to come and see it. That is a great advantage. The school concentrates on the thing and does the work much more intensively as it has a definite object in view. If it is going to have hundreds of teachers come in to see the work, it has to make a real showing, so it does a thoroughly intensive piece of work under the very best auspices; and, if that goes over, as it always does, so far as we know, it makes it comparatively easy to get the work into the other schools.

We call these schools demonstration centers, and Miss Stevenson has been traveling around, meeting the superintendents, principals, and teachers, and getting these demonstrations started. She has found lots of hard-boiled superintendents, and it has not been an easy task, but it is getting easier all the time: first, because Miss Stevenson knows better now how to handle hard-boiled superintendents; second, because they are getting less hard-boiled all the time on the subject.

Demonstration Centers

These demonstration centers were held during the last year (by the way, Miss Stevenson has stated that 3,000 people, almost entirely teachers, attended these demonstration centers last year and saw the work in actual operation) in Madison, Wis.; Milwaukee; Warren, Penn.; New Castle, Penn.; Chester, Penn.; Bethlehem, Penn.; two demonstrations in Allentown, Penn.; two demonstrations in New York City; Buffalo; Bayonne, N. J.; Worcester, Mass.; Springfield, Mass.; Pittsfield, Mass.; Lynn, Mass.; Boston; Baltimore (two demonstrations); Oak Park, Ill.; Wilmington, Del., and Atlanta.

Demonstration work is at present being developed and will be developed this fall in Central Falls, R. I.; Providence, Saint Paul, in a

parochial school in Milwaukee, Beloit, Wis.; Bridgeport, Conn.; Hartford, Conn.; Newton, Mass.; West Springfield, Mass.; Erie, Penn.; Altoona, Penn.; Terre Haute, Ind.; Somerville, Mass. Then, there are half a dozen more schools in which the matter is pending, and lots of other places which we hope will be coming in pretty soon. Miss Stevenson is mapping out her itinerary, and there are lots of superintendents who would be trembling in their boots to know how near they are to holding these demonstration centers pretty soon. That is one year's work. Besides, there are a large number of cities in which the work had already been established in previous efforts.

It is very important to have these demonstration centers, not only to get the thing started (if we once get a demonstration center, we expect it will spread out from that) but it is also important because you have to have laboratory schools in which to try the thing out. It would be ridiculous to try to push this thing as a theoretical proposition if we did not have places that were doing it and learning how to do it, for there is a tremendous amount of technique in it.

The second line along which we are working, and as a matter of fact, which is even more important in its actual results, although it does not seem so, is the problem of convincing educators themselves, not so much the school superintendents as the people who have control of the educational policy of the country, that this subject belongs in the curriculum.

If we did not do that, this process of getting demonstrations would be a very slow process, just going around picking places off, and it might take years and years to accomplish very much, but if we can get to the heart of the problem and reach the people, for instance, Mr. John Dewey, although, as a matter of fact, we have not tried to reach Mr. Dewey, but people who are well known educationally, and convince them this thing belongs there, it will present itself very easily, because, if they are convinced, the thing then will go into the schools they are connected with, I mean the training schools, such as teachers' colleges, and so on, and I think it will very naturally disseminate itself.

"Adventure"—A Safety Play

We have put a great deal of hard thought and work on that problem, and it has assumed a phase that perhaps you would not realize at first, because we have had to carry it further than demonstrating that we could save lives by this process. We had to show, with a crowded curriculum, that this subject belongs in the curriculum as a part of education, that has a real educational value. In order to demonstrate that, we went to such length a year ago at the annual congress of the National Safety Council in Buffalo to give a play, a real drama, written by the head of the department of dramatics at Carnegie Institute, Thomas Wood Stevenson, and produced by a cast of 61 people. We put that on at very considerable expense, and did it not so much for

its actual immediate effect as though we were dealing with the real subject, because we believed that if it had dramatic value that would be pretty strong evidence it belonged in the curriculum.

As a matter of fact, that line of effort has proved very successful, and we can say now that it is practically accepted by those who are the leaders in educational thought in the country, that the idea has been accepted that it has a definite place in the curriculum. That is evidenced now, for instance, by the men we have on our advisory committee. We have an advisory committee of eight men. Each of these men investigated this very carefully. They knew exactly what they were doing before they allowed us to use their names on our advisory committee.

I am going to tell you what that committee is, because that in itself will show you how far we have gotten in this second phase of the work in convincing educational authorities. This list consists of Mr. McAndrew, superintendent of schools in Chicago, and president of the department of superintendents of the N. E. A. this year; Mr. Payson Smith, commissioner of education, Massachusetts, and president last year of the department of superintendents. There is also Professor Stephen Duggan, director of the Institute of International Education, which arranges for the interchange of professors and students between this country and Europe and other countries; Professor Harold Rugg, of Teachers College, New York. Professor Rugg is so convinced of the worth of the work we are doing that he is not only on our advisory committee but on our executive committee as well and wrote the introductory chapter to our manual. Another member of our advisory committee is Mr. Claxton, whom you will recognize as having been, before the present incumbent, federal commissioner of education. Another is Professor Judd, head of the Department of Education, of the University of Chicago, and still another is Professor Cubberley, of Leland Stanford University, who is recognized as an author of many textbooks on the theory of education. There is also Mr. Meredith, commissioner of education, of Connecticut.

Material for Teachers

The third thing we have done is to prepare definite detailed matters for teachers to use in their classes. We can't expect teachers to take this new subject up unless it comes to them pretty well developed, and so we have worked pretty hard at that problem, and I think we have it pretty well on the way to solution.

Last February, at the suggestion of both our vice-chairman and our secretary, Mr. Reszke and Mr. Masslich, it was decided to prepare an eight-page bulletin for semi-monthly publication of the actual concrete material to use in classes, safety material. This is under the direct editorship of Miss Arrowsmith, and we have gotten now to the point where it has turned out to be an extremely interesting undertaking.

Safety, at first, seems to be a negative idea. There does not seem to be much to it except to tell the children to be careful and not do things. When you come to the details of it, it turns out to be in every way a very rich and broad conception, and we find no difficulty at all in getting material even at this early stage for publication in the bulletin.

Miss Arrowsmith, of course, collects her material from the schools. We serve simply as a clearing house, and one of the things I want to urge when I have an opportunity to speak to people like this, teachers, that you try to send us anything you think is good, particularly in ways of presenting this subject.

We have published during the year a hundred page manual dealing with the general subject of how to start the work and go on with the work in the schools, with a good deal of concrete material, but that should be supplemented at as early a date as possible with something still more concrete and detailed, namely, the grading of the subject. That is a matter that still needs to be done, and we need expert help on it. It is probable that we shall get some help from such an institution as Teachers College in the solution of that problem. That is something that should come along very soon.

We have issued one set of posters and we are, I hope, about to issue, in conjunction with the National Child Welfare Association, another most interesting set of posters. We have a series of traveling exhibits which have proved to be useful in traveling around the country and showing schools how this can be done.

Then, a fourth matter is such exhibits as we have here in connection with the National Safety Council, and, something along the same line, the play that I spoke of putting on last year. We shall probably develop that play later in the form of a movie, and perhaps go further with it as a play.

Affiliations

Another very important achievement during the year has been the affiliations we have established. We have established an important relationship with the National Congress of Parents and Teachers, which represents a million members. The woman at the head of that, Mrs. Reeves, is most enthusiastic about this work, and they are hoping to make this one of their major activities.

We have formed a similarly interesting relationship with the Playground and Recreation Association of America. Our work is very closely connected with recreation, because if we put the children off the street and don't allow them to play on the street we have no right to do that unless we can find some other place for them to play. In other words, it is not a very good adventure to play on the street, but it is probably better than not playing anywhere, so the recreation and safety movement go very closely together.

We formed a similar affiliation with the General Federation of Women's Clubs, representing 43,000 women's clubs and three million members. They are also going to put this on their program as an important activity.

We have formed a similar relationship with the National Child Welfare Association, and will probably get out a series of posters. We are also associated with the Woodcraft League. You will be interested to know the first of these organizations I have named, the National Parent-Teachers Association, the Playground Recreation Association, and the General Federation of Women's Clubs are all represented on our program here at this annual congress at Louisville. All three have sent speakers here to show their interest in the matter.

Appointment of Nominating Committee

I am going to name the nominating committee as the following: Superintendent Hartley, of Louisville; Superintendent Gosling, of Madison; Miss Beard, of Detroit.

INTERESTING THE TEACHER IN SAFETY EDUCATION

Thomas Goslin, Superintendent of Schools, Madison, Wis.

The leaders in the movement for safety education have been wise in their methods of introducing the new subject into the curriculum. They have realized early that they could attain no large measure of success unless they could have, first of all, the enthusiastic support of the teachers. The only condition that it is necessary to meet in order to have this enthusiastic cooperation and support is to show the worthwhileness of the undertaking and, at the same time, to present concrete suggestions for putting the work into effect.

Working as they do under the high pressure of time-allotments and of large classes, the teachers find the daily routine quite exacting and they are likely to feel that any new subject entails additional burdens upon them unless this subject can be woven into the present courses of study or unless it can replace work that now is required.

From a personal experience with a campaign for safety education, I offer the suggestion that the prime requisite for such a campaign is good *leadership*. A school principal who has enthusiasm, energy, goodwill, intelligence, and who possesses the confidence of her staff of teachers is most likely to offer the kind of leadership which will bring success.

The first task of the leader is to impress her staff with a sense of the importance of the work to be accomplished. Fortunately, in a safety campaign, most of the teachers realize without much persuasion that it is very much worth-while to teach the principles of safety to children. On every side, evidences are sufficiently abundant to show the pain and suffering that come from a failure to observe the cardinal

principles of accident prevention. The leader, having shown the value of the work, will readily enlist the full and hearty cooperation of the teachers. Then will come a call for information, for the teachers will be at a loss in the beginning to know just what is to be taught and what the methods will be by which the teaching is to be done. At this point, circulars of information, supplied by the National Safety Council, bulletins, records of similar work in other states, articles in journals and magazines, vital statistics, and much other collateral information will be most helpful.

The leader who is able to supply the most abundant information, and who can secure the thoughtful participation of all of her corps will be more successful than one who tries to do everything herself. Usually, after teachers get the big idea, each one will be interested in developing plans suitable to the grade of children with which she is working. It is quite apparent that the method of teaching in the first and second grades must differ widely from the method which is appropriate in the upper grades and in the high school.

Time Allotment

After teachers begin to work on their individual problems, they are likely to ask for a special time-allotment for the safety work. At this point the administrative officers of the school system are in a position to render assistance. It is obvious that if the entire time-allotment is to be given over to the other subjects of study, teachers will have difficulty in providing a special place for the safety work. In order to relieve the pressure which the time-allotment imposes, it will be necessary to reduce the attention given some other study or studies in the school. One of the chief reasons why teachers object to taking up new plans arises from the fact that they think they are expected to cover a certain amount of ground in each subject according to the amount of time allotted in the official schedule. If the administrators wish to support a new program it is necessary for them to change the time-allotment and give some space for new undertakings. The time-allotment, of course, is not, as I shall attempt to show later, the only means of introducing safety instruction. It is, however, in my judgment, one of the essentials.

The platoon organization, or the work-study-play plan, is admirably adapted to the needs of new situations. It is possible under the platoon plan to assign all special work, such as safety education, thrift education, civic education, and the like to special teachers who devote their entire attention to this work in auditorium periods. Thus the regular teachers of academic subjects do not feel that there is any invasion upon their time and attention. Until the platoon school organization becomes more nearly universal than it is now, it will be necessary to think in terms of the conventional organization of schools and to adapt our plans for safety instruction to the old system.

The great school masters have been able, through the force of their personalities, to give tone to a school in ways that were beyond the reach of the classroom. Some noted schools, for example, have been characterized by the athletic prowess of their students; some, by the high sense of honor and integrity of the student body; some, by religious fervor; some, by a sense of civic duty which was implanted in the students. Where results like these were secured the whole spirit of the school was permeated with the controlling purpose of the master and of his corps of teachers. So it must be today with our public schools. In the matter of civic education, thrift education, safety education, and all other special types of education which the schools can give, we must rely upon the controlling purpose of the school rather than upon the mere formal introduction of a new subject of study into the curriculum; and so it is that we must look for results in safety education to the development of a controlling interest in safety throughout the whole school in its special tasks, and in its thinking, and in its behavior.

Training Children's Thought

I do not wish to suggest that our schools have no higher duties to perform; what I do mean to say is: if we grant the tremendous importance of safety education we must not look to any merely formal or adventititious measures for the accomplishment of our purpose: we must look, rather, to a re-making of the thinking of boys and girls to the end that the thought of safety shall have a large place in their lives. Only by giving an important place to this type of thinking can there be any large reduction in our appalling losses by accident.

Although the instinct of fear has had a large influence in the education of the race, I doubt very much whether in our teaching of the principles of safety we should make very much use of fear as a motive force. Some of the most unwholesome and distressing characteristics of large numbers of people can be traced to the over-mastering sense of fear which possesses them. The upward struggle of the race has been characterized by a progressive release from one set of fears after another. Fear of the dark; fear of unusual manifestations of nature; fear of spirits; fear of serpents; and many other kinds of fear have wrought havoc in our lives. One of the great purposes of education is to free men from their fears and to give them confidence, and trust, and hope, and joy. For this reason, it seems to me that it would be a contravention of good educational principles if we were to use a sense of fear as the prime agency in safety instruction. Prudence, alertness, quickness of judgment, physical vigor, ready articulation of mind and body—all these seem to be proper objectives in our educational policy.

In harmony with the foregoing principles, a safety program was developed in the Brayton School of Madison, Wisconsin, under the auspices of the National Safety Council. Through the leadership of the

principal and the cooperation of each member of the teaching staff, a vital demonstration of safety education was given. Details of the program are included in this pamphlet.

A few illustrations show the general plan.

Kindergarten

In the kindergarten, the floor of the room was marked with lines to represent street railway tracks and street crossings. Wagons were shown upon the streets and the policeman was shown at the crossing. At the time when the demonstration was making, the children insisted that every member of the class should cross the streets only at the crossings.

In the first grade every child was taught to memorize his house and telephone number and to write the name of the street on which he lives. A drama of the lost child was presented and the part of the friendly policeman brought vividly to the minds of the children.

Second Grade

In the second grade, safety instruction was closely articulated with the work in English, spelling, penmanship, drawing, grammar, and dramatization. The spelling lists contained such words as *safety, quickly, look, traffic, jump, sleigh, trucks, burning, watch, hurt, policeman.* In the penmanship lessons such sentences were used as "Firemen fight fires" and "Cross the streets at the crossing." On the sand-table there was an illustration of children waiting on the side-walk for fire apparatus to pass. Songs, stories, readings all played their part in the safety program.

Seventh Grade

In the seventh grade safety posters were prepared. One of these had the legend—"A boy in school is worth two in a hospital". In the arithmetic work of this grade, graphs were drawn showing the various causes of accidents. Vital statistics from the health department and life and accident insurance statistics were used to good effect in appropriate places.

Older Boys

The older boys in the school were organized into a group of safety helpers for the benefit of the younger children. These boys were very proud to wear arm-bands indicating their official position. They took their stations at the street crossings adjoining the school and assisted the younger children in crossing the streets where without assistance danger of accident would be very great. This form of participation by older boys in contributing to the welfare of the school is a kind of civic service which all are glad to render and which makes for good citizenship as well as for safety.

Further details would merely serve to strengthen the impression that a safety program may be carried on not only by giving a definite

time-allotment to the subject, but by selecting material that can be used in the several subjects of study without increasing the amount of time devoted to them.

If you were to ask for the results of a program of this kind, it would be difficult to prove the value by showing the definite reduction in the number of accidents after the instruction as compared with the accidents which occurred before. Madison is only a small city. Fortunately, the accidents to children in Madison are not numerous. For this reason, statistical proof of the value of the demonstrations cannot be given. Nevertheless, if concentration of thinking upon a subject and if inculcation of certain habits have effect upon life procedures, there can be no doubt that a safety campaign in schools is very much worth while. In the particular school to which I have referred, the interest of the children and the interest and the enthusiasm of the teachers were aroused to an unusual degree. Members of the teaching staff from other schools in the city were very much stimulated by the demonstration which was given in the Brayton School. Furthermore, the work is going on, not to be sure, with the same concentration as before, but with the solid, continuing methods that promise to give good results.

It is only by continuous education in the schools that the great social and industrial losses can be avoided—losses which bring measureless suffering and sorrow to many homes.

THE CORRELATION OF SAFETY WITH GRADE SCHOOL SUBJECTS

Charles D. Dawson, Assistant Superintendent of Schools, Grand Rapids, Mich.

If safety is to be introduced into the public school curriculum, there are, in general, two ways to do it, namely: Introduce it as a special subject by giving it a special time in the daily program, say 10 minutes per day, 20 minutes twice a week, or some such time, depending on conditions of the curriculum; or it may be correlated with other subject matter and given no special time on the daily program. In other words, it may form part of the content of other subjects which are already in the curriculum.

The curriculum of many schools is now overcrowded. Even though one is not directly connected with the public schools as a teacher or as an administrator, he is more or less familiar with the crowded conditions of the curriculum in many school systems. To tack on a few minutes per day for this and for that is merely complicating curriculum conditions which educators are attempting to relieve as occasions warrant. By correlating safety with other subjects, it is possible to introduce safety with little disturbance to the curriculum.

It is quite possible to enrich and vitalize some of the present subjects by the introduction of more practical material. For example, why teach cube root in the grades if such is being done? It has been found as a result of scientific investigation that those who studied it in the grades have had little or no use for it since leaving school; that is, it proves to be of no value to the average adult. In other words, cube root for the average grade pupil has little or no utilitarian value in later life.

If safety can be shown to be of value in childhood and adult life, its introduction into the school curriculum can be justified, and especially so if it is to take the place of material which now has little or no utilitarian value.

The generalizations which may be made on the subject are:

1. That many school curriculums are already overcrowded and cannot stand enlargement. From an administrative point of view, at least in school with crowded curriculums, it is much better to correlate safety with other subjects already in the curriculum.

2. There is a grave suspicion that there is some material in every subject which could be eliminated with profit if safety material were substituted in its stead.

3. A public school curriculum ought to contain content which will be of value to the individual after he grows up. Knowledge pertaining to safety certainly fulfills this requirement.

4. Hard study on impractical content is not sufficient to train one's mind in meeting the every-day practical problems of life. In other words, it does matter what one studies in school if he is to be properly educated.

5. Mental development consists in ability to make many and important mental associations; in other words, mental development is ability to use one's knowledge for the betterment of the individual and the society in which he lives.

The second part of this discussion has to do with the process of habit formation. No matter how much a child may know or be taught about safety, if he doesn't put his knowledge to use it has little value individually, no social value, and absolutely no habit formation value. Unless an individual takes part in an act, he does not form a habit relative to that act. For example, habits which are acquired by the father are not transmitted to the child. That is, through heredity, the child is not born with habits acquired by the parent. The child, therefore, must form his own habits through his own acts. The safety habit, as well as other habits, requires repeated action on the part of the individual to establish it.

Habit Formation

Another psychological point relative to habit formation is that habits are more easily formed and, likewise, more easily broken up during

the youthful days of the individual. For example, an infant a month old may form a habit after an act has been repeated once or twice. On the contrary, with mature people, an act must be repeated over and over, again and again, if a habit is to be formed. In other words, the old saying that it is a hard job to teach an old dog new tricks is just as true today as ever.

We must begin, therefore, with youth if we are to train them easily in safety habits. School children must form many habits relative to safety such as:

1. Keep on the sidewalks and crosswalks in going to and from school.
2. Stop at the curb and look both ways before crossing the street.
3. To think the shortest way is not always the safest.
4. To remember not to hang on or hitch on to moving conveyances, etc.

We have been thinking for some time of drawing up a set of safety rules similar to the health rules which I have enumerated and checking pupils each week to see if they are actually obeying these rules, since it is only through action that the safety habit may be formed.

How are we to sufficiently impress children with the importance of doing these things so that they will actually do them? We are attempting it in the following ways:

1. By the organization of junior safety councils in each room from the fifth grade up. These councils have their officers who wear a special pin donated and sent out by the Grand Rapids Safety Council. Occasionally the officers are called together and addressed by some one on safety.

2. By the use of the school Safety News, which is issued every two weeks by Manager Haven of the local safety council. This paper is read by a pupil or teacher in the room to the other pupils, preferably by a pupil. The bulletin contains safety jingles, safety news in general, and information about recent deaths and serious accidents of school children in our own city. It emphasizes the careless act of the child (if the child was actually careless) which caused the accident. For example, one of our most recent deaths was due to the fact that a small boy about eight years old secured a ride in a Ford delivery truck. When the truck pulled up to the curb to let the boy out, he climbed out on the side next to the middle of the street instead of the side next to the curb. Just as he alighted, a touring car struck him, knocking him forcefully to the street and injuring him so that he died within a few hours. The boy climbed out on the street side possibly because he would not have so far to walk across the street after he was out of the truck. This accident illustrates to the child very concisely that the shortest way is not always the safest.

3. Another way of assisting in habit formation is to have the room choose sides and form two safety teams for the semester. Let the teams draw up their own safety rules. Here is where the ingenuity of the teacher comes in. She can easily manipulate the rules so as to include all the major safety hazards about the school and community. Every time a child disobeys one of the safety rules, a black mark shall be put down against his team. Of course, the team which has the least black marks at the end of the semester wins the game.

An interesting incident happened in one of our schools after two teams had been formed and were in working order. Prior to the formation of the teams, the principal of the school was having trouble in keeping boys off freight cars, as they went to another school building for their manual training. On their way, they would crawl under and over freight cars which were standing on the siding. After the formation of these two teams, it stopped immediately, because the boys were carefully checking each other on this point, since it was against the rules which they made themselves.

The point is that if carefully manipulated and handled pupils will teach each other proper safety habits. The chief difficulty for a teacher to handle is that pupils will disagree as to the facts on certain points. It is well not to put down a black mark if the child accused of disobeying a rule says that he did not. In other words, be sure that a rule has been disobeyed by a member of a team before penalizing his team.

Dramatization

4. A fourth method of impressing children with safety habits is through dramatization. It is much better to have the children stage and dramatize their own plays however crude, rather than to reproduce one of much finer quality written by some one else. Plays which are organized and staged by the children themselves are vitalized; while other plays are only memorized.

5. We occasionally run a safety film in the schools, in order to keep up interest and enthusiasm in regard to safety. Sometimes, however, safety films prove to be amusement to pupils rather than informational. Pupils make a laughing matter of some films either because they are not sufficiently impressed with the seriousness of safety or because the film is so unreal as to make situations comic rather than serious.

The sand table in the kindergarten is a fine means of giving concrete expression of children's ideas of safety, so with paper cutting, etc.

Is safety of sufficient importance to justify its introduction into the curriculum? This question possibly ought to come first in a topic of this sort and seems perfectly absurd, I know, to a group of safety enthusiasts like those who are assembled here, but when we realize that there are patrons of the public schools who think that everything

outside of the realm of readin', 'ritin', 'rithmetic are fads and have no place in the educational program, we begin to realize that it is necessary to present facts to show the validity of introducing safety into the curriculum. In the first place, if safety can be taught as a legitimate part of arithmetic, geography, history, etc., without having to give up any time of the daily program in doing so, when the criticism is partially eliminated, because we are still teaching arithmetic, geography, and history as before, but with safety as a part of the content.

DISCUSSION

MR. F. E. RESZKE: We in Cincinnati are definitely committed to the value of safety instruction in the schools. It has been my pleasure to be associated as head of that movement for the past five years. We have just completed a course of study very comprehensive and suggestive for the use of teachers in the grades from the kindergarten through the eighth grade. We are also committed to the plan of teaching safety, not as a separate subject, but in correlation with other subjects. All this has been brought out by the two previous speakers.

We also have a very complete organization among the school children of Cincinnati. We have in the city about 50,000 pupils in the public schools, and, of that number, we have about 20,000 or 22,000 belonging to this organization, which we call the Safety Guards. The organization takes care of all children from the first to the eighth grade. The children from grades four to eight belong to what we call the senior safety guards, and have their proper emblems to distinguish them from the others. The children from grades one to three belong to the junior safety guards.

You may ask: What was the reason for having the children from grades one to three belong to an association of that kind? It was simply this: We found we were not getting our safety instruction over in the home, and we thought by having the children of grades one to three belong to this organization would, through them, get the instruction into the homes. You know, from your own experience, the little child, when he comes home, answers the question which is the first thing the parents put to him: "What did you learn today?" That is not true of children in grades five, six, seven, and eight. In fact, they are not in the home enough for the parent to ask these questions.

Then, again, instead of an emblem for the children from grades one to three, we have a little card. On one side we have a very simple set of safety rules and on the other side we have a pledge, which is very simple, and which the children memorize and agree to live up to and sign. The teacher also signs, and this goes into the home. I have had my kindergarten teacher tell me she has visited a great many homes of first grade children and in practically every one of

them, at least in the big majority of them, she has found this particular safety card hung up somewhere on the wall, and it is something the parents feel proud of. In that way, we get the instruction into the home.

The schools of the city of Cincinnati send a representative who is selected by the principal of the school to attend a central safety council which we call the Cincinnati Public School Safety Council and of which I happen to be the head, so that makes some 65 to 70 representatives, one from each school.

About five years ago Dr. Condon asked me to make a study of safety and sent me to St. Louis to study the system there. I spent several days with Dr. Payne, who was a pioneer in this work, and I returned to Cincinnati filled with ideas and ambition to carry on this work. The safety council met, and we proceeded to organize, appointed committees, and made a study of that work. I spent my holidays during the winter season down in the police department and in the coroner's office gathering statistics which I felt were important.

I believed we must find some place to attack the problem, and I felt the way to attack this problem would be to familiarize myself with the accident situation of the city, to find out what accidents befall children of various age groups and grade groups, what accidents befall children in the home, on the streets and various other ways.

Children in Age Groups

After that study, we began deliberations, and we tried to formulate some plan to train these children of the proper age group in proper action to avoid the accidents that were peculiar to their group. If you study the matter (it is the same in every city) and if you make an investigation like that in Louisville, you will find that the principal accidents befalling children to say grades under six years, from one to six, befall them in the home and can be classified possibly under three or four heads, the first one of which is falls, because they have no bodily stability at that age. They are just getting that and, naturally, are not steady on their feet. Another one is burns from grates, matches. A third one is poison, and so on down the list. You will find out they are general throughout the country; it makes no difference whether it be Cincinnati, Louisville, New York or anywhere.

Then, after a study of the accidents befalling these children, we began attacking that situation by trying to form in those children proper habits of safeguarding themselves against just such accidents.

Then, there is another group from the first or second grade through the fourth in which you will find the spirit of adventure enters in, and a great many of those accidents befall children on the streets. There, again, we emphasize that phase of it. The young children cling to the mother's apron strings, and the mother is more careful and concerned about those children. As soon as they get to be about nine

years old they leave the home and go into the streets. There you have again an altogether different set of accidents befalling children.

We have fashioned a course of study along that line based on the experience of the children, the ages, and the various grades. We have made it very suggestive and rich, and we hope it will be a big help to our teachers. That is one thing that teachers want, and I know you will want to know what to do and how to do it.

I believe one of the most important things that the National Safety Council, or this Education Section, can do is to interest our training colleges for teachers, normal schools and universities, to give us a set of teachers who, when appointed, will know something of safety education. We can't learn it over night. I have made a study of it for five years, and I don't say I have any more than scratched the surface. I have a lot of information, yes, but we are in the experimental stage. We must have leaders; we must have colleges to train these teachers in this work, and in that way put it over; otherwise, the turnover in the schools is so great, at least in a city the size of Cincinnati, where hundreds of teachers are changing every year, we will have the same problem over and over again of training these teachers in the proper way of putting this subject over.

This matter has been taken up with the dean of the college of education in the Cincinnati University, and we are thinking very seriously of having some one take charge of that work to train the coming teachers for our schools in this very important subject.

As you know, the University of New York, under Dr. Payne, is already doing it. There may be two or three other universities doing it, but Cincinnati has been a pioneer in this work. We are not the first one to undertake it, but we have been pretty close to the first one, and we don't want to stay very far away in the work of training our teachers along that line.

Because we had no such system in our schools, the work fell upon me to devise ways and means to put that work into the hands of teachers and through them pass the work on to the other teachers who are not in this council by having one representative from each school take part in the deliberations, the program, the monthly meetings of this safety council of public schools. This representative reports back to the principal, to the teachers of the school, just exactly what happened at that meeting. In that way we are hoping to bridge over the gap at the present time which exists from not having trained teachers come into our system from the university and teacher training colleges.

THURSDAY AFTERNOON SESSION

CHAIRMAN MASSLICH: Mr. Whitney asked me if I would not preside. There are to be two speakers on our program this afternoon.

THE CORRELATION OF SAFETY WITH ENGLISH

Miss Ida Flowers, Principal, Montebello School, Baltimore, Md.

Instruction in safety must be based on children's experiences and should result not only in giving clear and full information but also in creating the mental attitudes and habitual acts that characterize proper behavior in this important phase of good citizenship. In planning a course in safety education, therefore, we need to remind ourselves that any material which has legitimate place in the course holds that place because it is related to some situation in which the child is likely to find himself and in which his reaction is likely to be modified because of a safety lesson. There is no lack of such material from the kindergarten on up through the grades. The excellent courses prepared by Miss Beard, Mr. Payne, and others show this conclusively.

The first objection which teachers make to safety instruction is the lack of time since the curriculum is already so full. It is my purpose to show how it can be used in the English periods in such a way that the instruction in English does not suffer but is actually improved. A recent course of study in English calls attention to the fact that "the weakness of school English has been its isolation, its separation from the child's experience," and it shows ways "by which the child in his daily school life, through discussing some vital school problem in the forum, by addressing his fellow classmates in assembly, or in participating in some other school activity, may learn to play well his part in the home and community." In all of these important aspects, safety instruction can be used advantageously.

Let us consider first the work in the lower grades in composition: Hosic, Sheridan, and others recommend placing chief emphasis in compositions upon the children's experiences. Therefore, let the teacher have a series of lessons on crossing the street, at crossings with and without a traffic officer. Teach the rules "Look first to the left and then to the right before crossing the street" and that the curbstone stays "Stop, look, and walk." Teach also the meaning of the white lines on the street and how important it is to keep within them. To make the procedure clear when there is a traffic officer with a semaphore, several teachers of my acquaintance have used a toy semaphore in the classroom and have trained the children in the right way of crossing. Frequently, classes of small children are taken out to the street and, there, taught the right way of crossing. This is particularly necessary with school beginners who are unused to traveling on the streets alone. Isn't that as valuable a form of dramatization as the more customary playing of fanciful stories?

Cloudy or rainy days, when the children have umbrellas, provide the opportunity for interesting and valuable lessons on the best way to carry open umbrellas. This can be shown in the classroom and on the street-corner, weather permitting. Such discussions certainly afford good practice in English as well as good instruction in safety.

The Safest Route to School

An excellent series of lessons which come under my observation dealt with the safest route by which to come to school. The teacher approached the topic by telling the class that the school safety bulletin which would be issued in a few days would contain a letter from the safety council to their parents asking them to plan for their children the safest route to use when coming to school. After arousing the children's interest in planning this route, the teacher brought out the fact that the children know best streets near their own homes, and interested them in making a map of the school district on the floor, the streets being placed by different children. As an outgrowth of this lesson, the children were assigned to plan at home that evening the safest way to come to school and to be ready to report the next morning. In the second lesson, individuals told and showed on the map the route which they considered safest from their respective homes, and the class and teacher passed judgment on it. As a part of the lesson, the children reviewed the following safety rules:

1—Do not jay-walk.

2—Look first to the left and then to the right before crossing the street.

3—Obey the traffic officer or safety patrolman.

4—Observe the white lines at street crossings.

5—Use streets and not back alleys.

6—Walk on the pavement.

A series of lessons in another class dealing with safety on the highways had as its motive not only the personal safety of the members of the class (a third grade) but also the need for their teaching younger brothers and sisters how to keep safe on the streets. These lessons emphasized the safety rules referred to above, showed the danger in jay-walking, dramatized correct and incorrect ways to cross the street, showed the danger of playing in the street, and the best places for them to play in the neighborhood. In this series was included a discussion of a familiar Red Cross poster entitled "Find the good citizen", in which a child has just peeled a banana and thrown the peeling on the pavement. A man walking along is about to step on it. Another child is throwing some fruit peelings into a can. Another topic of safety on the highway related to the proper place to walk along a road where there is no pavement, a condition which exists in our school neighborhood. The children were shown why walking on the left side close to the curb allows the pedestrian to see and be seen by approaching traffic.

Excellent material for oral composition is found in a discussion of emergencies. A third grade teacher first presented the word *emergency* by writing it on the board, having it pronounced by pupils, and then developing and illustrating the meaning. After telling the children

that one must think quickly in an emergency, she asked if they would like to tell what they would do. She then wrote on the board "What would you do?" and under it a number of *ifs*, such as "if your dress caught fire, if you had to cross a crowded street, if you cut your finger, if your ball rolled into the street." The children volunteered to discuss one point, and in turn came to the front of the class and told their plans. Each child's statement was commented upon by teacher and pupils and, in a perfectly natural situation, much valuable training was thus provided in both English and safety.

Discussion of Emergencies

In connection with the discussion of emergencies, a good lesson for little children, and larger ones as well, may deal with the prevention of burns and cures for slight burns. One teacher began by telling three true stories to her class about children who had been burned. She then raised the question, "Can't something be done to save boys and girls from being burned?" The children were interested and their suggestions, which were recorded on the board by the teacher, included such dire statements as:

1. Never play with matches.
2. Never play near a bonfire.
3. Never play with fire.
4. Never go near a hot stove.
5. Never go near steaming tea-kettles or cooking utensils.
6. Never play with gasoline.

The teacher next emphasized the need for calling a doctor in the case of a bad burn and then taught the children what to do for slight burns, when the skin is not broken. The materials on her table included gauze, bicarbonate of soda, water, a tumbler, a basin, lard, olive oil, carbolized vaseline, castor oil. A child would pretend he had a burned finger, and another child would treat it, the method being suggested either by a pupil or by the teacher. The following treatments were used: covering the burn with baking soda; covering burn with cloth which has been dipped in solution of baking soda and water (teaspoonful of soda to pint of water); greasy substances applied to relieve pain, as lard, olive oil, castor oil, etc.; applying cold compresses. At the close of the lesson each child who had been "treated" told what had been done for him.

Sometimes the instruction in safety and in English can be combined through a question box. Questions are contributed by both children and teacher. The teacher writes each of these on a separate little card and in a subsequent period the children draw cards from the question box. After being allowed time for reflection, each pupil reads his question to the class and then tells his answer. Some questions which have been used are:

What would you do if a stranger asked you to go for a ride?
Before crossing the street, what should you always do?

Why shouldn't we throw water on burning fat or oil?

Why is it dangerous to stand on a rocking chair or box to reach something?

If you saw a fruit peeling on the sidewalk, what would you do?

Why should there be no pushing in a fire drill?

Why shouldn't we keep old rags or papers in our cellar?

The procedure may be varied by having the pupils ask the questions of their classmates. One who answers correctly may be the next questioner.

Original Stories

In a second grade, after certain safety rules had been developed during Safety Week, the teacher asked the class if they would like to make some stories about boys and girls who did and did not remember these rules. She then referred to the board on which she had previously recorded certain words and phrases, as follows:

1. One day
   boys and girls
   ball
   rolled into street
   girl ran
   automobile
   broken leg
   hospital
2. Once upon a time
   boy
   all alone
   wanted to play
   matches
   fire
   hospital
   three months
   scarred face and hands
3. One rainy day
   little girl
   umbrella
   before her face
   boy on bicycle
   threw her down
   broken arm
   couldn't play
   always over head
4. Last week
   boy named Jack
   boy named George
   skating
   come into street
   called Jack
   catch on wagon
   no, said George
   remember safety rule
   skated on pavement
5. Last summer
   boy
   three years
   head
   car window
   truck
   doctor
   very, very ill
   never again

Following the stories, the teacher asked "What safety rule did you talk about in the first story? Second? Third? Fourth? Fifth? Which child was happiest? Why?

The correlation between safety and English may be carried over into the seat work period to reinforce the oral instruction. For example, an exercise in silent reading in the second grade such as this:

Draw the picture of a little girl crossing the street in the right way.

Color her dress blue, her hair yellow, and her shoes and stockings brown.

Draw her pushing a baby in a carriage.

Make the carriage brown.

Copy the sentence which tells how to cross the street.

Draw the picture of a little girl carrying her umbrella the wrong way.

Color the umbrella red.

Draw a little boy holding his umbrella the right way.

Color his umbrella black.

Write a sentence telling which way you would hold your umbrella.

Pupils may be asked to fill blanks in sentences (in the third grade) using a suggested list of words. One such exercise contained these sentences:

1. Children should not play with.....
2. Do not play in the.....
3. It is not safe to play near a.....
4. Always stop at the..... and look.
5. Pans of hot water should not be left standing on the.....

The words given were floor, bonfire, street, curbstone, matches.

Or an exercise to be answered by "yes" or "no" may be given to the children, such as: "Is there any danger in playing in the street? Should you look to the left and then to the right before crossing the street? Should you run down the steps? Should you walk when crossing the street? Should you play on the sidewalk?"

Interesting, lively, and profitable lessons from the standpoint of both safety and English can be devoted to the making of slogans, which the teacher or pupil writes on the board. Then, too, a question can be raised for general discussion, such as "What can you do to keep from being hit by a car?" Either the pupils, according to their stage of progress, or the teacher may record the answers.

True Stories of Accidents

In her book on "Civics in the Elementary Grades," Miss Harris suggests having the children tell and write true stories of accidents. In the intermediate grades this could be done easily. These stories are either written on the blackboard or typed and given to the children. Besides each story is a question. Individual answers to this question are written by the children. These are read aloud, and the best one of them is selected to be written on the board at the close of the period.

To illustrate:

A girl was looking for her best shoes. She kept them in a dark closet. She took some matches with her. She struck the matches while she was looking for the shoes. A skirt caught fire. The girl's clothes got on fire. She was badly burned.	What did she wish she had done?
A neighbor of mine was burned. They think she will die. She lit the gas range. She turned away to do something else. She was too near the range. Her dress took fire. She ran out into the hall to get help.	When she found her dress was on fire, what should she have done?
When I was a very little girl I washed my doll's dresses. One day I hung a dress to dry on a line over the gas range. Mother did not see it. She lit the burner. The dress caught fire.	Who was to blame for this accident?
Tom was going to see his aunt. The car passed just as he got to the corner. He ran after it. He tried to jump on. His foot slipped off the step. His leg went under the car. The wheels crushed it.	What does Tom wish he had done?

Kate is absent to-day. Yesterday she went to see her married sister. She came home in the car. She started to get off the car. She took told of the grip handle with her right hand. She faced the back of the car. The car started just as she got off. She fell on her face. Her nose, forehead, and chin were cut. She was so frightened that she never wants to see a car again. She is in bed today.

What will Kate do the next time she gets off a car?

Probably all teachers to-day appreciate the value of dramatization and utilize it in their classrooms. Excellent use can be made of dramatic situations in safety instruction. For example, the children can dramatize the correct way to get off a street car. Or, they can make up a little play showing a street accident. One pupil may ride in a toy auto, one be a member of the safety patrol, another the victim. Have a policeman, a doctor, an ambulance; take the injured to the hospital.

The Chicago course in safety education suggests that the children play that two rows of school desks make a railway car. Have one pupil play conductor telling the passengers what safety rules to obey, such as these:

"Baggage must be kept out of the aisle."

"Do not put head or arms out of windows."

"Do not stand on platform while the train is in motion."

"Do not get on or off the train while it is in motion."

The children will frequently suggest topics for little plays and work them out very successfully. Bibliographies on safety education supply references to plays.

Sometimes safety may be taught through the fanciful story project. Many well known tales lend themselves to this purpose. Minnie M. Cole's story of the "Silly Squirrel" illustrate this.

The work of safety instruction can be connected with English teaching just as successfully and in as interesting a way in the intermediate and upper grades as in the primary grades. Many of the ideas and plans previously described can be utilized to advantage. The class as a whole or committees may be asked to report accidents they have heard about or seen, to clip items from the papers about people, especially children, who have been injured or killed by accident, to discuss the causes of each accident and suggest ways in which it might have been avoided; to give a number of reasons why children get hurt in play; to learn the different ways in which fire is extinguished; to discuss the automatic sprinkler in the school building. Some of these reports can be made in connection with the opening exercises each morning or by the bulletin board committee. Others may come in connection with current events, the relationship of which to safety may be noted.

Some excellent topics for children in these grades concern their care and protection of younger brothers and sisters. Such topics as taking them on the street cars, the best place for them to play, teaching the little ones not to play with matches, preventing their standing beside an open window, teaching them not to put things in their mouths that have been dropped on floor or pavement, etc.

Pantomimes

A committee of an eighth grade class presented, as a special feature of the morning opening exercise, a series of pantomimes, illustrating the right and wrong way of the following.

1—Throwing away fruit skins.
2—Leaning out of window.
3—Passing through the halls.
4—Drinking from bubble fountains.
5—Carrying open and closed umbrellas.
6—Crossing a busy street.
7—Walking on a road where there is no pavement.

Children in many grades will be interested in such pantomimes and in charades, illustrating the observance or violation of safety rules and will gain in initiative, in ability to organize, etc., as well as in safety habits and practices.

Safety topics provide a real motive in letter writing. Last year one class corresponded with a child in California, keeping her informed on what we were doing in safety education. Again they wrote to the director of the Baltimore Safety Council asking for buttons, inviting him to their Council meetings, etc. One letter was addressed to their parents on safety in the home with the suggestion "Hang this in your kitchen."

Pupils of the sixth, seventh, and eighth grades could profitably devote some of their English periods to writing a safety play to be produced for the school assembly, and in writing safety songs to familiar tunes.

One teacher of the eighth grade has competitive slogan writing now and then, the best slogans being used by the art classes for posters. The characteristics of slogans are developed by the study of familiar slogans, i. e., they should be short; they may have rhyme or rhythm; a balance of phrases is good; the repetition of a letter is catchy, and certain well-known phrases may be changed slightly and give a safety message. Slogan making becomes not only an excellent exercise in English but is one of the best ways of impressing upon the children the necessity to be careful. Through the school magazine, one section of which is devoted to safety material, the English teachers also stimulate interest in composition writing, on such themes as Safety in the Home, Safety in the School, Safety on Rainy Days, etc.

Safety material is collected by both pupils and teacher, and used in the oral composition periods, in which at least two members of each group must give three to five minute talks upon safety. The monthly safety bulletin issued by the Baltimore Safety Council, a copy of which reaches every teacher, provides interesting items, stories, etc., which are utilized in the classroom and the bi-weekly bulletin of the National Safety Council is another source of good material.

Junior Safety Councils

While all of the means I have described produce good results, the really vitalizing influence in safety education in the school is the junior

safety council, which meets weekly during school hours. The Montebello School safety council has as faculty adviser and director a teacher of English in the upper grades who attends all meetings, and to whose inspirational leadership much of its success is due; but the children themselves, through committees, plan for the meetings and conduct them. Enough of parliamentary procedure is used to make the meetings run well, and to train the members in the use of these forms, in courteous ways of responding, in checking, etc. The preparation of the minutes is a valuable exercise in itself and the comments of the members when the minutes are read show intelligent criticism, far different from the somewhat hackneyed comments frequently made on school exercises.

Moreover, the members of the council carry back to their classrooms a report of each meeting, and some of them go also to the first three grades which do not send members to the council, taking to them certain messages of importance.

One of the very important activities of the school safety council is the preparation of a safety bulletin, which is issued once or twice a month. This bulletin provides excellent training not only in English but in committee work, in organization, etc. A committee plans series of bulletins, such as: safety in the home, safety in the school, safety in the streets. This fall, two have been issued, the first devoted chiefly to announcements and a reference to safety rules taught last year, and the second entitled "Safety on the School Grounds." The committee selects topics to be worked up under each subject and announces them to the English classes. The first writing is done in school time in the composition period. The teacher reads the papers first and selects some for the committee to examine. The committee then selects those best suited for the bulletin, occasionally combining two in order to get a strong paper.

The work for the bulletin gives excellent practice in the difficult art of selecting good titles and headlines, as in newspapers, and in the other essentials of a good composition, such as a good opening and a good closing sentence. Sometimes the children turn with delight to writing rhymes and jingles, recent contributions being:

"A little boy hopped on a truck.
A little boy had awful luck."

"Safety is the finest thing
Make it a rule in everything."

"The boy that hitches on behind
Hasn't safety in his mind."

Besides the weekly meetings of the council, general meetings are held once a month, which are attended by delegate members. Any child is privileged to become a member if he carries out certain requirements which are posted in every classroom.

Last year, the first year of the safety program for Baltimore, saw the organization of safety councils in 23 schools with a total membership of over 4,000 boys and girls. This year, we hope to have one in every school. Interest in the councils was stimulated last spring by a mass meeting on Saturday morning at a theatre, which all members of the school councils and safety patrols were invited to attend themselves in company with one guest. About 2,800 children responded and greatly enjoyed the program which had among its numbers a good comedy film, the safety film *"Ask Daddy,"* one or two very brief addresses, Mr. Payne's safety play entitled "Dick's Dream" by one school council, and the singing of some of the national airs.

In conclusion may I state that the best way to promote safety education in my humble opinion is through the junior safety council. Any idea which is to become an influence, a force, needs some one to push it. This force the safety council with its facutly representative supplies. It keeps the work alive, it provides incentives, it gets the children to talking safety. In other words it make safety a habit by making it interesting and popular.

CORRELATION OF SAFETY AND PHYSICAL EDUCATION

Carl L. Schrader, Deputy Commissioner of Physical Education, Boston, Mass.

What is one of the great objectives of physical education? Not a new one at all. One that has been connected with it as long as we know anything about physical education, that is in all various types of activities which are inherent in a program of physical education. We are conquering endless chains of coordination, of situations, so that the reaction time, if I may use that common term, on the part of the one who is well physically trained will be of benefit to him; he has stored up so many coordinations, has mastered so many situations, that when he is confronted with a new situation he is going to meet it far differently and more safely for himself than one who is not a master of many situations and many coordinations.

That, as I say, is one of our objectives, which we can hardly evade in our program. In the field of play alone we have had created for use a lot of safety games, and let me tell you, they don't begin to compare with the games which are 100 years old, because they have a singular situation in mind; whereas our activity games that have stood the test for years back and generations back, games suggested by our great grandfathers, by the pioneers, were preparing for life situations.

I believe thoroughly in the child living in his play world the situations that occur in real life. Those situations occurring in the play world the child understands; they become, as we understand the term, purposeful activities. In this play world we have these purposeful ac-

tivities contained in the child's world, but the play must have an aim. I don't mean playing in such a way that we can't talk about a play thought, but we as teachers should inject into it the real meaning of play and by acting it out they can't help but see the connection.

We come to another very important point, which, again, is best taught in this play world by the playing of games. That is the obedience of law. When the child begins for the first time to play in a group with other children against another group of children, it plays a game that is based on possibly only one definite law, and unless the teacher who is teaching that particular game knows the objective of the game and sees to it that both groups can see that one game according to the one law, she has lost the golden opportunity. First of all, there can't be any winner one over the other, if they are doing different things. You can only compete when they are both doing the same thing. There is the teaching of law in the game world.

We have the game with one law, two, three, four, and five, and finally we come to the games that have 15 and 25 laws, as baseball, basket ball, football. The time will come, I am optimistic enough to believe, when we won't have to have any more officials on the field other than the players to see that we don't break the laws. If we are correct in the assumption that habits are the result of repeated action, we are justified in believing that when a child has played only that way it is bound to act squarely in the obedience of law, whether it is a law of nature or whether it is a law made by man. It is going to be more obedient, going to do that more instinctively.

You are justified in asking: Have not we had football championships? Have not we won in the Olympic games and competed in them for some time? Yes, but where do we begin? Do we begin in the grades? In many a community for the first time the child becomes confronted with the reality of physical education, with the proper environment, and with the well trained teacher in the high school. That is eight years too late.

Grade Schools Must Have Gymnasiums First

In Massachusetts, where it is my privilege to work as state supervisor of physical education, I am going so far to discourage communities that are building a new high school in saying, "Don't build a gymnasium for the high school." I ask them to reserve space until they have dealt squarely with the grades, that if they have to economize to economize on the high school and let them shift for themselves a little longer, but not to start children in the high school physically illiterate.

Those of you who are engaged in physical education may wonder why we use such an extravagant term as physical illiteracy. That is what we must call it when we don't know how to behave, conduct ourselves, handle ourselves in our own way.

Health education is fundamental (you can't have a well balanced program of physical education and exclude any phase of health) but it is very easy to conceive of having a set of exercises aiming only at health and losing all the educational factors involved in a physical education program.

And so in our planning of a program in physical education, the various kinds of exercises which we include in a program, whether they be performed on the apparatus, climbing a rope and jumping from one rope to the other, are all dangerous things, but they are doing them easier than you walk out of the school building if they have been taught how. It is here where the importance lies in safety education along that line and in physical education in general, that physical education be taught by people who know the motive underlying the subject that they are teaching, and it is for that reason that care should be exercised in the selection of teachers who are going to handle this program of physical education, whether it be in the school or on the playground.

The playground is no longer simply a place for the bad boys, as was the original idea of the playground. It is no longer simply a place for the boy and the girl. The playground today is in reality a place for the community, not only because it is a safe place to be, but it is a place where they can live out life to the full.

And so in our physical education program we are cognizant of the fact that the things they are learning in a playful way are the things that are going to be of service to them as they travel through life and confront all those various dangers.

Now, a great many wonderful things have been achieved in the field that are really of national consequence. Let us single out for a moment the efforts on the part of the Red Cross in training life savers. What a tremendous piece of work they have done! What does it mean? There too, there are certain definite things that have to be mastered, the first of which, of course, is swimming under all sorts of conditions, but there too, they have to be instructed in so many different ways of attack which are likely to be there if they try to save any one so that they will be able to throw out a new form of attack in which they have not been trained.

Lifesaving

I was connected with the training school of physical education in an institution before I went into state work. One of our graduates from the school had gone to teach in a college outside of Philadelphia. She had gone through the work of the camp and was a qualified swimmer. She was a southern girl. On this particular occasion to which I have reference she was walking along the banks of the river with a friend of hers, a gentleman friend. As they were walking along a boat capsized. She heard the shrieks. She threw her coat over the arm of

her gentleman friend and dived off the bridge before the man had time to think at all or she had much time to think. He held the coat. I would not want to be the man holding the coat. She didn't know beforehand she would act that way. None of us do, but she had confidence; she was master of the situation. When we hear of people doing like deeds of that sort and receiving, as she did, the Carnegie medal and a free education for a medical degree (she graduated a year ago) we can rest assured that those people have gotten to that stage of helpfulness through a preparation which has been theirs.

Our physical education program, like the safety education program, must mean participation on the part of children and schools 100 per cent; otherwise it is not a democratic undertaking, and it is here that we have fault in our physical education program, that it is undemocratic; we have thought of physical education in terms of representative small groups of teams and have centered all the attention and all the financial outlay on those. We have now, however, some 30 odd states that have compulsory physical education laws. Massachusetts was not the first, only the twenty-first to fall in line. With the creation of physical education laws, we are driving home through the schools to one hundred per cent of the children this education not yet as effectively as might be the case, because in a great many communities they have not reached the point of wisdom in spending money on prevention.

There is a great deal of handicap to be overcome in those states where money is not forthcoming for this purpose, but in the states where they have gone a good ways those citizens will not go back one step. They are realizing their shortcomings. Where formerly a high school principal saw in the winning team in any sport the greatest glory for the school, we have now a great many high school principals who pride themselves on having the best record physically of the whole school body, boys and girls, as compared with other schools. If, supplemented with that, they can also have the winning team, well and good, but it does mean that we must have competition. There is fascination in competition. We must carry that competition right down into the grades, not in the same way that it is carried on in the high school, not imitating the games there, but teaching the fundamentals of the games that will follow later.

When I say later I don't simply mean high school and college, I mean later in life.

We have discovered in connection with health education, which is safety education, that we obey the laws of nature in safety for ourselves. Here, too, we have discovered that we are making the best contact for the teaching of health through charts, observation, talks, some of the things included in the latter being sleeping with the windows open, brushing the teeth, eating of vegetables, drinking of milk, and all those things that you are as familiar with as I am.

The "In Training" Idea

We have arrived at the point where we are thinking of boys and girls in terms of being in training like the college man is in training, like the high school lad on the team is in training. Whenever the child realizes that by observing health rules he achieves that in which he is particularly interested in the line of playing, whatever it may be, and that in a dozen different varieties of activities the achievement depends entirely on his mode of living, and when he sees that because he is observing those rules he is improving and becoming a more valuable member of the team, he is going to do those things you advocate and for that reason alone, the same reason why the college man does it.

The man in college and the man in high school who retires at 8:30 at night, which may be the retiring hour, who cuts out smoking and eats certain foods, cuts out going to dances, does this religiously, not because some wise professor has succeeded in telling him he will be handsome or live longer, but because he is convinced, through observation, that it is going to insure his place on the squad, that it may mean a place on the team, he may distinguish himself in competition.

Your comeback might very well be: When the training season is over, don't they break training? Yes, they do, but they didn't begin when they were children. With them is it not a matter of training almost in a commercial sense?

But I again repeat this. This is being done very extensively in the large group. The state of California is observing that very rigidly. Every boy and girl is in training and is taught to observe in the manner I have spoken of.

My final appeal to you as co-workers in this safety campaign is to see to what extent we can tie up all our safety education that we have in mind to the actual activities we are carrying on in the program of physical education, to see the games they play are worthwhile activities.

It won't do, just because we have this instruction, to take from the book meaningless things. There must be a gradual progress running through the game so that we are aiming in the right direction. You can't expect boys in the fourth and fifth grades to be playing games for the third grade children. They have passed that stage. It would be the same as expecting the high school girl or boy to read "Goldilocks" or "Tom Thumb". There is a gradual scale that the boy travels. He lives out all the various stages in this play work, and I for one am so optimistic as to believe that the behavior of the boys and girls in the making is going to be changed to that level to which Professor McDougal at Harvard points in saying we may make a division of human behavior into three or four groups. The first level is the one that is modified only by pain and pleasure; that is the early, the lowest possible state of behavior. In the second level, he claims the modifying

factor is the reward or punishment, and he says that is the level in which we live to a large extent, and from which we are freeing ourselves as rapidly as we can in order to dwell in a third one, where we live entirely in a life which is modified by approval of society. That is a very important factor in this play world as shown by the behavior of the one boy who went back on his contract in drinking coffee, and the disapproval of the others. So in all the rules being observed it is the disapproval of the group to any foul play that is going to be far more effective in changing the behavior than the higher official who simply declares that individual act as having been a foul.

MR. RESZKE: I am a firm believer that safety can be most effectively taught through just these two subjects: English and physical training, emphasizing on the English side the dramatization.

REPORT OF NOMINATING COMMITTEE

MISS BEARD: I shall have to report for the committee, as the other two members were not able to be here. We report the following:

Chairman, Mr. A. W. Whitney

Vice-Chairman, Mr. F. E. Reszke

Secretary, Mr. George B. Masslich

We desire to continue with the same officers as we have had this year.

CHAIRMAN MASSLICH: I suppose I ought modestly to put that motion. I don't believe the committee did very much work. (The report was unanimously accepted.)

ADJOURNMENT

Electric Railway Section

September 30 and October 2, 1924

J. P. BARNES, Chairman
President, Louisville Railway Company, Louisville, Ky.

H. M. KEYSER, Vice-Chairman
Claims Attorney, Washington Railway and Electric Company, Washington, D. C.

MELVIN W. BRIDGES, Secretary
Safety Engineer, Chicago Rapid Transit Company, Chicago, Ill.

TUESDAY MORNING SESSION

CHAIRMAN BARNES: The first order of business is the report of the officers and committees.

REPORT OF SECRETARY

Secretary Bridges (Safety Engineer, Chicago Rapid Transit Company, Chicago, Ill.): The secretary has not much to report except that the usual routine business of the section was handled as usual during the year.

I attended two meetings of the program committee in Chicago.

A meeting of the executive committee was held in Chicago on February 16 with Messrs. Barnes, Keyser, Hellmuth, Hodson and myself present and with Mr. Cameron representing the headquarters office.

The secretary received a very great many inquiries from the different members during the last year regarding safety devices. Most of these were from different roads and I have answered those that I could, and those that I did not have data for I referred to somebody else, and they were answered and as a rule I received a copy of the answer.

I want to thank the members of the section for their co-operation during the last year, and as a matter of fact, for their co-operation during the last couple of years when I have been secretary. There is not one instance where I called on a member for something and failed to get it. If he did not have it himself he got it for me. and I

think that is about the best co-operation any one can get. I hope you will give the new secretary of this section the same co-operation.

REPORT OF BULLETIN COMMITTEE

MR. PAUL HODSON: Your committee wishes to express its thanks to those of you who offered suggestions, photographs and cartoons to be used as bulletins.

There were only a few who offered them directly to the committee but some sent them direct to the Chicago office.

Shortly after the committee was appointed, a circular letter was sent to every member of this section, asking for ideas and material for bulletins. Approximately 15 replies were received and from these about 50 suggestions. Some of the suggestions could not be put into bulletin form because of their nature, but we are sure that Mr. Solensten has used every bit of available material sent in to the best advantage.

The committee wishes to take this opportunity to thank Mr. Solensten of the National Safety Council for the assistance which he so kindly gave at any time he was asked. We do not believe that member companies are taking as much advantage of the bulletin service as they should. Twenty-five bulletins were issued for the Electric Railway Section, with a total distribution of 42,000 or an average of 1,700 of each. During the same period, 36 bulletins were issued to the Steam Railroad Section, with a total distribution of 137,000, or an average of 3,800 of each. The Steam Railroad Section on the other hand has only 86 members, while the Electric Railway Section has 150; therefore, the basis for the argument about taking advantage of the service. Two kinds of bulletins were issued during the year—one for the workmen which includes all employees of the electric railways and one for the traveling public as well as the employees. The second one was issued primarily to post in cars. For some reason or other these were not used by all companies. We feel that unless this Section makes some decision as to the size of posters to be used in the cars, this type of bulletin will have to be abolished. We believe that safety bulletins posted in the cars are of great advantage to the riding public and some standard size should be adopted for use in all electric cars. Some of our companies have a standard size poster and others have a great deal of trouble in finding a place for these posters.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN BARNES: I will appoint the following members to the nominating committee: J. H. Truett, Baltimore, Md.; C. B. Proctor, Memphis, Tenn.; Guy R. Radley, Milwaukee, Wis.

Mr. G. T. Hellmuth, Claims Attorney, Chicago, North Shore and Milwaukee Railroad Company, Chicago, Illinois, read Mr. Graham's paper.

OVERCOMING THE HAZARDS OF MOTOR BUS OPERATION

R. N. Graham, Manager of Railways, Pennsylvania-Ohio Electric Company, Youngstown, Ohio

Our company inaugurated the operation of intercity coaches between Youngstown and Warren, Ohio, in August 1922; between Youngstown, Ohio and Sharon, Pa., in September, 1922. We started the operation of a city bus line in New Castle, Pa., in July, 1923, and a coach line between Youngstown and Akron, Ohio, in October, 1923.

Up to August 1 of this year, our total mileage has been 1,826,729. No person has lost his life in the operation of our busses and coaches. Nor has any person received a fracture or major injury of any kind.

The accidents reported, including broken windows and occurrences of such nature, have averaged 25 per 100,000 miles of operation. There has been no case settled in which the cost of settlement has been in excess of $1,000; only one case in excess of $500.00, and thirteen in excess of $100.00. We have six reports where persons were struck by busses, mainly in city streets, but in no case was the injury serious and $384 was the most money paid.

Taking the result of our operation as a whole, I should say that two years' experience with this form of transportation indicates that it is not an operation inherently hazardous.

All of our operation is in extremely busy thoroughfares. The highways to Warren and Sharon lie penetrate a busy industrial locality. The highway from Youngstown to Akron is one of the main thoroughfares of the northern part of our populous state. Our intercity coaches are of a uniform type. They are all of sedan deluxe type, seating 18 persons, with three doors for the use of the passengers on the sides. The only distinctive feature of the construction of these coaches, from a safety standpoint, is the fact that the driver is separated from the body of the coach by plate glass partition. We do not permit passengers to ride with the chauffeur. Aside from this, I should say that our equipment is barren of safety devices or features. Our work of preventing accidents is concentrated upon the chauffeur.

The first step to be taken in safeguarding coach or bus operation is in the selection of a driver. It is far easier to avoid accidents through care in the choice of a driver than to educate or train an ill-equipped driver after he has been selected. The ability of a man to operate a motor vehicle depends upon age, physical health, freedom from outside worries and cares, and temperament.

In selecting drivers we confine ourselves to the age limits embraced between the years of 25 and 35. Our experience has indicated to us that the man younger than 25 is not inclined to take his position seriously, is more inclined to recklessness and speed, and age and experience have not mellowed his egotism to the point where he will be patient in any and

all circumstances in his treatment of passengers. Beyond the age of 35, particularly if he has spent years at vocations other than driving, he is apt to have lost that close co-ordination between mind, vision and muscle necessary to meet the critical situations that are almost certain to arise at some time in his driving career on a busy thoroughfare. There may be exceptions to both limits, but it is far better to be arbitrary than to make experiments in individual cases, which experiments are all too apt to result disastrously.

Married Drivers Are Best

Our second qualification is that the prospective employee shall be married. I will not enter into a discussion of the reasons why a married man makes a better bus operator than a single one. I will simply say that in our experience our results have been so much uniformly better with married men that we now enforce the rule that the applicant must be married.

In the third place, the applicant must be free from defects of vision and physique. We do not enter into any splitting of hairs as to whether the defects would interfere with his usefulness as a driver. In our experience, we have had a waiting list of applicants for our positions and feel that we should have a whole man physically for this job.

An applicant being between the ages of 25 and 35, married and sound in eyesight and physique, the choice is governed by his general physical appearance, manner and bearing. A surly looking man is apt to be surly in action. A nervous, irritable man betrays the fact in being interviewed for a position, and is not suitable for bus operation. A man that is careless in his apparel and person will not appeal to passengers and is apt to be careless in his operation. These things can only be developed by a personal interview. What I have said on the matter of selecting personnel, indicates that considerable time must be spent upon this matter. As a matter of fact, on our first bus operation, we employed seven drivers, and selected these seven after personally interviewing over 200.

After the driver has been selected and appointed, then is the time to commence to talk care in operation from a safety standpoint. It has been our practice when installing bus service on a new line, to give a dinner to the new drivers, attended by the officers of the company, by our claim department attorneys, and attorneys of the insurance company, and after the dinner, the entire evening is devoted to the pointing out of the necessity of care and the essentials of safe operation. We have never deviated from this practice.

The line is therefore inaugurated with safety as the most prominent factor in the mind of the prospective employee as he takes his coach for his first trip upon the street.

However, if operation is to be made safe, the care exercised in employing drivers must be supplemented by vigilance in supervision. The word

"accident" by its derivation indicates an occurrence out of ordinary routine. If accidents are to be treated as inevitable or routine matters, then they are no longer accidents, but incidents to regular operation. Notice must be taken of every accident reported. It is our practice to interview the driver regardless of the trivial nature of the accident or lack of responsibility on his part. If investigation develops the fact that no care on the part of the driver would have avoided the occurrence, the atmosphere surrounding the investigation should be that it is still a deplorable occurrence and one showing the necessity of constant care on the part of the driver.

If there is any belief in the minds of the public at large that motor bus operation in itself presents any inherent hazard, that impression must arise from the publicity that has been given unfortunate and lamentable accidents arising from collision on grade crossings between steam railroads, interurban railways and busses, engaged either as common carriers or in the service of carrying school children. This is the worst catastrophe that can happen to a motor bus. In the case of an independently operated motor bus venture, an accident of this character often puts the line out of business. It always fills people with a dread of this kind of transportation. Therefore no effort should be spared to avoid such a deplorable occurrence. The only safeguard that I know to reduce the chance of such an accident to the minimum, is to require the coach or bus in any and all circumstances, to be brought to a full and complete stop at any railroad or interurban intersection. This requirement must be definite, positive and undeviating. In the case of our operation, this requirement extends not only to the coach while engaged in revenue service, but on trips empty to the garage, or any special trip anywhere in the country, or to any movement in which the coach is engaged.

There is no excuse in our operation for failure to stop at a grade crossing. The penalty is discharge. This penalty is enforced regardless of previous service, freedom from accidents or general reputation. As the rule is enforced, it becomes a mechanical operation on the part of the driver, so that it never occurs to the driver not to make the stop.

Of course, having made the positive stop, there is a point where the driver must exercise his judgment as to whether he shall continue his coach across the tracks. In case of the intercity grade crossing, where the view is unobstructed and a freight train is approaching at a slow rate of speed and at a comparatively great distance from the crossing, the driver must make a decision as to whether he shall cross or whether he shall wait until the train passes. The result to be sought in the instruction and education of drivers in this respect, is to wait, if there would seem to be any danger in crossing in the mind of the most careful and conservative passenger. We very much prefer to provoke the wrath of the impatient passenger rather than to arouse the fear of the most nervous. After the wait is made and the crossing successfully accomplished, the impatient passenger is the very one who will probably

turn around to his fellow passenger and comment upon the safety of the operation.

In our experience we have had only two passengers who have fallen getting on or off a moving coach, yet by far the larger part of our operation is with the sedan type body in which there are three doors that can be used by a passenger at the sides of the coach. The design seems well calculated to permit this type of accident. The situation has again been met by fixing attention upon the chauffeur. In our operation, the chauffeur alights when making a stop to discharge passengers or to permit a passenger to board, and opens th edoor in either case and closes the same. This requires the chauffeur in every case to leave his seat and the coach and go to the door involved and personally perform the act of opening and closing the door. We believe that this personal attention by the chauffeur is better than any safety device that can be secured in the way of door mechanism. It seems like considerable work to place upon the chauffeur. The answer to this criticism is that it has been done in our operation for a period of two years and not only results in freedom from this type of accident, but is treated by the passenger as an act of courtesy on the part of the chauffeur and the company, and results in appreciation of our personnel by the traveling public, and therefore results in maintaining the patronage or the public.

In our operation we have enjoyed comparative freedom from collision accidents. Our schedules are arranged with time points covering the whole route, with a little leeway in time between each time point. This results in eliminating from the driver the strain of traveling behind time. The actual speed at which the coach must travel is approximately 35 miles per hour on territory outside of the cities. This is slightly higher than the average speed of vehicles in such localities. I believe it is safer to have a speed higher than the general average of traffic, so that the schedules do not force the coach to become a part of the numerous processions of vehicles which are always found on main traveled roads on holidays, Saturdays and Sundays.

Effect of Deviations from Normal Operation

An analysis of accidents indicates that they generally follow interruptions or deviations from normal operation. It therefore becomes a part of accident prevention, to reduce to a minimum interruptions which disturb the poise of the chauffeur. Whereas in a street car is very little actual machinery from the source of power to where the power is delivered to the axle, in the case of the motor coach, the machinery through which power is delivered from gas tank to driving wheel is extremely complicated and more or less sensitive in adjustment. In our practice each coach at night is given an inspection, which roughly corresponds to the general inspection given approximately each week in street railway operation. About every ten days each coach is in for a general inspection. at which time the carbon is removed, valves

ground and other adjustments of the kind made. It is of great assistance in properly inspecting, maintaining equipment and reducing interruptions, to have very few types of chassis. We are fortunate enough in our coach operation to be confined entirely to one make of chassis, and the advantage of not having a variety of equipment, we feel, will far outweigh the superiority of one type over another, which we might secure in taking on other varieties and other models. Since all of our wheels are interchangeable the loss of time through tire interruptions is reduced to an absolute minimum. We have spare parts assembled ready to throw on a service truck and proceed immediately to points where defects may have developed.

Interruptions can be minimized by close attention to tires. It is the best practice, if possible, to confine all tire equipment to one make and to one size. Tires should be removed at the garage when curb cuts, chafes, or any other condition developes, which might result in blowouts. In coaches equipped with dual wheels, the best tires should be kept constantly moved to the front. Chains should be placed on outer tires of rear wheels, without disturbing the wheels, when sizes do not exceed 34 x 5. While coaches equipped with dual wheels show no tendency to skid, chains should be installed whenever there is snow or ice. Tire pressure should be checked whenever coach leaves garage. It will be found advisable to fully fill gasoline tank and supply engine with oil, whenever coach enters garage, so that there can be no missunderstanding at any time coach is sent out as to whether it is properly gassed and oiled. All of these things tend to reduce interruptions to a minimum, and the reduction of interruptions will in turn reduce liability to accidents.

I believe that care should be used in securing the best type of horn and, if possible, a horn should be used whose tone is distinctive. The chauffeur should also be provided with first class flash light, so that in case the lighting on the coach is placed out of commission, he can have a source of illumination to look for the trouble, or may, if advisable, proceed on his journey. This flash light should be so arranged that it can be used to the best advantage for signalling.

Brakes

Late models of busses have eliminated brakes on the propeller shaft for the reason that it was thought it threw too much of a strain on the rear end and consequently are equipped with internal expanding and external contracting brakes, acting on drums on the rear wheel. While this type of brake is adequate for a light car, it is my deliberate opinion that it is not adequate for commercial coach service. The equipment is so heavy and the number of applications of brake is so great that enough material cannot be put in the drums to properly prevent great fluctuation in braking adjustment through the effects of heat. While I have had no experience with air brakes, I do not feel that it touches the problem involved, as the air brakes system does not change the final

application of friction to the wheel, but merely changes the method of applying the braking effect. In the absence of further developments on brakes, it is certainly a necessity to pay most careful attention to the condition of brakes.

Coaches in public utility business must operate at night and special attention must be given to adequate lighting of the vehicle, outside and inside. Headlights must be adequate in size, provided with lenses that will present a minimum interference with light rays, and at the same time not disturb opposing traffic. A first class spot light should be used to define the curb when dimmers are used. Furthermore, I believe that markers should be so used that all traffic, both opposing and in the same direction, shall be made aware that the vehicle is a coach used in public transportation service. I believe this is important for the following reasons:

First. The average coach is wider than the average passenger car, and the person attempting to pass the coach should know the character of vehicle in order to afford sufficient clearances.

Second. Slow moving vehicles proceeding in the same direction as the coach are much more inclined to turn out of the way for a public transportation vehicle than they would to a passenger car.

Third. The lighting should be so distinctive that a prospective passenger can identify the coach long enough ahead to be able to adequately flag same.

When we consider our operation as a whole, we will find that the very efforts that we make toward giving a consistent and complete service to our patrons, also produce the practice that results in freedom from danger. Furthermore, when we direct our attention to the individual driver, we will find that instinctive respect for the rights of other people that results in courteous treatment of passengers, will also result in making the driver a careful, conscientious and safe handler of our equipment. It is certain that to our drivers are confided the destinies of our business, regardless of the character of our advertising, the kind of equipment furnished, the system that we may install in our terminals and garages, yet the people as a whole will judge our service by the men to whom we confide their safety while on the highway. With proper care in the selection of men, with the proper appreciation on their part of the necessity of careful operation in the beginning of their service, and with persistent, consistent and vigilant following up of their performance from the standpoint of safety and courtesy, we can confidently trust our welfare in their hands.

DISCUSSION

MR. GUY R. RADLEY (Safety Engineer, The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.): Electric railways are finding that the bus is a logical unit in the transportation system.

It is gratifying to find that Mr. Graham has given us a specific figure—25—representing the average number of accidents they have experienced per 100,000 car miles. The rest of us now can compare our accident record with that of the Pennsylvania-Ohio company. To my mind this frank statement of their experience is very valuable and helpful in a meeting of this kind. A century ago no one would have done such a thing: it would have been regarded as a "trade-secret." But today we are coming more and more to believe in co-operation.

This splendid Congress is made up of people who believe that two heads are better than one, who give their ideas for helping save suffering, and yet return with more than they brought.

Following Mr. Graham's example in giving some facts about his company at the outset I might say that the Wisconsin Motor Bus Lines, which is the bus subsidiary of the Milwaukee Electric Railway and Light Company, is now operating, regularly, routes totalling 650 miles. The equipment consists of 15 double-deck and 35 single-deck busses used in city and suburban service, and 65 interurbans.

During the last four months, May, June, July and August, there were reported a few less than 300 accidents. These included every kind, even garments soiled by mud or water. The mileage during those four months was almost a million. Hence, our average was 30 per 100,000 car miles.

There is another record I would like to see compared and that is the number of accidents per 100,000 passengers carried. Our record was a fraction less than 23.

To take up the points Mr. Graham mentions:

1. Age. They take no one under 25 years. We lower this to 21. Some of our best operators started in when under 23.

2. Marriage. We prefer married men but do not reject an unmarried man if otherwise qualified. Domestic discord may upset a man for safe driving as much as some things an unmarried man may do.

3. Vision and physique. We refer this matter to the medical examiners. Obviously, better eyesight is required in a bus operator than in some industrial jobs. Binocular vision is necessary to the correct estimation of distance.

4. Appearance, manner and bearing. These qualities are also regarded as important in making selections. We give an intelligence test to every applicant. This test has been developed experimentally for the purpose of picking out the kind of man who can be entrusted with the responsibility of handling the public. It is given by a trained psychologist. It incorporates an interview which is designed to bring out such factors as general moral level, emotional control, ability to think quickly, interest in people, courtesy, and other matters of a personal nature. The many compliments we have received upon the splendid type of men operating the busses confirms our conviction that the "test" is very much worth while.

Training the Driver

After the selection comes the training. For this we have a standardized course. The new man must first take the collector's course. This requires from six to eight days. Standard practice is just explained, giving the reasons for each item. It is then demonstrated. After that he tries it himself, practicing under an instructor until he has formed the habit of doing the work correctly and skillfully. When he goes on a bus on his own responsibility he is accompanied for four or five days by an instructor.

When the time comes to take the course for operators the four points stressed are:

1. Safety.
2. Service.
3. Operation.
4. Responsibility.

This takes 12 to 16 days. At the end, the student must pass an oral examination, followed by a full day's road test over a prescribed route. He is graded on both. Before being promoted to be an interurban driver a third test is given, covering bad turns and hills. After they are accepted and in the service they are followed up by the instructor at periodic intervals, and graded by him. Those falling below a certain standard are called into the office and shown their chart; they are given a personal talk calculated to stimulate their interest in their own improvement. The best runs are given to those men showing the greatest improvement.

The importance of this follow-up cannot be underestimated. There is always the human tendency to do the thing in the easiest way. Disaster does not result from every violation of a safety rule. Hence, if broken once it will be broken again, and then again. This explains the need of inspection, of follow-up, to discover and check these departures from the standard before the inexorable law of chance steps in and destroys innocent and guilty alike. This follow-up must be very frequent at first.

A sad case we had lends emphasis to the feature of standardization of equipment mentioned by the paper of Mr. Graham. The bus with which the accident occurred had an emergency brake which had to be pushed to apply. Other busses have brakes that have to be pulled as in ordinary automobiles. Some are located on the left and some on the right. It would seem that for the emergency stopping of a heavy bus there would be an advantage in the ability of the operator to pull with the right hand and push with the right foot. Why would it not be well for the National Safety Council to name a committee to gather data as to preferred location of the elements of control which have so much to do with whether an emergency is to be handled successfully or fatally. Coming from such a source the bus

manufacturers would doubtless incorporate these features in their new designs, and before long there would be safety standardized including such things as arranging so that no passenger would be seated beside the driver, for we all know how a pretty girl may take a man's eyes off the road ahead.

Speed

The matter of speed is a difficult one. We all know that there is no fixed value above which we can apply the term "unsafe." Nevertheless, the severity of the penalty for an error in judgment, or the results of a breakage of parts, seems to increase with the speed: We must find some means of determining the safe limit without killing people in the process.

Mr. Graham mentions that their interurban schedules are based on 35 miles per hour. That may be an entirely safe speed, but what does the driver do who has been delayed for some reason or other? Does he make up for lost time and, in doing so, does he cut around slower moving traffic? Statistics show this to be one of the greatest causes of accidents on concrete highways. Our practice has been to base the schedules on 30 miles, to allow some layover at stops, and to keep with the traffic on Sundays and holidays. During the four days around the Fourth of July we carried 58,000 persons without a single accident.

MR. G. B. POWELL (Secretary, Kentucky Carriers, Incorporated, Louisville, Ky.): The only reference I wish to make to Mr. Graham's paper is emphatically to emphasize his statement that in the selection of operators, their supervision, the maintenance of schedules and the proper maintenance of equipment, is to be found the best method of overcoming the hazards of operation. The operation as described by Mr. Graham is almost entirely interurban, while that of the Kentucy Carriers is strictly city service, and so I hope a recital of our experience will add something to the discussion of the subject.

On Sunday, June 24, 1923, the youngest member of the Louisville Railway family, "The Kentucky Carriers, Incorporated," made its initial bow to the people of the city of Louisville, establishing service on Third Street from Main Street, in the business section, to Brandies Avenue, in the southern residential district, a distance of 3.3 miles, operating on a ten minute headway. The equipment consisted of six White Model 50 chassis, Bender body, front entrance and exit, automobile type seats, upholstered with leather seating 25 passengers each. One month later, July 22, six additional coaches of the same type were placed in operation from the same downtown terminal to Bonnycastle Avenue in the Highlands, the eastern residential section of the city, a distance of 5.5 miles, providing the same headway as on the Third Street Line. This 10 minute schedule was maintained until September 2, at which time the base schedule was cut to a 20 minute headway and the coaches thus released were used to establish a line

from the downtown section over a west end route to Parkland, a distance of 4.5 miles. This line was discontinued in November and the Third Street Line discontinued in May, 1924, in order to extend the Highland Line into territory not as conveniently served by street cars as other sections of the city. This extension added 1.4 miles each way, making total length of line 7 miles, and at the same time was rerouted through Fourth Street placing the coaches in the heart of the retail district over the most congested streets in the city.

Taking into consideration that in this age of speed, gasoline, rubber and wrecks any additional vehicle placed in operation on our streets would add to their already crowded condition, and that such vehicles in the role of public carriers must at once establish themselves in the public eye as an absolutely safe mode of transportation, it was deemed very necessary to make a careful selection of the operators. This was an easy task, however, with 900 responsible men to select from. Thirty days prior to starting the operation of these coaches a bulletin was issued to the trainmen in the employ of the Louisville Railway Company requesting applications for positions as coach operators. Seventy-five men filled out applications and the 26 required were selected, the choice being based on their experience in driving heavy automobiles, their records as trainmen and age, men under 30 years being given the preference. These men were given preliminary instructions on a five ton White truck by a driver of the White Company and one of our supervisory officials, and actual experience operating the coaches three days before the first line was started. Shortly thereafter an expert from the White Company was obtained to instruct the men further on acceleration, braking, gear shifting and such details.

Placing Responsibility on the Operator

It may be well to mention here as an important fact that after the selection of the operators a meeting was called at which they were told the aims and intentions of the company, that the operation of coaches in Louisville was purely experimental and that the responsibility for the success or failure of the venture rested almost entirely upon the individual operator. The spirit of cooperation has been 100 per cent, this being shown not only by an unequaled record for safe operation but also by the readiness with which those coaches acquired the reputation of being the most carefully operated vehicles in the City of Louisville.

Our accident records are based on "miles operated per chargeable accident." All accidents, near accidents or unusual occurrences are reported daily on the regular accident form and are divided into three classes. These are "operator's fault," "non-committal" and "no blame." The "non committal" accidents are those which, though not the operator's fault, might have been prevented by him. The "no blame" accidents are those which could not have been prevented by the operator.

Of the three classes of accidents, two, the "operator's fault" and the "non committal" are charged against the operator's records.

During the last six days of June and the month of July, 1923, 26 accidents were reported—operator's fault, 11; non committal, 2; and no blame, 13, making the very poor record of only 3,465 miles per chargeable accident. August showed slight improvement, with 3,999 miles per chargeable accident. About this time the seriousness of operating half grown apartment houses on rubber wheels through narrow streets dawned upon the entire rank and file of the Kentucky Carriers, Incorporated, and many were the small group meetings held by operators and supervising officials to discuss ways and means of producing a real record. Results were shown in September where 5,164 miles were operated for every chargeable accident. In October, this rose to 6,828 miles, to 45,655 miles in November and, in December, to 15,760 miles.

At this time the operators and supervising officials decided to start the new year with an extra effort, to make a clear record for the month of January. In this they succeeded stacking up during the month a record of 47,822 miles not per accident, but without an accident. In recognition of this accomplishment the operators were invited to the monthly safety banquet, at which they promised the managing officials that they could be expected at the safety banquet the following month with another 100 per cent record. True to this promise, they came, and they repeated each succeeding month for nine consecutive months, operating from December 28, 1923, to August 25, 1924, a distance of 345,008 miles, equal to 13 4-5 times the distance around the world, without an accident which was the operator's fault or which they could have prevented. This, we believe, is a world's record for coach operation in city service. One hundred and eighty-seven accidents were reported between June 24, 1923, and August 31, 1924, of which 134 were classed "no blame", 24 "non committal" and 29 "operator's fault." It is interesting to note that of the total accidents reported, 133 were with automobiles, 91 of which ran into the rear of coaches.

Cost of Accidents

The cost of accidets has been 1.87 per cent of the gross receipts. We have operated 635,000 miles without a fatality. We have not injured a passenger and the few slight injuries to non passengers arising out of our operation have been due almost entirely to automobiles running into our coaches.

Summing up the safety situation, we have found that this is a proposition that can be handled only by the ability and cooperation of the individual operator. The hazards are there. He meets them face to face and he must feel that they are his responsibilities. Reckless and irresponsible drivers, careless pedestrians, steam and street rail-

way crossings, children on the street and thousands of other conditions confront the operator in which he must have ability to think quickly, to judge correctly and to act promptly. Ability alone will not do this. The operator must have that spirit of cooperation which keeps before him his company's interest and be a man big and broad enough in mind and thought to realize the big thing in accident prevention is the saving of life, limb and suffering.

The personnel of the Louisville Railway family, which includes the Kentucky Carriers, coming as it does from the best brand of American manhood, "bred in Old Kentucky," has been taught for generations to deal squarely, live clean and fight hard. In consequence, these men have developed the spirit of cooperation and individual interest in the business they represent to such a degree that they practice safety as a matter of company and civic pride, carrying out the best known safety rule in existence today, "Do unto others as you would that they do unto you." With our present force on the front end of our coaches and a good bumper on the rear we are most optimistic as to the continuance of our safety record.

MR. G. T. HELLMUTH (Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.): The Chicago, North Shore and Milwaukee Railroad operates approximately 40 motor busses, mostly in operation from city to city, and, of course, being adjacent to Chicago it is through a section where the streets are congested and the accident hazard is always present. Operation was commenced about two years ago at which time it was thought that some form of insurance should be taken out, which was done, not against employee accident but against public accident. The cost of that insurance was $700 per bus per year for the 40 busses. About a year ago we decided to discontinue this insurance, and we took the risk of building up our own reserve. The cost per bus per year for the 40 busses was $140, and we are building up our reserve very nicely. We have in mind, though, the ever-present danger of a bus going into a ditch or being struck at a highway crossing, and so we have catastrophe insurance, which Lloyds seems to write ever cheerfully, and that costs us, for our 40 busses, $5,000 a year. For that we have insurance in excess of $10,000 and not to exceed $25,000. Combine $5,000 and 40 times $140, and it gives us a very low rate as compared to 40 times $700.

Runs with 25 Mile Speed Average

MR. R. R. HADSELL (New York State Railways, Rochester, N. Y.): We have two suburban bus lines and one is seven and one half miles, between Rochester and Pittsford and the other is 25 miles. Traffic is rather congested and in many places we cannot make thirty miles an hour and run safely. On that line it is congested and we average 25 miles an hour. We have also a trackless trolley of three miles. Bus lines operate eight busses connecting seven of our city lines and it

is very popular. We have operated about 11 months and we have operated very successfully and our accidents are similar to our last year's record. We have very, very few accidents and our liabilities are covered by a casualty company. Most of our accidents are caused by some automobiles running into the rear of our bus, or an accident that cannot be charged to the operator. I believe we have had only one passenger accident.

MR. J. H. TRUETT (United Railways and Electric Company, Baltimore, Md.): I cannot give you any accident figures between the two men busses and the one man buss but there is a hazard. A hazard developed on our duplex busses through the fact that there was no step from the platform to the street. The passenger coming out of the bus steps onto the platform and from that to the street. Many times when the passenger alights he thinks there is a step from the platform to the street, and anticipating that step he is thrown. It occurred to me that as we are placing before the bus manufacturers the matter of standardization of brakes it might also be well to place this matter of steps before them at the same time. I have placed a light directly underneath the platform so it will show the street at night. When the passenger comes out he sees the street instead of the step and is saved. I have also put up a small sign, "One step to Street".

MR. RADLEY (Milwaukee): It just occurred to me also in regard to Mr. Graham's paper where he mentions the crossing of railway crossings. We require that the operator shall not change gears while passing over a railroad crossing. If he starts to cross at a certain speed or gear, he must retain that gear all the way across.

CHAIRMAN BARNES: It seems to your Chairman that Mr. Radley made a very important suggestion about a committee to study these things and arrange basic conditions for auto busses for transportation. Do you care to take any action on his recommendation?

MR. H. K. BENNETT (Safety Manager, United Electric Railways, Providence, Rhode Island.): I move that a committee be formed in this section for the purpose of looking into the matter of standardization of size of appliances and everything in connection with the general operation of motor busses. (The motion was seconded and was carried).

CHAIRMAN BARNES: The next subject "Why We are Interested in Safety" was to have been presented by Mr. John W. Carpenter, General Manager, Texas Power and Light Company, Dallas, Texas. He was unable to be present and the subject will be presented by Mr. Robert J. Williams of Youngstown, Ohio.

WHY WE ARE INTERESTED IN SAFETY

Robert J. Williams, Youngstown Municipal Railway, Youngstown, Ohio

The reason a person becomes interested in anything is surely because of the benefits to be derived from his interest, or on the other

hand, he may become interested in order to escape some penalty which he knows will be coming to him on account of his lack of interest.

I have no hesitation in saying that we are interested in safety, not because we have fear of punishment, here or hereafter, but simply because of the wonderfully good results of our efforts in this direction.

A glance at our accident report for August of this year as compared with August of 1923 should convince the most skeptical that it is profitable in more ways than one, to be interested in accident prevention.

The number of accidents per 1,000 car miles is the lowest in the past five years, being only .398 or one accident for over 2,500 miles operated. The number of accidents per 100,000 passengers carried is also the lowest in five years, namely 6.83.

Collisions with persons have been reduced 50 per cent.
Collisions with vehicles have been reduced 33 per cent.
Collisions with cars have been reduced 57 per cent.
Passengers falling in cars have been reduced 75 per cent.
Fell getting on or off cars have been reduced 37 per cent.
Collisions vehicles with cars have been reduced 19 per cent.

The total number of accidents tabulated for the month of August is 129, which is a reduction of 31 per cent from the figures for 1923. These results are very encouraging and establish one reason why we are interested in safety.

Since we took up accident prevention work in a systematic manner we have found that our employees have become progressively more interested from month to month. This, alone, is one place where the company has been repaid a hundred fold for its interest in safety work. The men are earnestly trying to prevent accidents. They are decidedly cleaner in their personal habits and smarter in their appearance. Their dispositions have entirely changed for the better; they are more reasonable in their demands. Fault finding is almost a thing of the past and, in its place, we have loyalty and cooperation. The men on our safety committees are very businesslike in the conduct of the meetings, and regret sincerely the expiration of their term of service, often declaring they will not pass up any opportunity in furthering the interest of safety work, but will consider themselves as still being members and will cooperate with the committee in every way.

The company has gone the limit sometimes, to carry out some recommendation that has been made by an employee and in this manner encourages everyone to make suggestions.

Not all of the suggestions received are strictly safety suggestions. A large proportion are what maybe termed "service recommendations" as they embrace suggestions for the improvement of our operations even

including that of maintenance. Perhaps this is one reason why we have been able to get into such close contact with the men, for they see how willing the management is to co-operate with them and they naturally bring their individual problems to us.

All Recommendations Acted Upon

Our transportation committee has made over 180 recommendations, only three of which have not yet been complied with, but I believe that these three will be taken up again later, and closed to the satisfaction of all concerned.

We are interested in safety because it has brought the employees into closer touch with the management.

Quite a number of unusual recommendations are received and I recall one made by a laborer working in the yard at one of our power houses. It was to the effect that a switch engine used in the yard be turned around so as to head in the opposite direction, the object being to make unnecessary the continual crossing of the track in front of the engine in order to throw switches, and to recross the track to give signals. Needless to say, the engine was turned at once, and we then found that it had been headed the wrong way for many years, but it took a common laborer to figure out what was wrong. College men do not have a monopoly on common sense and even the least experienced can see hazards.

We are interested in safety because it has caused our men to think and right thinking sharpens the intellect and promotes efficiency.

For about two years we have had four teams of 75 trainmen, each engaged in a monthly accident prevention contest. The winning team each month is given a dinner at which some prominent man of the city gives a talk. We are now receiving requests from men on the losing teams asking that they be permitted to attend the meetings after the dinner has been cleared away. The dinner has no great attraction for them; it is the talks in which they are interested. We have found that a good speaker is worth all of the trouble and expense in procuring one. In addition to this dinner we are now giving individual recognition by a bonus of one dollar for one month without a chargeable accident, two dollars for the second month, and three dollars for the third and each succeeding month of no accident. It is surprising to see how keen and alert the men have become in preserving their records.

This safety work has taken us into the schools. Safety films have been shown and talks given by safety men. It is very gratifying to know that very few children of school age have been injured by our cars. Safety poster contests have been conducted in the schools and this has been productive of much good.

We had such a contest on August 28, on the occasion of Kiddie's Day sponsored by one of our newspapers. Posters of the National Safety Council were displayed and a money prize was given the youngster naming the most popular posters on view. This proved to be the busiest corner on the picnic ground. The contest was very successful and we know that the lessons will not soon be forgotten by the children. In fact quite recently a little boy was saved from accident by the prompt action of one of his boy friends. Our safety supervisor, who witnessed the incident and talked to the children, was told that the older boy had been at the picnic and remembered the poster depicting a boy on roller skates in front of a street car and narrowly missing an automobile on the other side. If we are instrumental in preventing the suffering or death of children through a preventable accident is this not a very good reason for being interested in safety?

We are indebted in a very large measure to the Bureau of Safety of Chicago, for the success we have attained in our accident prevention work. The men coming to us from Chicago are experts and bring to us their experiences met with on other properties. They are very likable fellows and are treated by the trainmen as one of the family. Their character is such that we respect them, and the trainmen are inspired to give their very best service.

The payment of compensation for injuries carries with it very little satisfaction, for no matter how large the amount or how willingly it may be paid, you will have lost a friend, and made a number of enemies, all depending on the size of the family and the number of the injured party's relatives. Money paid out for accidents is lost to the company; there is absolutely no return either in dividends or good will.

To sum up the whole situation and to answer the question as to why we are interested in safety, I would say that it is because it is humane to do so. To save human life brings its reward not only in the satisfaction of having done a good deed but there is the further satisfaction in knowing that we are doing our bit in making this a better and safer world in which to live.

DISCUSSION

MR. JAMES HARMON (Interstate Public Service Company, Indianapolis, Indiana.): We have conducted service work for a number of years and our experience on a comparative basis shows why we should be interested in safety work. We carry on our safety work in a systematic way and make a part of our business, and, as far as our electric railway is concerned, it has increased in growth considerably, and even though we have increased in size we have had a reduction in our accidents. We have done this by teaching our employees to prevent accidents.

The responsibility is placed on the trainmen, and we hold our regular get-together meetings with them. They have become very much interested in the work, in fact, they have become so interested that if we do not hold our meetings on the scheduled time they want to know why. We started our work in 1907 and we have carried on our safety work with wonderful success and I have no comparative figures, but I know that the accidents are decreasing in view of the investigations into our business.

The executives of our company have taken a very active part in the work of accident prevention, just the same as the foreman or the superintendent of the shop or the trainmaster or our road supervisors. We find that if the men in charge do not take a leading part the ordinary man under them does not think it worth while. So in our work we have shown the boss that it is his business and that he is resonsible for the men under him. When an accident does occur we do not put the blame on the injured party but upon the fellow in charge of him, and if you will make your investigations carefully you will find that in many cases it is due to the fact that the foreman in charge has not given proper supervision to the men under him. We think it important to fix the responsibility and eliminate a recurrence of such an accident in the future.

The safety engineer has a pretty big job to keep the employees as well as the foremen over them interested, and he must put a good deal of care into that. We don't want to make the work monotonous to the men, and we must be on the alert all the time to see that these meetings are interesting so the men will like to come, and we must prepare a program so the men can take an actual part in it. When this is done the employees, themselves, realize that the work is for them, and they also realize the value of the safety work. We realize and we tell them that the work is for their benefit and not for the benefit of the company from a dollars and cents standpoint. In our company we think of the effect the accident has on the public, and for that particular reason alone everybody ought to realize the importance of accident prevention.

It has been my hope for a long time that the interurbans, the street railways, and the bus operators would standardize on proper advertising in the way of card advertising or road crossing advertising. When people get to know there is a regular standard of advertising or notices that they are approaching an interurban, right there I think it helps us materially.

Conduct of Meetings

We also find that it makes the work more interesting and beneficial if we have our president or vice-presidents at the central meetings which consist of the foreman and the supervisory forces. If you have the chairman of your supervisory force conduct and take charge of

that meeting you will see that it will materially impress upon the employee the fact that there is greater interest shown in his work. Another thing: we feel that it is important to have rules for all operations. In our company, we have rules for the track men, rules for the trainmen, rules for every department, and we try to do the best we can to get every man even though he cannot read to have somebody tell him what the rules are so he will know them. And one of the most important things is to see that the supervisory force sees that those rules are carried out. We realize and know that the violation of rules causes most of our accidents.

MR. J. H. HANDLON (Claim Agent, Market Street Railway Company, San Francisco, California.): Twenty years ago it was my lot to work for the claim department of an eastern railway company, and at that time the claim agent did not know anything about the prevention of accidents—that was left to the operating superintendent. He was the man who handled the claims for accidents and he tried to account for the accident as best he could and that was the end of it. In 1908, or sixteen years ago, I took charge of the Market Street Railway Company of San Francisco. That year we had 84 fatalities in a city of 450,000 people, and that was more than New York City had. We did not have fenders at that time. The figures kept at a high rate until about 1913, and at that time we put on a basket sort of a guard and the fatal accidents were reduced to approximately 36 a year. Even then they compared unfavorably with the Public Service Company of New Jersey.

At that time I thought I ought to begin to broaden my functions and I then decided that the claim agent should not only dispose of yesterday's accidents but should prevent as much as he could the accidents of tomorrow. I went into a thorough investigation of each accident. Last year we killed but 22 persons on our property and this year we have killed eight less than last year. Today we carry about 50 per cent more passengers and operate about 50 per cent more miles per accident than we did 16 years ago.

MR. H. K. BENNETT (Providence, R. I.): There are many railroad men even today, I am sorry to say, that are skeptical as regards to having a safety director or a safety man or whatever you might choose to call him, and I arise to tell you what has been accomplished in one year in Providence, Rhode Island, since they have taken on that work.

For more than 20 years I had the pleasure of settling claims for railway companies, and in March, 1923, I found myself on the job where I am now employed. The first eight months of 1924 as compared to 1923 showed a decrease in accidents of all classes of 29.6 per cent. We have decreased automobile accidents, in spite of the 15 per cent increase in registration, by 22.8 per cent. During the same period expenditures for current claims have decreased 33.88 per cent with a decrease in claims of 27.31 per cent. For the first

25 days of September all accidents have decreased 31.6 per cent, and automobile accidents 33 per cent. For the same period in 1924 over 1923 automobiles have increased in that period 35.7 per cent and all accidents 26.9 per cent.

MR. E. K. EASTHAN (United Railways of St. Louis, St. Louis, Mo.): I would like to back up what Mr. Bennett has said as to what organization of a safety department will do, and I am speaking for perhaps a larger system than has as yet been heard from. We started organizing safety work about eight months ago. I hold today the position of safety director and during the month of August we cut accidents to 716, amounting to 32 per cent as compared with August of last year. So far this year we have cut accidents approximately 2,900 over the same period of last year and our cut in claims has been approximately the same proportion. We have 40,000 automobiles more than last year, or a total of about 135,000, and we have reduced automobile collisions by a little over 25 per cent in the month of August. We have cut our car collisions 60 per cent.

Education of the Public

MR. J. H. TRUETT (Baltimore, Md.): Most of the discussion has been toward the side of educating the employees, but I want to turn it to the education of the public. We, in Baltimore, have turned to the public. Last year there were developed quite a number of local safety councils. We are fortunate in having one in Baltimore and it has been of great value to us in our work. The director of the Baltimore Safety Council asked me to prepare some copy, which I did, and I think every man who is a railway man will appreciate the opportunity of giving it out to the public. We distributed 25,000 pamphlets to the automobile drivers in which we showed them the hazards that we saw, and I prepared some figures and showed them in the exhibit. We asked the B. & O. Railroad to come in, too, and it was really a people's exhibit, and the people did not feel that it was a United Railway exhibit.

Another thing was used at the Better Homes and Builders' Exposition. There we erected a kiddies theater and showed safety slides. We reached in that way 25,000 children and 75,000 adults. So I do not think the work now lies so much in the education of the employees as it does in educating the public. If it is possible to get a local council in your town or territory I think it would be of great value to any railway company.

CHAIRMAN BARNES: One other point in this matter of educating the public. Don't overlook the fact that your own platform men are the best educators of the people. If you will pardon me, I will cite another home experience. It is amazing to know the interest taken by the people who ride the cars from these car houses as to the standing of their car house from day to day. It is a positive fact that a great

many people who have never regarded the railway proposition at all except for the ride have actually come to be constructively interested in what we are trying to do, because of the fact that they see that the winning car house is going to get a dinner. That is the greatest leaven we can put into our work—getting the public interested in this proposition.

MR. C. E. ROBB (National Safety Council, Chicago): Mr. Williams and I have given some thought to the causes of accidents. The trouble as I see it with a classification is that personalities might creep into the classifications. When you say it was the fault of the motorman you don't know any of the circumstances of the accident. It seems to me it would be better if the accidents were classified according to manner of occurrence and the circumstances surrounding them. Then we could get some benefit from the record of the accident whereas we do not know what the attendant circumstances are when we say the motorman was or was not to blame.

DR. CHRISTIAN P. SEGARD (New York City): This classification of accidents is going to come up for standardization very shortly. We tried at one time to classify our accidents as to who was to blame. I want to say that the platform man is never to blame in his opinion. We tried to form a committee composed of myself, one representative of the claim department and a representative of the department involved, and again we bumped up against a stone wall. With regard to accidents as far as motorists collisions are concerned, we had our share and we are not decreasing. They remain about the same and the saturation point as far as New York City is concerned has not been reached although we have 400,000 autos in New York City.

MR. VICTOR T. NOONAN (Chicago Surface Lines, Chicago, Illinois.): I came in here to listen, but after hearing these thoughts expressed I thought I would be falling down on my job to prevent accidents if I kept silent. In listening to the discussion this morning I have been impressed with the splendid knowledge of this problem presented by the various gentlemen. No man can go to this conference and not learn something. For instance, one speaker emphasized the importance of paying attention to employment department. That man is applying his hand on a very, very sore spot, a spot that needs attention.

It is not so many years since I was called to Cleveland to start a system of accident prevention. I know what that effort cost me in my own personal efforts. Then I was transferred to Chicago, and personally I don't like Chicago, because I think of all places it is the most hard boiled. I go home at night and wonder whether I shall have courage or enthusiasm to begin again the next day that work that lies before me.

What was the situation there? You operating heads that think you have a hard job, let me tell you about Chicago. Here is a company that has operated say for 30 years without a single scientific accident

prevention. Three different street railway companies operated with different colored cars and one is working against the other. Then comes a new management, and the new management brought me in. I believe that we had about 1,000 accidents a week. I don't know how many motor car accidents, and we had 2,400 street car collisions with other vehicles, and we had 2,400 men repairing these street cars. I looked over the city and found that it had no community spirit like Louisville, Buffalo, Rochester and Detroit.

I found in looking over the statistics that last year there were 719 people killed on the streets, and 150 persons were killed in collisions with street cars. Fourteen trainmen had been killed in the 12 months ending December 31 last. Accidents were so numerous and so varied that I decided not to attempt to cover all accidents in Chicago, but I picked out of the mass some one kind of accident on which I could put to work some remedy and reduce that particular class of accident as a proof that accident prevention could be accomplished in Chicago no matter what the difficulties were.

What was the first difficulty? Mr. Blair called for the holding of 32 meetings for 16,000 men. I found when we started that little program of work that there was another agent outside of the company that had to be reckoned with. They have the largest street railway men's union in the world in Chicago, a union that actually gives orders to the board of directors. The officials said, "You can never hold meetings for the trainmen because the unions would pass the word around and there would be nobody there."

My first meeting was held with union and board members scattered throughout the room. I was a stranger to them all, and I did shake my sleeve to show them that I had no tricks up there. I told them I was there for their own benefit and that I had received no instructions from either side. I approached my men on faith. I made it clear that I was there to help them and that we were all going to help each other, and that no doubt they were doing the best they could.

In the program of the work I selected the elimination of the fatal accidents among the employees. I backed that up with the explanation of the fatal accidents in connection with the street cars of the 14 men killed last year.

This year in Chicago we have 3,900 more men employed than last year, and we have 51,000 more automobiles on the streets, and our traffic has been four and one-half million passengers a day. We are now entering the tenth month of our work and there has only been four employees in all the departments killed as against eleven for the first 10 months of last year.

THURSDAY MORNING SESSION

CHAIRMAN BARNES: The first business on the program this morning will be the report of the nominating committee.

REPORT OF NOMINATING COMMITTEE

MR. J. H. TRUETT (United Railways & Electric Company, Baltimore): Your committee met and after due consideration and without malice aforethought made the following nominations:

Chairman, H. M. Keyser, secretary, Washington Railway and Electric Company, Washington, D. C.

Vice-Chairmen, R. R. Hadsell, general superintendent of transportation, New York State Railways, Rochester, N. Y. and Melvin W. Bridges, safety engineer, Chicago Rapid Transit Company, Chicago, Ill.

Secretary Neil Funk, safety engineer, Louisville Street Railway Company, Louisville, Ky.

(The report was accepted by unanimous vote.)

REPORT OF COMMITTEE ON AWARD SYSTEMS

R. R. Hadsell, General Superintendent of Transportation, New York State Railways, Rochester, N. Y.; Chairman of the Committee

It was thought that such an investigation as was assigned us would present data which might furnish the basis for some definite conclusions, or that from its experience, the committee might make specific comment or suggestions with regard to the relative merits of the various plans.

So that a clear understanding may be had of the manner in which the committee proceeded in its investigations the progressive steps will be set forth somewhat in detail.

A questionnaire was prepared and sent out to members of the Electric Railway Section of the National Safety Council. While nothing original or unique is claimed for the questionnaire except insofar as it was brief and requested specific information which could readily be given, there was a departure from the usual manner of designing and forwarding the questionnaire. Inasmuch as the returns from the questionnaire were unusually satisfactory from both the standpoint of numbers and content it may not be amiss to devote a short space to a more detailed description of the vehicle which supplied the data from which the committee gleaned the facts which are forthwith to be presented.

Knowing the aversion of most people toward anything that even resembles a questionnaire, the committee conceived the idea that a less formal request for information, one that seemed more personal, might be accorded a more cordial reception. Accordingly, each member of the Electric Railway Section of the National Safety Council received a request for certain specific information, written on the stationery of the company represented by the chairman of your committee. The first impression given by this scheme was that another company, rather than a national organization, was seeking the information.

Eighty-three companies, out of the 120 to whom the questionnaire was sent, responded; one reply came all the way from Kingston, Jamaica, British West Indies, and another from Sidney, New South Wales, Australia.

A systematic digest of the 83 replies afforded an opportunity to study many diverse attitudes toward the matter which was the subject of our survey. That the subject of bonus or award systems is one in which the membership is keenly interested is manifested in a variety of ways. Twenty-eight companies expressed unmistakable interest, a number of them specifically requesting that we publish or otherwise make known to them the results of our study. Forty-four companies had had no experience with safety bonus or award systems. This statement should be qualified to the extent that in those cases where a company simply replied, "We have no bonus," it was assumed that the company had had no previous experience. Thirteen companies actually had in operation a bonus or award system, six gave dinners to certain groups of their employees, (which they did not consider a bonus.) Fifteen expressed themselves as decidely opposed to the bonus, never had had any and never did want any, while several had had a bonus, but for various reasons had discarded it.

Views on Bonus

The companies whom we found antipathetical toward the bonus as a means of stimulating interest in accident prevention had had unsatisfactory experience with some sort of bonus system or were opposed to it in principle. The contention of the latter group is that it is just as illogical to pay a man a bonus for operating without accidents as it is to offer him a prize for being honest. They contend that it should not be necessary to pay a man twice for the same thing. This is simply another way of stating that accident prevention is not a thing apart but part and parcel of efficient operation.

Some members of this group feel that accident prevention has, of itself, a sufficiently impelling motive to interest and inspire men to devote themselves to its cause. Their belief is that there is in every man enough compassion, sympathy and consideration for his fellows that no artificial stimulus is required to induce him to endeavor to avoid accidents.

Another reason advanced in opposition to the bonus system is that it increases "no report" or "blind" cases. This is a common objection and is one of the first, if not the foremost, among the adverse criticisms voiced by the claim agent against the bonus or award system.

The equitable distribution of the awards given is another source of difficulty in the successful functioning of a bonus system. It may not seem fair that the conductor should receive a share equal to that of the motorman because the burden of the prevention of accidents is carried by the motorman.

Some companies have taken cognizance of this fact by awarding 75 per cent of the bonus to the motormen and 25 per cent to the conductor. Others do not differentiate between motorman and conductor and divide the bonus equally between them.

Among the opponents of the bonus system are those who have, through unfortunate experience, been led to their present attitude. Originally open minded on the subject they were willing to be convinced that the bonus would hasten the attainment of a desired objective and, after what seemed to them a reasonable trial period, abandoned the scheme as unproductive of appreciable results.

The blame, fairly enough, was not laid upon the bonus as such, but it is thought by some members to have been due to the particular type of bonus adopted. It is conceded that had another form been employed it might have accomplished results that would have justified and assured its continued operation.

The friends of the bonus system are prepared to champion the various forms of bonus, each adherent enthusiastically endorsing his particular type.

A criterion of successful accident prevention is found in a reduction of accident costs, frequency and severity. The most convincing example being the one in which a reduction is evident in each of the three classifications.

Measured by this standard, and not found wanting, those properties which have adopted the bonus system may be justified in contending that the bonus is a potent force in the reduction of preventable accidents. Their experience would seem to repudiate the charge of opponents of the bonus that "no report" or "blind" cases are more numerous under the bonus system as there is no evidence in support of this contention that could be found in the voluminous material from which this report was prepared. However, the committee is not prepared to go on record as asserting this as conclusive evidence or undeniable fact. The matter of "no report" cases is controversial, the frequency of their occurrence problematical and their entire elimination under any system improbable.

Forms of Bonus

It is interesting to note the varied forms of the bonus that have been adopted by electric railway companies.

A cash bonus is ever popular with many who much prefer a monetary reward to one of any other kind. To them it represents a definite value which can be measured in terms of units which are familiar to everyone. A reward of five dollars, for instance, twenty-five or one hundred is likely to be an incentive to the individual who loves money for what it will purchase for him either in material comforts or security against want in old age. The money award is given in various forms. Some

companies fix an arbitrary sum of five dollars or some multiple thereof, others set aside an amount contingent upon the cost of accidents during the year, any savings being divided between employer and employee upon some predetermined basis. One company pays one half cent per hour per annum as a bonus charging against this 300 hours for any accident occurring during the year that might be attributed to the personal negligence, indifference, or carelessness of the motorman or conductor.

The cash bonus is paid bi-weekly, monthly, quarterly and annually. Like the bonus itself, the frequency of payment varies according to the choice of the individual company. Some companies believe that, in order to maintain the interest of their men, the bonus must be paid at short intervals while others prefer to present a larger amount at less frequent periods.

Time and space do not permit a detailed account of any of the many forms of cash bonus that are in effect or have been tried by member companies. There are but few systems that may be said to be unique, most of them being adaptations or modifications of some older form of cash bonus. Doubtless, the discussions that are to follow thi sreport will precipitate many questions and thoughts that are in the minds of those in the audience. A list of those companies which are paying a cash bonus as well as those paying any other form of bonus is appended so that those who are interested in any particular cash scheme or one of the other forms may communicate with headquarters of the National Safety Council as all of the correspondence relative to this subject of bonus awards will be placed in its keeping.

Instead of the cash bonus we found that some of the companies are offering uniforms, other articles of merchandise and vacations with pay as awards for exceptional safety work. The same general characteristics regarding elegibility of the individual motormen or conductor that applied to the cash bonus prevailed in the distribution of the other forms.

A third form of reward, one which by some companies is not considered a bonus, is the giving of dinners to a group of men whose record has been such as to warrant some special recognition. One division may have had an unusually small number of accidents as compared with those of the other divisions. To such a division would be given a dinner as a token of recognition on the part of the company. In some instances, the wives of the men are also invited. This latter form of award has much to commend it. Among other things it subordinates individual effort and promotes group effort or team work, of itself a feature of no small importance in railway work. The group award has a tendency to lessen the likelihood of "blind" or "no report" cases because an individual in a group who sought to hide an accident and thus jeopardized his group's chances of winning by handicapping it with a penalty for non-reporting, would be made unwelcome in his

own group and therefore more apt to be on his mettle than if he had only himself to consider. Another factor that is favorable to group effort is that there are men who like to be associated with others in competition and are not and cannot be interested in a lone game. If they can help their group or team they are willing to add their assistance. The difficulty attending an equitable distribution of individual awards is eliminated by the group awards whether it be a dinner or some other.

Manner of Administration is Important

It is difficult, if not impossible, to make a comparison of the effectiveness of the various bonus systems. Comparisons are never satisfactory and to attempt to draw conclusions that would be convincing might produce evidence that would be misleading if not contradictory. Local conditions must govern each case, and each company must decide for itself which form of bonus is likely to be productive of the greatest amount of good, taking into consideration each of the various factors that naturally enters into such a project. It is not illogical to assume that because the cash bonus has proven efficacious in a number of instances that it would probably be productive of some good on a property in question. Again, because of the fact that a cash system had proved undesirable in a few instances it does not follow that it should be denied consideration.

The opinion of the members of the committee is that the form of the bonus or award, is not so vital to its success as is the manner of administration. First, and of greatest importance, the award must be so equitably distributed that there can be no feeling of partiality, or discrimination. It must be clearly understood so that the men will not be prejudiced through lack of understanding of any of the provisions regarding eligibility, the amount due them, or the justice of any penalty that might preclude their participation in any benefits it contains. The foundation of the whole success or failure of the award system rests upon the bond of good faith that has been established between the company and its employees. Without that, any system or scheme is doomed to failure at its very inception.

In conclusion, therefore, your committe would recommend to any company that is contemplating the adoption of a bonus system as a reward for successful accident reduction work, that it first establish evidence of good faith; second, that it select a system that seems fair to all who may be expected to participate in its benefits and, lastly, that the proposition be fully and carefully explained to all of the men before it is put in operation.

The committee is indebted to the members of the Electric Railway Section of the National Safety Council for the material from which this

report was prepared and takes this opportunity to voice its appreciation of their co-operation.

Respectfully submitted,
By the Committee on Awards and Bonuses,

R. R. Hadsell, chairman
B. D. Haskins,
H. Restofski.

COMPANIES HAVING BONUS SYSTEMS IN OPERATION ON THEIR PROPERTIES

COMPANY	LOCATION	BONUS
Jacksonville Traction Co.	Jacksonville, Fla.	Day off with pay per month—after four months for motormen—ten months for conductors.
Charleston Int. R. R. Co.	Charleston, W. Va.	Uniform—annually — motormen only.
Washington Railway & Electric Co.	Washington, D. C.	Monetary—quarterly—no difference between motormen and conductors.
Memphis Street Railway Co.	Memphis, Tenn.	Confidential report given.
Gary Street Railway Co.	Gary, Indiana	Annual vacation—five days full pay.
Menominee & Marinette Light & Traction Co.	Menominee, Mich.	Monetary—quarterly.
Northeast Oklahoma Co.	Miami, Oklahoma	Monetary—quarterly.
Los Angeles Railway Co.	Los Angeles, Cal.	Monetary—merit system.
Tennessee Electric Power Co.	Chattanooga, Tenn.	Monetary—semi-annually — no difference between motormen and conductors.
West Penn Co.	Pittsburgh, Pa.	Monetary—monthly.
Nashville Railway & Light Co.	Nashville, Tenn.	Monetary—quarterly — motormen 75 per cent; conductors 25 per cent—must work 700 hours per quarter.
Durham Public Service Co.	Durham, N. C.	Uniform—for 12 months without accident.
El Paso Electric Railway Co.	El Paso, Texas	Day's vacation with pay—monthly.

DISCUSSION

MR. H. F. WEBB (West-Penn Railways Company): The West-Penn system has two forms of cash award for the trainmen. Although we have had it in service but a little over a year we feel that after consideration of the good results that we had the first year that we wanted to continue this cash award. The men like it and we are arriving at the point where we can see some good results from it. In the first place we are getting more co-operation from all the trainmen through their extensive interest in it.

We started in with the dinners and the offering of the award at these dinners. We have a sliding scale proposition. The first month if he goes through without an accident he gets a bonus of one dollar

and on up to ten months. The other two months he gets two dollars additional, and if he completes the whole year he gets an additional bonus of $25. The men are all very much interested, and it is surprising the number of cases that we get in the minor cases, the less important accidents. One might think that by reporting all these the men would lose all their chance for the bonus at the end of the year. A very good example of the interest that is shown in this matter. One man had gone the 10 months and had reached the award for that period. Had he gone the other two months without an accident of any sort he would have gotten $45 more and he was naturally very anxious to get that. He was running between cities when the driver of a commercial vehicle, who was intoxicated, by the way, ran into him and scratched the car slightly. It caused him to lose the bonus and he was very sore about it, and he did one of the most remarkable things, I think. He first of all reported the case and said that he did not think he ought to lose his bonus because he personally was not responsible for the accident. He went to the owner of the vehicle and reported to him the fact that he was eligible for the bonus that we offer for not having any accidents, and told him that because of the fact that an intoxicated driver had bumped into his car he had lost all chance of getting his bonus. And he asked the owner of the vehicle what he intended to do about it.

The owner said, "I am only too glad that no real damage was not done, and if you go the other two months without an accident I will give you the $45," and so everybody was happy.

I will say that our bonus system is working out very well and we are very much pleased with it. This is the start of a new year and we have not made any changes in it. It has reduced a great many accidents, but so far it has not decreased the automobile accidents. When we get to the point where we can stop the reckless driver from bumping into us we will be doing a whole lot.

MR. BENNETT: (Providence, R. I.): Do you include such accidents as running into the end of the car?

MR. WEBB: Yes, an accident is an accident whether it scratches the paint off of the car or does further damage. It is really astonishing the number of reports we get on things that are so minor, and it seems a shame to make the men lose the bonus on their account.

Analysis of Accidents

MR. ISAIAH GORDON (Bureau of Safety, Chicago): As a rule the Bureau has opposed awards and bonuses, but the Youngstown Municipal Railway management saw fit to put in a bonus system about two years ago. We thought we had minimized the accidents, but with the bonus system there has been even a greater decrease in the accidents. I don't believe there is any more reason for penalizing a motorman or conductor for a rear end accident when they are not responsible

for it than there is for convicting a man for the murder of a person at Fourth Street when that man was standing on Broadway.

We wonder how we are going to eliminate these accidents and analyze them fairly, and it must be fairly done. We have left it to the claim department. They analyze the accidents and give us the cause of the accidents or the place where that accident should be charged. The witnesses are called in and the matter is taken up very thoroughly. Of course, they give credence to the statements of the crew, but after they find from the witnesses that the accident was unavoidable they charge it to transportation accidents.

We have a contest with four teams of about 75 men on a team. These contests have been running something like three years and we have never had a complaint from anybody on the charge that they have been unfairly treated. The local safety man and the Bureau of Safety has nothing whatever to do with the charge of that accident, and I believe that is as it should be.

The meetings are well attended and we have a speaker of prominence talk to them, and incidentally the safety men put in a few words. The interest is so great that the men on the losing team ask if they cannot come in and hear the talks after the dinner has been served to the winners. I don't know of anything on earth that has drawn the men and the management so closely together as these mass meetings, as we might call them.

We are trying out the bonus system now with the bus operators. We appointed a committee of the bus operators to figure out how to do it, and the fair way to do it, and they submitted their recommendations to a central committee just a few days ago, and the recommendations were approved and will be put into operation immediately. Here is what they recommend: One day off with pay if they go three months without a chargeable accident. If they go six months without an accident they get one day off with pay and a dinner, and if they go an entire year without a chargeable accident they are to be given a gold star to wear conspicuously, and I believe that every man would be proud to have the passengers ask him what the gold star was for. It is an advertisement to the company to have such men running their busses.

MR. M. L. COWAN (Wheeling Traction Company): The Wheeling Traction Company has a reserve of $200,000 which is two per cent of the property revenue. We pay out to the trainmen $500 a month from the claims reserve. Last year The Wheeling Traction Company had its best year and this year it is not so good. We will be paying cash awards 13 months and, to date, our claim reserve is still around $200,000, and for that reason we feel that we are doing some good work for cash awards.

Washington, D. C. System

MR. KEYSER: I will not go into the type of the award scheme, but five years ago we paid out five and one-half per cent of our gross for

injuries and damages. We put an accident award system into effect four years ago, and last year we paid out 2.58 per cent of the gross for the first eight months and for the first eight months of this year we are exactly 2 per cent and we hope to get through the year with a shade under the 2 per cent, I figure about 1.93 per cent. Five years ago we had 550 lawsuits involving $3,500,000. Today, we have 16 lawsuits and $35,000 involved. During that time our damage reserve has grown from $25,000 to $450,000, and we have had two fare decreases.

Does safety pay? I am not going to try to take time here to say how much is due to the award systems, but those are the conditions today. We have an award plan and we feel that in Washington it has worked and we would be loath to try any other system. The award systems work differently in different localities. There are certain local conditions that you have to surmount, and those can be accomplished with study and analysis.

INTERESTING SCHOOL CHILDREN IN SAFETY ON THE STREETS

Isaiah Gordon, Bureau of Safety, Chicago, Ill.

We may expect much of a school boy if his interests and energies are properly directed and they are being so directed more and more through the Boy Scout and, to some extent, through the safety movements; but we are just beginning to interest them in the conservation of life and limb.

Some schools are advanced in this work, others just beginning, and too many have not made the start.

It is the duty of all safety men and women to do all they can to interest the school authorities, teachers and children, to the extent that each school will have an active and efficient safety organization.

Safety advocates should avail themselves of every opportunity to address school children—being sure not to talk over their heads.

Of course, admonitions and many things said in such addresses may be quickly forgotten—until the child is confronted with a similar hazard or circumstance to that referred to in the talk; then the warning will be remembered. We grownups do not remember many admonitions for our welfare until placed in reminding circumstances, but when needed they hob up to remind us.

A little boy once was waiting for a long freight train to pull by so he could cross the track, and while waiting, another boy pushed him so he fell under the cars and his arm was cut off. I used this in my talks and said that it would be good judgment to always stand back one's full length from such danger. I daresay many will never think of the

Authorities should close dead-end streets and also should set aside certain zones where children may play and be free from the hazards of traffic.

As a rule parents are not trained enough in thinking and observing to realize that their children could play where it would be safer—it is not inconsistent that children, seeing themselves under continual guidance and correction, should look for perfection in those who have reached the age of maturity. Unfortunately, we find that years have not always yielded the fertility of goodness that we might well expect to see.

Getting Safety Into Homes

To get the lesson of safety into the home is one of the big problems of the safety man, but I know of no better medium than through the child actually inspecting the home and calling attention to hazards. thus bringing to the parents more forcibly perhaps than any other way the necessity of guarding against accidents and fires and forming the habit of being observing and of thinking before acting.

We should teach children, and through them the parents, the necessity of making a safety stop where there are extra hazardous conditions. For example, we are all agreed that the greatest hazard today is the automobile: I recently asked a group of 800 school children what our greatest hazard is at the present time, and almost in unison they said, "the automobile." Well, when we know this, we should use extraordinary methods to guard against such hazards.

We no doubt are also agreed the most dangerous place is at the curbing—where one step therefrom may be the last one we will ever take.

In hilly towns, at the top of the hill before descending, and at other extra hazardous places, we require street and interurban cars and busses to make a safety stop. If it is good for them to so guard against an accident, it certainly is good for all of us to make a safety stop, when we come to a place where unusual danger exists. Let us all endeavor to get everyone, including the children, to make this a practice or habit.

People step off the curbing while reading papers or books, absorbed in conversation, thinking of business deals, troubles, sickness, etc., but if we can get them to form the habit of hesitating long enough to observe the existing hazards and to have their minds on their safety before stepping from the curbing. I feel that it will result in a big decrease of accidents which are caused by thoughtlessness in crossing streets or stepping from behind street cars or parked automobiles. If we can get this one habit formed it will result in the practice of being observing and thinking before acting.

By teaching *thought before action* we will not only save life and limb, but we will promote peace and happiness—because most of our unhappiness, pain and sorrow, both to ourselves and to others, is caused by our action before thought.

Following is an outline of school safety committees:

APPOINTMENTS, DUTIES AND TERM OF OFFICE

Captain: Superintendent of schools (high schools-graded schools) parish parochial schools.

Lieutenants: Appointed by the captain to serve during the school term. (Each school to have a lieutenant—preferably the principal of the school.)

Sergeants: Appointed by the lieutenants to serve for a certain term (each room or grade to have as sergeants one elder boy and one older girl).

Corporals: Appointed by the sergeants to serve a certain term (each room or grade to have its own corporals in charge of the various nine assignments: books and desks, room appearance, new pupils, etc.

DUTIES

Captains: Keep record of accidents, hazards, dangerous practices, etc., and take proper action.

Lieutenants: Will have charge of all sergeants at the school. Will report all accidents or hazards to the captain at once. Will hold meetings once a month with the sergeants of each room or grade and take such action as is necessary to promote safety.

Sergeants: See that the corporals understand their duties and that they faithfully comply with them or take up with the lieutenant for correction. Report to the lieutenant all accidents also dangerous appliances or practices.

Corporals: Each will be expected to supervise and report hazards to the sergeants, also to know that the pupils are complying with the rules and if not, call it to their attention twice in a kindly manner, and if not then obeyed, take the matter up with the sergeant.

Each corporal is to have charge of one of the following duties:

Books and Desks—See that all books and desks are not misused, damaged or untidy.

Room Appearance—See that the room is in order—tidy and free from hazards.

New Pupils—See that all new pupils are welcomed and given fair treatment, also that the safety rules are explained to them.

Cloak Room—See that the cloak room is kept neat and in order, free from fire or accident hazards and that clothing is properly taken care of and not abused or damaged.

Stairways and Corridors—See that stairways and corridors have no physical defects or hazards and that pupils use care on stairways—no running up or down—one hand on railing—hands out of pockets and no running or pushing in corridors.

Basements and Yards—See that basements are free from fire or accident hazards and that the yards and playgrounds, including amusement apparatus, are free from hazards and safe to use at all times—inspecting daily.

Street—See that automobiles and other vehicles observe the traffic rules in front of school, reporting to the sergeant the number of those which do not. See that the pupils do not play in the street.

Amusements, Games, etc.—See that the pupils do not engage in hazardous games or in dangerous practices. That the older pupils are considerate and concerned for the safety of the younger ones.

Entering or Leaving School Premises—See that all pupils are conducted to and from the yards in safety and that there is no carelessness, also that they do not "Jay-Walk."

DISCUSSION

MR. J. W. OLIVER (Safety Engineer, Chicago, North Shore and Milwaukee Railroad): Mr. Gordon's wide experience as an advocate and teacher of safety, and his love for children, especially fit him for an authoritative discussion of this phase of organized safety work, and I can only agree with him as to its value and importance.

The children of today are the hope of tomorrow, and I believe that the future success of the Safety Movement depends largely upon the success of our efforts to impress upon the minds of the very young the fundamentals of safety.

The school offers the best field for work of this kind, and it depends largely upon the attitude of safety men themselves as to whether or not this means of teaching safety to children will result in permanent and practical convictions.

The Chicago North Shore and Milwaukee Railroad Company operates a high speed traction line between Chicago and Milwaukee. Two of the cities through which this line operates are Kenosha and Racine. During the months of April and May, assisted by Chester K. Thomas, a motorman, I conducted a safety campaign in the schools of these cities.

In the grade schools we found that it was advantageous to divide the school into two classes, the first class being the children in the first to fourth grades, and the second being the children in the fifth to eighth grades. Classifying students in this manner made it possible for us to adapt our talks to the ages of the children. In the lower grades we presented the subject in the form of a story so as to make it impressive and understandable. The talks to the upper grades of the grammar schools and the high school students were necessarily different from those given to the small children. Mr. Thomas and I both talked in all the schools and, in some cases, it was necessary to make as many as 13 talks in one school. The time allotted for these talks in the grade schools was limited to 15 minutes, and in the high schools, 25 minutes. I talked for a few minutes on home and street accidents and concluded my talk with the introduction of Mr. Thomas as one of the men who operated the high speed trains of the Company.

It was interesting to note the expression on the children's faces when the word "railroad" was mentioned. There is something fascinating about the word "railroad" to the children and I dare say there is not a man in this room who in his boyhood days did not have his mind set on being an engineer, conductor or brakeman, and the boys today are in the same frame of mind as you were in those good old days.

Talk Children's Language

In order to have the child grasp the meaning of your words, it is necessary to talk to it in its own language and by doing so, you will not only get the interested attention of the child, but the good will and co-operation of school authorities as well, and this, I believe to be absolutely necessary if we are to accomplish the desired results.

Occasionally I have encountered indifference upon the part of school principals and teachers, due to the fact that some safety advocate had talked to the children in language which they were incapable of under-

standing, thereby causing the faculty to look upon our efforts as a mere waste of time, and a useless interference with the regular routine. Wherever this attitude is encountered a study should be made to see if this is not the cause and it should be off-set by a more carefully prepared and simple talk calculated to reach the child's understanding and the teacher's approval.

Mr. Thomas in his safety message told the children about the speed of the trains and the distance required to stop the trains in cases of emergency. He described the various warning signals and also emphasized the proper way to board and alight from trains.

The story to which Mr. Gordon refers in his paper about the little boy being pushed under a train and losing his arm was one that I used in my talks and I might relate an experience I had in one of the schools at Kenosha. I was telling the children about this little boy and the handicaps that he was under for the rest of his life when I noticed a little fellow sitting about in the middle of the room with tears streaming down his face. Of course, he attracted my attention immediately—in fact, I was almost forced to conclude my talk, the sight touched me very deeply, but while concluding I tried to observe if there was anything particularly wrong with him and failed to notice anything unusual. When I finished I asked the teacher if she would allow me to talk to the little fellow and to my great surprise I found he had only one leg. I inquired the reason for his losing his limb and learned that it was due to negligence on someone's part in administering first aid after the little fellow had stepped on a rusty nail. Neglect to take care of it resulted in blood poisoning and to save his life his leg had to be amputated.

I used this example in my subsequent talks and emphasized as forcibly as I could the necessity for immediate attention to apparently minor injuries.

A good way to talk safety to children is to make use of a narrative wherein some child has figured in an accident. A true story is better, and there is no lack of supply. Usually accidents happening in the vicinity of the homes of the children can be cited to illustrate the consequences of any and all kinds of unsafe practices. The mind of the child can be impressed in this way much more forcibly than otherwise, as will be shown by another experience I had while talking to a group of seventh grade pupils about the danger in attempting to board moving trains. I told them about a high school boy, living in their vicinity who had attempted to board a moving train. When reaching the point in the story where the boy fell beneath the wheels, a boy about eleven years old was so noticeably and deeply affected that every other child was impressed with his interest. This boy will be sure to remember the story should he ever have an impulse to board a moving train.

Results of Campaign

Since holding this campaign I have been interested to know what results, if any, were obtained. In Racine there is one school that is

located close to the tracks and I was told that approximately half of the students or some 400 have to cross the tracks to reach the school. At this location crossing gates are operated from a tower and during the school year for additional protection, a flagman is also placed there. I inquired from this flagman as to the attitude of the children when they came to the crossing. At that time it was unknown to him that we had been in this particular school to talk to the children about safety. He said to me "Somebody must have been talking to those kids because I hear all kinds of remarks when they stand there waiting for a train to pass, such remarks as 'stand back'—'remember what the motorman told us'—and other similar remarks."

I believe the electric railway industry has by far a better opportunity than any other industry to present our safety message, because to the average child there is something romantic and fascinating about railroading.

A great deal can be accomplished by securing the assistance of the parent-teachers associations, community centers, and any and all civic associations, and no opportunities of this kind should be overlooked.

Organized safety advocates are the pioneers in the movement to make our people traditionally careful, and, like all other movements requiring patience, long suffering, and education, must look to future generations for its consummation. Much has already been accomplished, and future possibilities are unlimited. In many localities children are actually teaching safety to their parents, as the result of having learned it from the safety man at school, and this fact alone is conclusive evidence that teaching safety to school children pays.

DISCUSSION

MR. CHARLES SCOTT (Chicago, Ill.): I don't believe that safety can be best taught like arithmetic is taught. I don't believe you can teach safety best like you teach geography. To bring safety to the children I think it should be handled as religion. In other words, you have got to get it under their skin.

When you touch the hearts of the children as well as their minds then you have accomplished something. I would teach the children to act safely and to use their influence for safety because their own conscience tells them to, because that is the right way to live, because that is the right thing to do, because it contributes to the happiness of other children in the community. And children have hearts, they have understandings just as we have, and action reaches them in that way. I want you to take the subject seriously, look at it as you would at religion; teach the children from that point of view and get it into their hearts as well as their minds.

MR. RADLEY: In Milwaukee we have had the subject up for three years and have given talks to the children. The speakers were the

motormen and conductors, and they appeared in uniform. The brass buttons on the uniforms have an appeal to the children which is not the case with the ordinary business suit. That among other things helps to hold the attention of the children. Those speakers are usually men who have children of their own, and those men who go once want to go again.

One of the schemes to get the attention of the children was a common round mouse trap, one of those with the four holes in. Of course, the children knew what that was and that it would kill the mice when they got caught. Then the automobile was likened to a trap that caught two hundred and thirty-five children in Milwaukee last year. He had their attention, and then he unrolled an oilcloth diagram. It showed the street corners and a car was coming from this direction, and an automobile from this direction. The little girl wanted to cross the street, but she looked to the left and saw the oncoming street car and thought there was time enough to hurry across, but she did not have such good fortune in the case of the auto. Then he turned the back of the oilcloth to the children and there was the approaching auto—that was the trap. The little girl was caught and she was one of the seventeen, of the two hundred and thirty-five children who were in the accidents last year, that was killed. In order to fix that in the minds of the children he gave each of them a card, and each child took that home and told their parents about the danger they were in. That idea has gone across fine.

Must Appeal to Human Nature

MR. H. O. ROUNDS (Superintendent of Police, Detroit, Michigan.): There is something in the human nature that must be appealed to. I think that we will find that the child is as safe on the streets, or probably more safe, than an older person, say of about fifty or thereabouts. The child's mind grasps the dangers of today quicker than that of the older person. You notice an old person cross the street. As a child they were taught to fear the horse and buggy and such things as were common dangers in their childhood days, but they don't seem to be able to judge the speeding car or the speeding automobile that is coming down the street. Thirty per cent of all the adults killed in our city are over the age of fifty, and when they were children the streets were safe.

There are four uniformed officers speaking in the schools of Detroit today, public and parochial. They say nothing in those schools that is not approved by the superintendent. We are holding five meetings a night for 35 weeks and not only the children are coming but their fathers and mothers as well. We have to turn away from two to four hundred every night. We are thus accomplishing a great work.

MR. F. T. SINGLETON (Public Service Commission of Indiana.): This has been a wonderful meein gand I just want to tell you that we now have the consent of the state superintendent of schools to make a part of the public school curriculum include safety education.

ADJOURNMENT

Employees Benefit Associations

October 2, 1924

HAROLD E. LEY, Chairman
President, Fred T. Ley & Company, Springfield, Mass.

F. E. CHAPMAN, Vice-Chairman
Superintendent, E. B. A., International Harvester Company
Chicago, Ill.

H. M. DAMBMANN, Secretary
Sparta, N. J.

THURSDAY MORNING SESSION

CHAIRMAN LEY: Three committees were appointed last year, one to look into the question of government taxation of mutual benefit associations, and we were organized.

The report of the committee on statistics will be embodied in the paper by Mr. Brundage and the result of the other committee will be embodied in the first paper by Dr. Ryan.

During the winter I got a report that was gotten out by the International Conference Board on mutual benefit associations. I would advise anybody interested in that subject to get a copy of the report and read it, because it is a very comprehensive report of what is being done over the country. It covers about 382 benefit associations.

In reading over that report it seemed to me the benefit associations had been organized in rather a hit-or-miss fashion. There had been no definite plan to cover the needs of the employees. Some of them paid health benefits, some of them paid death benefits, some of them gave or helped pay for medical service. But I couldn't find any of them that seemed to cover all of the needs of the employees or made the benefits adequate. Their recommendations, their conclusions were along that line that benefit associations had never gone as far as they should, and what our committee tried to do during the winter was see if we couldn't work out a plan which would give adequate sick benefits, adequate life insurance and a health service that would be within the means of the average employee. Something he could buy.

We have tried to work out a plan which is based on the health of the employee. If those problems can be solved it is going to be a direct benefit to the employer, and I feel that every employer can well afford to spend some of his additional profits towards paying for these expenses for it is going to enable employees to get so much bigger benefits, and in that way you want to interest the employees in the mutual benefit plan.

My experience in organizing these mutual benefit societies has been that it is infinitely harder to sell the employer than it is the employees. I am speaking now of a plan on a fifty-fifty basis. It has been a very surprising thing to me to find out how easy it is, if the plan is well thought out, to get the employees to put up their share of the money. I find it is a good deal harder to get the employer, and I think the problem is to work out some plan that is going to induce the employer to put up his share, and that is what we aim to do in the plan to be submitted in the first paper.

Probably all of you are more or less posted on the ordinary insurance features of the benefit plan. We have tried to make a feature of the health work. My experience has been when you start to introduce health work by doctors in the plan you are going to run up against the medical profession, and unless the plan is pretty thoroughly worked out you are going to find opposition among the local doctors in your town. In looking for a plan to submit we found a doctor who had connected with Tufts University and who has been interested in this particular problem and the first paper is to be presented by Dr. A. H. Ryan.

BENEFIT ASSOCIATIONS—THEIR NEED, SCOPE AND POSSIBILITIES

Dr. A. H. Ryan, Professor Physiology, Tufts College, Medical School, Tufts College, Mass.

There is a definite connection between poverty and illness. An investigation carried on by the Health Insurance Commission for the state of Illinois, from July 1917 to July 1918, in Chicago, consisted of a survey of over 12,000 individuals to establish this connection. The income was found to vary from $750 to $2,000 for standard families of five. A standard budget was calculated, for that time which provided only for the bare necessities of life, as $850 for such a family, and proportionated higher for larger families. It was found that about one family in seven was living below the line of bare subsistance, and that of this number one fourth stated that sickness was responsible for their poverty. A little more than one fifth of the wage earners had been seriously ill during the year.

The expense of sickness varied with its duration. For those disabled for a week or more the average wage loss was found to be about $120, but since other members of the famliy were wage earners, it brought the average wage loss per wage earner in the family to about $24 per wage earner (4,474 families) or about three and one fourth per cent of the wages.

The attempt to estimate the cost of medical service did not result in such accuracy, but it was estimated that it cost about 25c for every dollar of lost wages. This did not include medical service to dependents.

The narrow margin between the cost of living and the average wage of workers has lead some countries to establish insurance measures which attempt to offset lost wages due to sickness. This health insurance feature has usually included provision for medical treatment. In Denmark, state aid is given to voluntary insurance against sickness, whereas, in Germany and England insurance against sickness is made compulsory. In both places, however, there is a noteworthy likeness; they each include both cash relief and medical treatment as insurance benefits.

These plans have not appealed to the American public for several reasons. The cash benefits are small. The medical attendance resulting from the small fee is inadequate. There is a strong tendency against paternalism in American government. And as Mr. Gompers has remarked, such procedures are remedial rather than preventive. A bill was passed in the New York senate in 1919, but was smothered in the assembly. This bill was patterned somewhat after the German law.

Insurance was to be compulsory—no restrictions on age— and was to cover sickness and non-industrial accident. The insured were to be insured in carriers known as "funds," jointly managed by the employers and the employees under state supervision. Contributions which provided the insurance benefits were to be paid into each fund except in case of extraordinarilly low wages, one half by the employer and one half by the employee. Contributions were to be based upon wages with a maximum weekly wage limit of $12. The benefits were to be as follows:—weekly wages of $12 or more, $8; weekly wage of $7.50 to $12, two-thirds of weekly wage; weekly wage between $5.00 and $7.50, $5 a week; wekly wage under $5, 100 per cent of weekly wage.

Medical and surgical attendance, including consultants, visiting nurses, surgical supplies, hospital, and dental services, were to be included. A funeral benefit of $100 was included.

The mutual benefit association is a voluntary organzation, having the same purpose as health insurance. It ordinarily includes only cash benefits and funeral expenses. However, certain of the mutual benefit associations have gone farther.

The Wisconsin Association

The Employing Mutual Benefit Association, including a group of public utility concerns in Wisconsin, with 4,000 membership, pays $1 a day

sick benefit, $300 death benefit, provides loans and pensions, and provides a doctor's office and physician where members may go for treatment. It also provides nurses in case of serious illness. In regions where regular association physician is not available, the member may have any physician and the association pays the bills. The regular district physicians are paid a fixed fee. A reduction of 35 per cent in lost time through illness resulted from this service.

Many of the mutual benefit associations examine applicants for entrance. This is rather for the purpose of protecting the members of the association from undue financial burdens, resulting from lost time through defects at the time of entrance. The defective applicant is required to sign a waiver. While this relieves, somewhat, the obligation of the Mutual Benefit Association, it does not improve the physical condition of the applicant unless the revelation of the defect leads him to secure corrective treatment.

The large number of mutual benefit associations in this country as well as the great number of fraternal organizations having sick benefit features, indicate a tendency toward voluntary solution of the problem of illness and its economic losses on the part of American workmen. The success of their efforts may be greater if they choose, than compulsory health insurance measures, because they are more directly concerned in the management of their funds and the factors which contribute to the cost of their benefits. Their plan, then, has the advantage of intelligent co-operation and sound business principles in management.

It is well recognized that an enormous amount of illness, in fact most illness is preventable. There is a great tendency in medicine now toward prevention through community activities. But the mutual benefit association has a great advantage in any preventive medical work that it undertakes, because of the fact that its members are so vitally interested in each other's welfare since they are in close contact with each other; since they are financially affected, and since many of them are working on the same job and are vitally interested in any injury which a particular job may be causing to another member, for they are likely to be affected next.

In the Framingham community health demonstration the value of health examinations was brought out. Before the demonstration began the average number of cases of tuberculosis reported to the board of health was 13 yearly. In the first year of the demonstration when physical examinations were held, 57 cases were reported. The importance of this is realized from their further observations covering four years in which only 6 per cent of the cases discovered early died, while of the moderately advanced group and far advanced group the death rate ranged from 28 to 92 per cent. Another interesting point is that the medical work of the demonstration was done through consultation work, the physicians connected with the staff having never offered medical treatment.

Within the past few years, health centers have sprung up all over the country, which have as their main features the promotion of health. The stimulus to this movement seems to be two fold: First, the realization on the part of social service, nursing and philanthropic organizations of the greater service that may be rendered by close co-operation, and second, the appreciation of the great benefits that may arise through prevention by means of health education, preventive medicine and the early detection of disease. P. S. Platt, director of the New Haven Health Center, states (1921) that such a center must concern itself to the highest degree with well people or those slightly ill by offering a careful examination, routine urine analyses, x-ray, blood analysis, etc., and that the patient should be instructed how to keep well. To develop this interest in health, he states that the medical treatment must be removed from the health center and the personnel must emphasize health not disease. However certain of them, exceptions to the rule, do provide medical treatment, for example, the Alameda County Health Center.

In so far as the mutual benefit association is concerned, the health center is of interest as indicating the trend of activity of philanthropic and welfare efforts toward the side of prevention and in indicating the type of work which is considered by them as most effective.

Annual Medical Examination

The Metropolitan Life Insurance Company has definitely proved to themselves that the cost of an annual periodic examination to their policy holders saves them each year many times the cost of these examinations, on death claims. There is no sentiment connected with these free periodic physical examinations which they give to their policy holders. They save thousands of dollars anually by doing it. There is no doubt about the value of periodic examinations in reducing illness, lost wages and sick benefits.

Sickness benefits are, at best, only a partial remedy for lost wages. A worker's physical condition is never improved through illness, and his lost wage plus his medical attendance cost more than his benefits. It should, then, be of vital interest to the mutual benefit association to prevent illness as one of the benefits of the association. But there is a stronger business argument than this, and that is that the prevention of illness decreases the amount paid in benefits. And a few mutual benefit associations are now providing their members with annual health examinations.

The great majority of mutual benefit associations (328 out of 382 studied by the National Industrial Conference Board) pay death benefits. These benefits ranged, in their study, from $12.50 to $5,000. It is this insurance feature of the mutual benefit association which frequently makes the strongest appeal to the worker. Such group insurance has the advantages of being the cheapest and not excluding because of

physical defects. Also, as shown above, there is a definite opportunity to decrease death rate through preventive medicine. Illness and death and their prevention are problems that are intimately related to the life of the workman, both as natural phenomenon and in their economic consequences. He is for this reason more likely to become interested in a plan, which will provide at one stroke for all of them. We may therefore include in our plan, adequate group insurance.

What Health Plan Should Include

An adequate health plan for mutual benefit associations would then *include the following points in logical sequence:*

1. It should reduce illness through the provision of a periodic health examination, a hygienic survey of the plant, and advice or education in matters of hygiene through medical advisors.

2. It should see that its cash benefits are sufficient for proper medical attention in the poorly paid group of wage earners or it should provide medical attention.

3. It should give adequate cash sickness benefits.

4. It should provide adequate group life insurance.

The place to begin is with the prevention of illness. The early detection of disease, of the discovery of habits or environment that may lead to injury are important factors in the prevention of illness. This requires a thorough health examination annually, consideration of, and if necessary, survey of the job upon which the worker is engaged, and health advice.

A patient who ordinarily goes to a physician presents some symptom or complaint, and from this the examiner works. An apparently healthy man presents no such lead and it is easier to overlook incipient trouble.

For this reason the periodic health examination should adhere to a strict comprehensive routine procedure which experience has shown to require on an average of 45 minutes. A comprehensive form blank should be used, and everything covered and filled in.

This routine examination may require very little special equipment, beyond that required for blood pressure, urinalysis and visual acuity. Cases will occur requiring more extensive laboratory tests. To merely indicate the desirability of these tests and leave the patient to his own resources, will probably result in his failure to take any further step until the condition has progressed far enough to partially incapacitate him. Moreover, at the present stage of the examination, the presence of defect is in doubt. It seems therefore, desirable to consider the provision of the necessary laboratory facilities, for communities in which they do not already exist.

Such laboratory facilities may include X-ray equipment for tooth, chest, abdomen, etc., laboratory equipment for chemistry of urine and blood, microscopic, bacteriologic and immunologic examinations, basal metabolism, and physiologic tests. In addition to the equipment, experienced technicians are required.

Even a moderately large plant would probably find such a laboratory too expensive, but where this laboratory can be made to serve the needs of several plants or an entire community the cost can be reduced and the expense of the services will be more than repaid in the savings resulting from improved health.

A practical plan would be for the manufacturers of a given locality to finance the installation of such a laboratory, which would charge appropriate fees covering the cost of operation for the services rendered. So far as the mutual benefit association is concerned it would be charged for such examinations as were required by the members needing them. Further revenue would probably come to this laboratory through the patronage of private physicians in the locality.

An arrangement which would involve less risk in financing such a proposition would be to pro-rate the cost among the members of the mutual benefit association. The manufacturers in this case would finance the installation of the laboratory, *that is the cost of equipment*, and would be reimbursed the entire amount in a period of five years.

A rough estimate of the approximate cost of such a laboratory would probably be about $16,000 a year, including equipment, provided that the cost of this equipment is distributed over a period of five years, or $26,800 for annual operating expenses, and $10,000 for initial equipment

A locality having mutual benefit associations with an aggregate membership of 10,600 could alone support such a laboratory. With an annual fee of $7.80 per member for health service, $5.80 would be available for the routine examination, $2 cents for hygienic surveys of occupations and plants, and $2.80 for the special laboratory examinations. This would provide $28,000 for the laboratory.

Factors Entering Into Examinations

The next question to be considered is, who shall make the health examinations, whether a company physician, a physician or physicians engaged by the mutual benefit association, or a doctor selected by the patient. In order to more intelligently discuss this point let us consider some of the factors likely to enter into the success of these examinations:—

1—The health examination should be confidential, the report going only to the patient. There should not be the least suspicion on the part of the patient that the findings at the examination are going to work to his disadvantage.

2—The health aspect of the examination should be emphasized. The patient usually considers the doctor only in cases of illness and treat-

blood, microscopic, bacteriologic and immunologic examinations, basal metabolism, and physiologic tests. In addition to the equipment, experienced technicians are required.

Even a moderately large plant would probably find such a laboratory too expensive, but where this laboratory can be made to serve the needs of several plants or an entire community the cost can be reduced and the expense of the services will be more than repaid in the savings resulting from improved health.

A practical plan would be for the manufacturers of a given locality to finance the installation of such a laboratory, which would charge appropriate fees covering the cost of operation for the services rendered. So far as the mutual benefit association is concerned it would be charged for such examinations as were required by the members needing them. Further revenue would probably come to this laboratory through the patronage of private physicians in the locality.

An arrangement which would involve less risk in financing such a proposition would be to pro-rate the cost among the members of the mutual benefit association. The manufacturers in this case would finance the installation of the laboratory, that is the cost of equipment, and would be reimbursed the entire amount in a period of five years.

A rough estimate of the aproximate cost of such a laboratory would probably be about $18,000 a year, including equipment, provided that the cost of this equipment is distributed over a period of five years, or $16,000 for annual operating expenses, and $10,000 for initial equipment.

A locality having mutual benefit associations with an aggregate membership of 10,000 could alone support such a laboratory. With an annual fee of $7.00 per member for health service, $5.00 would be available for the routine examination, 20 cents for hygienic surveys of occupations and plants, and $1.80 for the special laboratory examinations. This would provide $18,000 for the laboratory.

Factors Entering Into Examinations

The next question to be considered is, who shall make the health examinations, whether a company physician, a physician or physicians engaged by the mutual benefit association, or a doctor selected by the patient. In order to more intelligently discuss this point let us consider some of the factors likely to enter into the success of these examinations:—

1—The health examination should be confidential, the report going only to the patient. There should not be the least suspicion on the part of the patient that the findings at the examination are going to work to his disadvantage.

2—The health aspect of the examination should be emphasized. The patient usually considers the doctor only in cases of illness and treat-

ment. Unless he is made to realize the presence of impaired function without definite illness he will not take so seriously the necessity of preventive work.

3—The patient should have the opportunity to ask whenever the occasion arises in the interval between the examinations for information and advice regarding habits and hygiene.

4—The doctor should know that there is no reason to suspect that the doctor who makes the examinations has anything to gain by recommending medical treatment.

5—The relationship between the family doctor and the patient should not be disturbed by a transfer of allegiance to another examining physician.

6—A follow-up inquiry should be sent out, at least in the serious cases, in order to stimulate the patient to seek the proper treatment.

7—Adequate case records should be kept to enable the examiner to carry out the follow-up work, to determine progress, and to permit of a contribution to medical science.

8—Statistical studies should be made on the examinations obtained and on the course of progress of early defects in the interest of both the patient themselves and medical science.

9—The physician making the examination should have some knowledge of occupational hazards, industrial hygiene and sanitation. A general plant inspection should be made for hazardous occupations and sanitation before the examinations begin, and a careful watch should be made in the examinations for occupational injuries. When necessary a report should be made to the management.

From the foregoing points it is seen that more is required than the simple examination of the patient and the immediate advice given him. The examiner or examiners should be more than the practitioner working in an isolated manner.

An important matter relating to the success of any plan will be the selecting of the proper person, either secretary or other appointed officer of the mutual benefit association, to arrange the details of the examinations. Only one who has become thoroughly interested and sympathetic should be chosen. This interest may well arise out of the service which is rendered him by the examination.

The plant management may allow sufficient time, with pay, to the workers, for the health examination.

Having provided an adequate examination and the facilities for the same, the next important thing is to encourage the worker to seek medical treatment if such treatment is recommended. This can be encouraged by returning to the workers any dividends which accrue as the result of savings through reduced sickness benefits and deaths. Proper educational methods are also important.

But the mutual benefit association may go further. It may do two things:

1—Loans may be made to cover the cost of medical treatment.

2—It may provide medical treatment for the poorly paid group of workers, but only for this group.

The association's physician discussed in section B, following, would be available without additional cost to the poorly paid group. Beyond providing loans and educational work, nothing should be done for the better paid workers who must be expected to seek their own physician when they realize that medical attention is needed.

Poorly Paid Workers

The chief concern of the mutual benefit association, in so far as medical treatment is concerned, is with the poorly paid workers who cannot afford to pay a doctor. It is deeply interested in providing proper medical attention since it has a financial obligation in its sick member, and the longer he is out the more it will cost. But it is difficult to adjust a scale of cash benefits which will cover the cost of medical service in this group since even the regular wage leaves but little surplus above the bare living expenses. But the poorly paid member does not wish to become an object of charity, and charity in any case cannot be looked upon as a satisfactory solution. On the other hand no solution is satisfactory which would tend to lower the quality of medical service through a reduction of medical fees.

A scheme which will provide adequate medical service for the poorly paid worker, for which he can pay, is one for which there is pressing need. Such a scheme, it would seem, may be worked out on the following general principles:—

1—The distribution of the cost of medical service to the whole group instead of to the member sufferers who are partially or completely incapacitated.

2—The savings in the benefits paid for lost time because of sickness since it has been shown that such service has reduced the lost time through illness.

3—Reduction of the cost of medical service, with the co-operation of the local medical profession, by greater efficiency and reduced overhead, where a physician may be engaged by the hour at an office provided by the mutual benefit association; or by some other plan—see below.

4—Guaranteeing that no abuse of the plan shall disturb the preser high ethical and humanitarian standards of the medical profession—b limiting it strictly to the lower paid group of workers and by seekin the help of the local medical profession in working out the plan.

Briefly, two plans may be suggested. 1. Let the mutual benefit association provide the doctor's office. The management, in most cases, would be glad to provide such an office. The secretary of the mutual benefit association, or a duly appointed officer, would arrange with the physician to keep certain hours in this office, one hour a day per thousand workers, probably during the noon hour, or after the closing hour. The appointment for the physician would be made through the secretary of the mutual benefit association. In addition to the daily hour at the office, this physician would also give one hour daily to sick calls making a total of two hours a day, which would probably be adequate for a group of 1,000 workers. For this the physician would receive, perhaps $5 per hour, making a total of $3,000 per year per thousand workers.

In addition to waiting upon sick members, the association's physician would be available for treatment without extra charge of the defects revealed in the periodic health examinations discussed above.

In working out the details of obtaining a physician for the association it is believed that the above plan may commend itself to the local medical association and that their assistance may be obtained in securing one of their members as physician. It is possible that the local medical society might propose that the service be divided into quarterly, bi-monthly, or even monthly periods, and that the work be divided so that the service would rotate among a number of their members. Or possibly the plant physician might be obtained.

Another plan would be for the mutual benefit association to inform the local medical society of the amount of money available for medical treatment and have them submit a list of physicians willing to undertake it. They would be subject to call by the workers, and would render an account of these calls to the mutual benefit association. who at the end of each quarter would prorate the fund available on the basis of the number of calls made. The proper ratio for office and home calls could be decided upon. This plan would tend to prevent undue elaims on account of illness since the greater the number of calls the less the remuneration per call. On the other hand it would in this sense work to the disadvantage of the physician, but it must be remembered that the plan involves only those workers who, when ill could not afford to pay anyway.

The above plan would, as stated apply only to the poorly paid workers—those perhaps with a family income of less than twelve hundred dollars, or if unmarried with an income of less than seven hundred and twenty dollars. According to a recent study made by the U. S. Bureau of Labor Statistics this would include about 20 per cent of the families of industrial communities.

If it became necessary for the worker to lose time in order to obtain the necessary medical treatment, such lost time would be certified by the physician, and the member receive the usual sick benefit. Lost

time resulting from medical attention of a preventive character should be considered in exactly the same way as lost time resulting from illness which was not discovered until the patient was incapacitated. It should be regarded as a "stitch in time."

Adequate Cash Sickness Benefits

The sickness benefits should approximate two-thirds of the worker's weekly wage and should be paid for 52 weeks. By the end of this period, cases of permanent total disability can usually be decided and the total disability benefit would become effective without leaving an interval of time during which the worker is not cared for.

The life insurance should approximate a man's yearly salary at least and should be paid in case of either death or total disability.

Any plan which will encourage workers to preserve their health and increase their years of usefulness is one which should be strongly encouraged by employers. It becomes virtually a mutual benefit association in which the employer benefits as well as the employee. The reduction of poverty, the reduction of lost time, good will, and greater permanency of workers are some of the very obvious advantages. It is therefore proposed that the expense of the benefits be shared equally by the workers and the employers. However, it should be remembered that the success of the plan will depend upon the co-operation of the workers, and that everything should be done to encourage this. For this reason the management of the association should be in their hands. The employer has nothing to fear, for, in its very nature his own interests are identical with theirs and he is thus safeguarded.

The first group below, the lowest paid workers, are assessed for medical service. All groups are assessed for sickness insurance, life insurance, and health service. The assessment for the health service is sufficient to cover the cost of adequate diagnostic laboratory facilities in case the group is large enough (see above).

Group I

Unmarried persons earning less than $720.
Married men with family incomes less than $1,200.

$1,250 Life Ins. @ $10	$12.50
$10 a week Health Ins. @ $9	9.00
Health Service	7.00
Group Medical Service	3.12
	$31.62
Amount paid by employees 30c per week	15.60
Balance paid by employer	$16.02

Group II

Persons earning more than in Group I and up to	$2,000.
$3,000 Life Ins. @ $10	$30.00
$20 a week Health Ins @ $9	18.00
Health Service	7.00
	$55.00
Amount paid by employees 50c per week	26.00
Balance paid by employer	$29.00

Group III

Persons earning $2,000 to $3,000.	
$4,500 Life Ins. @ $10	$45.00
$30 a week Health Ins. @ $9	27.00
Health Service	7.00
	$79.00
Amount paid by employees @ 75c per week	39.00
Balance paid by employer	$40.00

Both the medical service and health service, discussed above, should be considered as measures that may be expected to, either partly or wholely, pay for themselves through reduction in sick benefits, death and disability claims. The returns, however, may not be seen until the end of one, two or three years. For this reason the above assessments should be considered in part as a health saving fund, it being understood that the savings which occurred as a result of better health would be pro-rated and returned annually to the members, perhaps as a Christmas fund, or to be applied to hospital costs for the poorly paid class.

To the management it offers an opportunity to formulate a definite policy in caring for its salaried employees and one which removes elements of doubt from the minds of the salaried employee as to what he is to expect. In the case of the salaried employee who ordinarily receives his full salary when ill, the management by only making up the difference between his regular salary and that paid by the Mutual Benefit Association would actually get back its entire share of the assessment in a case of prolonged illness.

If the mutual benefit association wishes to undertake a still more comprehensive plan, it may provide a dentist. as well as a physician, with additional costs.

The above plan is deficient in not adequately caring at the start for hospital costs and medical supplies for the poorly paid group, largely

because of the uncertainty of the cost and in any case the increased cost. It stresses the medical work needed for prevention. In the cooperation practiced in working it out doubtless ways would be found to extend the relief to meet further needs.

The relationship existing between illness, death, and poverty; the effectiveness of preventive medicine in reducing illness and death; and the protection which is afforded by distributing the burdens of sickness and death to the group makes a strong appeal for the adoption of a plan which does not omit any one of these essential elements.

The dollars and cents cost of the entire plan of life insurance, health insurance, health service and medical service, as outlined above is surprisingly small compared with the cost of the average case of sickness in lost wages and doctor's bills. Reference to the figures cited by the Health Insurance Commission for the State of Illinois, quoted at the beginning of this paper indicates a total cost of less than one-tenth that of the average case of illness of over one week's duration. An intelligent workman must readily understand that he cannot afford to be without this protection. Such a plan would seem to go a long way in solving the problem of poverty through intelligent cooperation.

SHOULD THE MANAGEMENT HAVE ANYTHING TO SAY IN THE RUNNING OF A MUTUAL BENEFIT ASSOCIATION?

J. E. Culliney, Safety Engineer, Bethlehem Steel Company, Bethlehem, Pa.

There are, at the present time, in active operation, close to 1,000 relief associations in various business organizations. They can readily be classified with respect to their form of administration into three general types, which are:

1. Those in which the employer assumes the entire management of the association.
2. Those in which the employees assume the entire management of the association.
3. Those in which the employer and employees both have some voice (to a greater or less degree) in the association management.

There are good reasons advanced by the associations for the existenc of each of these types; however, upon close analysis many of th associations, now supposedly members of the first two types, reall belong to type three. By that I mean in most associations the em ployer and employees both have either a direct or indirect voice, to greater or less degree, in the association management.

Just how and in what manner a relief association should be managed is dependent to a large extent upon five important factors.

1. The size of the association.
2. The personnel of members and management and the relationship existing between them.
3. Whether membership is compulsory or voluntary.
4. What dues are charged and what benefits are paid.
5. Who contributes to and handles the relief fund.

Considering the first of the three types of associations.

In about half of the associations of the first type the employer pays all expenses and benefits. It is perhaps only logical to suppose the employer in this event should have the right to assume the entire management of the association, however, is it not true that anything which any of us get for nothing is seldom appreciated? Again, are you not approaching paternalism, which is always something to be avoided?

If the employees pay part of the cost of the association, should they not have some voice in the management of the association? Is not cooperation more desirable than paternalism?

The success or failure of the second type of association depends largely upon the ability of the employees elected to manage the association. The job requires specialized ability, which is lacking in the average employee.

While it is true that many associations are classified as those having sole employee management, most of them are directly or indirectly supervised by the employer.

Associations in which the employer actually has no connection whatever with its management from the employer's standpoint at least, are not any more helpful than any outside lodge or beneficial association.

Plan of Management Recommended

The Bethlehem Steel Corporation has had various types of associations existent at some time or other. Experience gained in the operation of these associations has developed practices which we believe essential to satisfactory management of an association, which are as follows:

1. It has been found essential to have the dues deducted by the company.

2. It has been found advisable to make the company custodian of the funds, with ample provision for auditing by the employees.

3. It has greatly added to the interest in and success of the association by having the employees and company jointly function in the management. This is also a good medium for promoting better plant relations.

Having the dues collected by payroll deduction tends to a greater membership and eliminates the distasteful job of collecting dues. By making the company custodian of the funds increases greater confidence of the members in the stability of the association, and further gives to the association the benefit of the company's experience, through a trained organization, in investing and handling of the funds.

By having the employees and company both participate in the management has certainly added greatly to the interest manifested by the employees. We believe in 50-50 participation, in accordance with our established industrial relations policy.

A new practice in one of our steel plants where the association has been linked with the plan of employees' representation has proven as successful as any plan we have thus far tried, and we would now think well of the adoption of this plan in all our plants.

The association in the above case is administered by a board of managers composed of five employees and five company representatives. The five employee representatives are selected by the entire body of employee representatives from among their number while the company representatives are appointed by the management. The officers of this association are selected by this body of 10, with the exception of the secretary and treasurer, who are appointed from the company representatives. The secretary supervises the detailed activities of the association, such as reporting and investigating all cases, and the treasurer supervises the collection of dues, disbursement of benefits and investment of the reserve. However, the activities of both these officers are subject to the approval of the board, a majority vote of which is necessary to decide all questions.

Whether a company has an employees' representation plan or not, this same general idea can be successfully worked out. This gives the employees an interest in the association and at the same time assures a conservative administration of the association affairs.

In conclusion, I would therefore say that in the average association one of the most successful forms of management is that in which the employer and employee have an equal voice in the running of a mutual benefit association.

SHOULD MEDICAL SERVICE OF A MUTUAL BENEFIT SOCIETY EXTEND BEYOND THE WORK DONE IN THE PLANT?

Dr. Wade Wright, Assistant Medical Director, Metropolitan Life Insurance Company, New York City

I am tempted in reply to establish an inspiring record for brevity of oratory in the National Safety Council meeting by stating simply in my opinion, the answer is "Yes.' To extend my remarks beyond this is simply to indicate I am garrulous.

In asserting the belief that the medical service of the Mutual benefit association should extend beyond the work done in the plant I refer not to all mutual Benefit associations, but to those whose plan of organization and whose resources are such as to merit them to render any real service.

There are some industries and mercantile organizations who are stirred to play social and medical relief through their mutual benefit associations which are organized with little or no concern for actuarial procedure, with incomes which are haphazardly assembled and with benefits of very doubtful value.

The employees contribute their modest fees, dues, assessments and extra assessments and the benevolent employer, who looks upon his worker as upon a wayward child, and who wishes to do him good, stands ready to make up any deficit in the funds of the mutual benefit association should the lemons of the Hallowe'en festivals and sundry minstrel shows prove a little less succulent than had been anticipated.

Being so entrusted, one who would believe in fairies, Santa Claus and, possibly, of good in the Democratic party, I cannot but suppose there is some worth while purpose to be served by the host of mutual benefit associations which pay small benefits, but that purpose is certainly obscure. Essentially, mutual benefit associations are conceived as, simply, sickness insurance funds, benefits in service or in money apart from those death benefits which are payable to the local mortician and local florist are designed to mitigate the distress which is incident in the sickness or injuries of non-industrial origin. Without ignoring the fact that in many instances the ill health of the industrial workers is in part at least industrial origin, is in part attributed to the effects of working conditions, it remains true that the large overwhelming part of the illness among industrial workers is of non-industrial character. They share the frailties of the world at large. They get fat and bald like safety men. They acquire indigestion like that of book agents and get colds and pneumonia, lumbago and varicose veins and rheumatism like all the rest of us.

Medical Service Must Extend Beyond Plant

In a few places, but after all in only a few places, are there to be found fairly elaborate industrial medical services with personnel and resources which are adequately, quantitatively and qualititatively enough to meet the needs of the industry workers. Broadly speaking, the medical care of sickness among these people must be rendered by physicians and nurses, by other medical institutions which are not immediately identified with the industry. It is the family doctor who, after all, is the industrial doctor, and the physician in industry is only his cooperative colleague.

If it is then the function of the community medical agencies to aid in the restoration of sick workmen to health and working capacity, if it is the function of mutual benefit associations to assist their members during periods of enforced idleness due to illness, it seems reasonable to conclude that such associations can and should provide specifically medical service beyond that of workmen actively engaged in the respective industrial establishment.

Of course, practical considerations demand the provision of medical service of this character be limited, but the limits should be defined with liberality. Many of the ills of men are happily of short duration. The doctor is called only once and for some strange and happy reason he brings comfort and assurance. This assurance is absence of danger and is really a precious contribution, for often the only tangible fruit of his visit is evidenced in the balance sheet of some manufacturing pharmacist.

It is perhaps doubtful if mutual benefit associations need be concerned with this problem of medical service in cases of brief duration The final resources of the sick member or the disposition of his doctor between them are usually elastic enough to assume the burden of the small cost.

In connection with prolonged disabilities or those of obscure or unknown origin, there is presented, however, a very different problem and one which occasions frequently grave concern for the solvenc of mutual benefit funds. Those cases are not so numerous. Chroni disease is a common thing.

There is a great deal said these days about keeping people wel but little effort need be and little effort could be expended by th medical profession or any one else in keeping people well becaus there are very few people who get sick. How many people do yo know who have gone beyond late childhood? I mean those who aren served by the Life Extension Institute.

Getting reminiscent again I recall when an industrial physician e deavored to tell old Doctor Frederick Shattuck in Boston that h task in his particular plant was talking to well people. He was dea ing with well people, and he was very emphatic about it. Doct Shattuck was the professor of clinical medicine. He was a delightf old gentleman. He is now quite aged and in certain infirmities. I said, "Now, they are well. Then again they ain't well. You kn there are very few of us who are well. We become walking museu of pathological conditions, and I sometimes see men sitting arou and around on shelves."

Few People Are Well

It is very, very true and only too often the pathological conditi clamor down off the shelf and join hands and dance around in

innards, and it is then we need our physicians and our nurses and dispensors, and our hospitals. It is then we need the very best help that mind and heart can offer us. It is then we need the assurance of economic support in this frantic effort to salvage the wreck. It is then we want the assurance our wives and children are not to suffer privation and immediate want, while we seek the only possible safeguard against the impending illness of long duration or death.

Mutual benefit associations, little ones or big ones, in small places or big places, or other associations known as insurance companies, can, I believe, be of almost incomparable service in advancing the public health provided the benefits which they offer are materially large, that they are real and substantial.

I can not view with any enthusiasm, generally speaking, the provision of the services of a doctor on contract perhaps usually employed upon a basis of compensation which could not possibly permit of service of any sound value. Without a doubt, however, good medical service can be secured for cases of acute illness in many communities, not in all, if thoughtful consideration be given the matter. But in connection with more serious disability, the mutual benefit associations have an opportunity to make a very notable contribution to the welfare and contentment of the members. That lies in providing definite allowances for consultation and diagnostic services, the nursing service, for operations, for hospital expenses. If it can not be done feasibly in the form of specific benefits it certainly can be accomplished by the establishment and careful administration of loan funds.

Grown men and women, those who constitute, largely speaking, our industrial workers, must frankly face, the inevitable burdens and responsibilities of their lives. If they don't face them some one must face them for them. Almost inescapable is the burden of disabling sickness. Death is inevitable, and to provide adequately for these during times of working capacity is a duty not likely to be avoided and not to be deferred.

DISCUSSION

CHAIRMAN LEY: If you are going to have a mutual benefit society make your benefits commensurate with a man's salary, I think your society needs the $5,000 men just as much as the plant needs them. If you pay the $1,000 man $10 a week, you can afford to pay the $5,000 man $50 a week, and the boss can just as well afford to pay his share on the $5,000 man. In fact, he can better afford to, than on the $1,000. Those are the men you want to get in the mutual benefit society, and they will see that it is run in the proper manner and you will get the same kind of brains as the firm has and needs.

MR. W. H. WINANS: (Union Carbide Company, New York City, N. Y.): May I ask if any one here has had experience with discretionary awards such as Dr. Ryan referred to in connection with petty hospital expenses, operating fees or items of that character which are discretionary with the officers of the Association as to the amount.

MR. F. E. STIVER: (St. Louis, Mo.): I wish to say the association of which I am president gives to each member the services of the doctor free of charge. If there is any surgical operation he pays the assistants and the hospital bill, but we give the services of our head doctor free of charge.

We pay the medical doctor $100 a month. It doesn't make any difference if he has one operation or fifteen operations.

MR. CULLINEY: Our associations have a provision allowing the board of managers to make donations. There is no limit put to that amount.

CHAIRMAN LEY: If you have these insurance benefits which are paid for at the prevailing rates of insurance companies, introducing the health work is bound to cut down the cost of the insurance.

I believe every concern can afford to give to the mutual benefit society all the savings that result from cutting down the insurance.

MR. WOEDTKE: In the mutual benefit association, through the results of health work, we forced members to effect a reduction. We put it squarely up to the insurance company from whom we buy our group disability insurance. We wanted them to experience rate our risk the same as the workmen's compensation.

We were able to show over a period of two or three years that the service we are furnishing to the members of our club had brought about such a good result financially, they cut the rates 25 per cent. So it cost 25 per cent less to buy the group disability insurance because of the health work which the employees themselves did. We simply furnish the service and they follow it up and the results were so good it brought back a dividend to us, and the saving, of course, was given to the association. It went into the loan fund which they have. If they want to help somebody who is out of luck or help them in any way at all they use the money.

Salaried Man Should Be Taken Care Of

MR. H. W. FORSTER: (Philadelphia, Pa.): I am not a wage worker and I don't get any salary. If we make a profit I get an income. But the fact of the case is I carry very heavy disability insurance because I know if anything serious strikes me, I may go financially on the rocks. I haven't any benefit association in the business from which I can draw the assessment but I have to pay for it. Because I know every man, whether he is working on an hourly basis or salary basis, for moderate compensation or high compensation, is generally working fairly close to the wind, and if any serious disability hits him his resources

are very quickly exhausted and it doesn't make a bit of difference if he is getting $3 a day or $3,000 a month.

It behooves us interested in benefit associations to get in the salaried man just the same as the hourly wage man.

We have, however, one difficulty and that is the fact it is customary in most organizations to carry a salaried man on the roil for a reasonable period if he is disabled and, therefore, the employees' benefit association, which generally has the keenest support among those whose pay stops the minute they fail to punch the clock, approach the subject, "Well, I am taken care of anyhow." You have to devise a plan whereby the salaried man can join. You have to argue. "You need the income over and above the salary because you have other expenses." You can also do what they have done in several organizations, say "We have been paying you more or less without limit for disability. We now want to put our money behind the benefit association. We will go ahead and pay you half pay instead of full pay providing you join the employees' benefit association." Then you have an honest-to-goodness stimulant and the average fair-minded, average salaried man will say "Well, I don't think I am entitled to what the other fellow gets. If I get half pay I know I am getting more than the others." That is the way some of the employers changed the previous policy and got behind the work in an effective way.

MR. L. B. LANGDON (Mueller Company, Decatur, Ill.): I merely wanted to bring to your attention a help to our benefit association that has had a great deal to do with making it ninety-seven per cent full membership, and that was the help of the house organ. We could not get the people to meet. We could scarcely get a quorum even for important business sessions or election. So we adopted the policy of publishing in our magazine every month full particulars in regard to all the transactions of the society including detailed list of all benefits paid, and that thing has simply turned the daylight on it. Giving full facts all the time has made and secured the good will of the entire organization.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN LEY: The nominating committee to bring in nominations for officers for the coming year are: H. W. Forster, Brown-Crosby Company; W. H. Winans, Union Carbide & Carbon Company; A. L. Watson, Hooker Electrochemical Company.

Resumption of Discussion

MR. L. D. SHARPE (Southern Bell Telephone Company, Atlanta, Ga.): I would like to ask Dr. Ryan wehther he had any experience whatever with the plan he suggested of making arrangements with the physicians in the town to treat a whole group of employees for some fixed sum?

DR. RYAN: This scheme I have is one in which the cooperation of the local medical profession is a necessary point of its adoption, because it provides for going to the local medical profession with the proposition and getting their assistance. This scheme in exactly this arrangement has not been adopted because it is more limited than the scheme that the gentleman from St. Louis referred to in which a doctor undertakes to provide medical atention for a whole group at so much a month.

That is a method I think meets with the disapproval of a large part of the medical profession. Obviously, for $100 a month a man may be called upon to do a great deal more work than he would in private practice, and unless he can supplement his income in other ways he is working too cheaply, and the tendency is to lower the fees and standards. That is not the scheme I propose.

I propose to limit the plan to the strictly lower paid group of workers and let the medical profession, themselves, decide who will take care of it and agree to it before they adopt it. Giving them the responsibility for keeping it applied to that class and not allowing it to be taken advantage of by the higher paid group of workers who should provide for their own private medical service.

MR. SHARP: As I recall your figures, you anticipated $3 a year would be adequate per person. Then assuming a group of 2,000 employees you have approximately $6,000. Would your scheme be that you would go to the medical profession and say "We have $6,000 we can pay you every year, regardless of how much service you render"? The fees wouldn't amount to $3,000 but you would pay $6,000 anyway.

DR. RYAN: In that case if your provision said, "We want one hour of medical consultation per day at this office for which we will pay $5 an hour," you would assign men and let them take the examination once a month or once every three months, that takes one hour's time and they would get $1,500. Then there would be another hour visiting patients that may not be able to come to the office.

MR. SHARP: Are operations included in that?

DR. RYAN: They were not contemplated. I indicated it was just a start. It is one that offers possibilities. As the medical profession realizes their own interests are safeguarded in that they are operating the scheme, ways and means, I think, can be found by them in cooperation with the association to extend it as the need arises.

MR. SHARP: Were the figures in the cost of insurance based on any age group or very wide extension?

DR. RYAN: It is based on the rates the insurance companies quote for groups sufficiently large to give an age spread that safeguards them adequately.

THURSDAY AFTERNOON SESSION

CHAIRMAN IDE: Is the nominating committee ready to report?

REPORT OF NOMINATING COMMITTEE

MR. H. W. FORSTER: Your committee met and very promptly insisted on presenting only three names for re-nomination, the three gentlemen who have, for the last year, headed this organization. You can see from the calibre of speakers they have been able to get, from their activities and interests, that our selection at Buffalo was a good one. We admit it. Therefore, you will agree with us we will be willing to reelect them. (The report of the nominating committee was accepted by unanimous vote.)

STATISTICAL ANALYSIS OF SICK BENEFIT ASSOCIATION RECORDS

Dean K. Brundage, Assistant Statistician, U. S. Public Health Service, Washington, D. C.

Since JANUARY 1, 1920, a group of industrial mutual benefit associations and company relief departments has been sending monthly morbidity reports to the United States Public Health Service. Recently, through the cooperation of the National Safety Council 15 additional employee benefit associations have started to report their claims for benefits on account of sickness and non-industrial injuries. The reports are tabulated and analyzed in the statistical office of the Public Health Service, and the combined sickness experience is published from time to time, in the public health reports.

This is done because it is felt that continuous knowledge is needed of the amount and character of sickness occurring in a sample of the industrial population of this country. A durable public health structure cannot be builded, it is believed, without reference to the facts of sickness incidence and severity.

"Artificial" Factors in Morbidity Data from Insurance Sources

A question which arises at this point is whether the reports of industrial establishment disability funds actually afford a knowledge of the frequency of sickness and of its duration.

Obviously they do not cover all sickness, because the waiting period, which is generally one week, excludes many cases, and, the illnesses reported by industrial mutuals must be so severe as to interfere with the work of those gainfully employed to the extent of actual incapacitation. It thus would seem at first thought that only rather serious diseases and pathological conditions would be reported for disabilities lasting eight consecutive calendar days or longer. But experience has demonstrated that the expression "unable to work" describes numerous states of being between undoubted sickness and undoubted ability to work, even where the waiting period is as long as seven days. The personal equation of the sick person is a factor in "incapacitation", and especially in its duration. In the words of Sir Alfred Watson, sickness, as measured by the statistics of Friendly Societies, is "not pathological sickness, but claims upon the funds for benefits in respect of incapacity for work." (1)

Unfortunately, there are other disturbing factors also, which tend to limit the value of sickness data gathered from insurance sources. Some of the more important of these which have been pointed out by students of European sickness insurance experience, and by others, are as follows:

1. Methods of administration of the sickness benefits.
2. Effectiveness of claim supervision.
3. The rate of unemployment.
4. The average wage of the insured, and the percentage of wages paid in sick benefits.
5. The retroactive payment of benefit for the waiting period if the illness produces incapacity of more than a specified period.
6. The inclusion of Sundays and holidays in the calculation of the days of benefits.
7. Compulsory and voluntary membership.
8. Nature of the occupations of the insured, i. e., an illness which would incapacitate a locomotive engineer would not necessarily prevent a clerical worker from being at his desk.
9. Character of the medical service.
10. Age limits for eligibility to membership.
11. Omission of cash benefits for chronic cases contracted prior to the date of joining.
12. Omission of benefits for disability caused by venereal disease, by intoxication, by the violation of any law, or by wilful or gross negligence, etc.
13. Refusal of benefits by a few associations for such diseases as scarlite, lumbago, trachoma, lame back, and certain other diseases and conditions that are more or less difficult of verification.
14. Unsatisfactory sickness certificates.

(1) From the discussion of Mr. Rhodes's paper, "The Statistics of Industrial Morbidity in Great Britain," Journal of the Royal Statistical Society for January, 1922, Vol. 85, p. 14.

pacitation. It thus would seem at first thought that only rather serious diseases and pathological conditions would be reported for disabilities lasting eight consecutive calendar days or longer. But experience has demonstrated that the expression "unable to work" describes numerous states of being between undoubted sickness and undoubted ability to work, even when the waiting period is as long as seven days. The personal equation of the sick person is a factor in "incapacitation", and especially in its duration. In the words of Sir Alfred Watson, sickness, as measured by the statistics of Friendly Societies, is "not pathological sickness, but claims upon the funds for benefits in respect of incapacity for work." (1)

Unfortunately, there are other disturbing factors also, which tend to limit the value of sickness data gathered from insurance sources. Some of the more important of these which have been pointed out by students of European sickness insurance experience, and by others, are as follows:

1. Methods of administration of the sickness benefits.
2. Effectiveness of claim supervision.
3. The rate of unemployment.
4. The average wage of the insured, and the percentage of wages paid in sick benefits.
5. The retroactive payment of benefit for the waiting period if the illness produces incapacity of more than a specified period.
6. The inclusion of Sundays and holidays in the calculation of the days of benefits.
7. Compulsory and voluntary membership.
8. Nature of the occupations of the insured, i. e., an illness which would incapacitate a locomotive engineer would not necessarily prevent a clerical worker from being at his desk.
9. Character of the medical service.
10. Age limits for eligibility to membership.
11. Omission of cash benefits for chronic cases contracted prior to the date of joining.
12. Omission of benefits for disability caused by venereal disease, by intoxication, by the violation of any law, or by wilful or gross negligence, etc.
13. Refusal of benefits by a few associations for such diseases as neuritis, lumbago, trachoma, lame back, and certain other diseases and conditions that are more or less difficult of verification.
14. Unsatisfactory sickness certificates.

(1) *From the discussion of Mr. Rusher's paper, "The Statistics of Industrial Morbility in Great Britain." Journal of the Royal Statistical Society for January, 1922, Vol. 85, p. 76.*

In consideration of the fact that some of the sickness certificates are extremely vague and indefinite, or give symptoms only, and that the records sometimes retain the first and often tentative diagnosis, even though the physician may later send in his final diagnosis, Watson submitted very seriously that this "was not the proper material on which to build a huge statistical superstructure". (2)

These are not all of the difficulties by any means, but are the ones most frequently mentioned. They constitute barriers to getting at the truth about the incidence and nature of real disability which have led some to contend that sickness statistics based on the reports of industrial benefit funds would be of little value.

Procedures Which Offset the Chief "Artificial Variants"

But not all of these "variants" of sickness claim experience are of the same importance, and some of the obstacles can be removed altogether by careful selection of the associations from which reports are desired. The plan for sickness statistics, I believe, should consider an association having any one of the following features as disqualified for reporting:

1. Retroactive payment of benefit for the waiting period if the illness produces incapacity of more than a specified period.
2. Payments for disability which are as much or nearly as much as the wages paid.
3. Sick benefits which are too low. Payments of less than one dollar a day would appear to fall in this class.
4. Failure to pay benefits for neuritis, lumbago, rheumatism, etc.

The retroactive provision supplies an economic incentive for stretching out a few days' illness to at least a week's absence from work, since sick benefits for a week usually are more than the wages for one or two days. One association which reported to the service in 1921 had the extraordinary rate of 444 cases causing disability for eight days or longer per 1,000 male members; for this there was no plausible explanation except the retroactive feature.

Similarly, the rate of disability is liable to be fictitious when the benefits are too high a percentage of the wages paid.

Probably not all real sickness is reported when the benefits are too low. When they amount to only one or two dollars for eight or nine days of disability, a member can hardly be expected to make much of an effort to report his case.

The belief that associations which fail to pay for neuritis, myalgia, lame back, and other conditions which lack objective symptoms, should not report, is based on the theory that many of these cases are paid

(2) From the discussion of Mr. Kuhn's paper, "Statistics of Industrial Morbidity in Great Britain", Journal of the Royal Statistical Society, January, 1922, Vol. 85, p. 79.

for anyway by naming certain secondary ailments in lieu of the chief cause of disability, and that we would therefore get a distorted picture of the primary ailments among the members of such associations by tabulating their claims.

The statistical scheme should also exclude reliefs employing methods of administration which tend to discourage the filing of just claims, and, at the other extreme, associations which are lax in their methods of claim supervision.

An annual analysis of the data from each co-operating association can be counted on to a certain extent to indicate the funds that are somewhat lax in their methods of administration. When the analysis reveals high sickness frequency rates for many of the less serious diseases, and especially for ill-defined and indefinite causes of disability, as well as those diseases most easily simulated—in the absence of any plausible explanation for the extent of the excess morbidity, one is forced to conclude that the standards of such relief societies are different from those of the other reporting sick benefit funds. Incidentally, it ought to be of interest to such organizations to learn that their reports cannot be used for statistical purposes. Fortunately, from the statistical as well as from all other standpoints, there appear to be few industrial mutual associations in this country which go to either of these extremes in administration.

One method, therefore, of avoiding the most serious disturbing factors is to obtain sickness reports only from those organizations which have the best morbidity data.

European Experience Not Always Applicable to America

Certain criticisms of sickness statistics obtained from insurance sources apply more forcefully to the European than to the American situation. The rate of unemployment, for example, appears to disturb the claim experience to a lesser extent here than abroad. In 1921 when several million men were out of employment in this country, the frequency of sickness claims did not increase, but appeared to reflect very well the excellent health conditions of that year; for in the American reliefs, membership usually is automatically suspended when a lay-off lasts longer than a few months.

The Leipzig Local Sick Fund found that the days of sickness per person in the voluntary membership group was from two to three times as great as among those who were compelled to join. This, of course, was the result of selection against the fund by self-solicited risks. Although a large majority of the industrial mutuals in this country are on the voluntary basis, it seems improbable that the tendency for the less desirable risks to seek insurance would appreciably affect the total rate, since ordinarily a large proportion, and frequently a very large proportion, of a firm's personnel belongs to the benefit association.

While the inclusion or exclusion of Sundays and holidays in the calculation of the days of benefit may be a disturbing factor in European morbidity statistics, it can hardly be considered as such in this country for the simple reason that we usually do not pay benefits for Sundays and holidays, most of the associations being on the working day basis.

The argument that sickness which would incapacitate in one occupation would not necessarily interfere with certain other kinds of work loses much of its potency when minor illnesses are eliminated from consideration by the selection of a suitable waiting period. A case of pneumonia, for example, would interfere with carrying on any kind of work. No matter what the waiting period really is, one can always increase it artificially, simply by leaving out of account all cases of less than a certain duration. Thus the comparability of occupational statistics of sickness is dependent to a certain extent upon the selection of the waiting period.

As to the difficulty arising from the tendency to report the first and often tentative diagnosis: wouldn't association secretaries be willing to have the final diagnosis looked up, especially if reports of "closed" cases only were sent in at all times except the end of the year when a list of the cases "carried forward" is necessary in order to obtain sickness frequency rates according to the months and year in which disability began?

"Artificial" Factors Which Cannot Be Corrected

There are, however, certain artificial factors in the data from sickness insurance societies which cannot be offset or corrected. The age limits for eligibility to membership, for example, prevent the age distribution of the persons belonging to the association from being entirely representative of the personnel of the establishment from which the membership is constituted. At present it appears impracticable to attempt to obtain reports of the disabilities for which benefits are not paid, such as chronic diseases contracted prior to the date of joining, disability on account of venereal disease, intoxicating liquors, etc. The sickness rates based on the reports of industrial sick benefit associations will simply have to be regarded as understatements of the amount of disability actually occurring. However, if it is clearly understood that the yardstick is not quite 36 inches long, one can still obtain a better estimate of the thing to be measured than can be arrived at through pure conjecture.

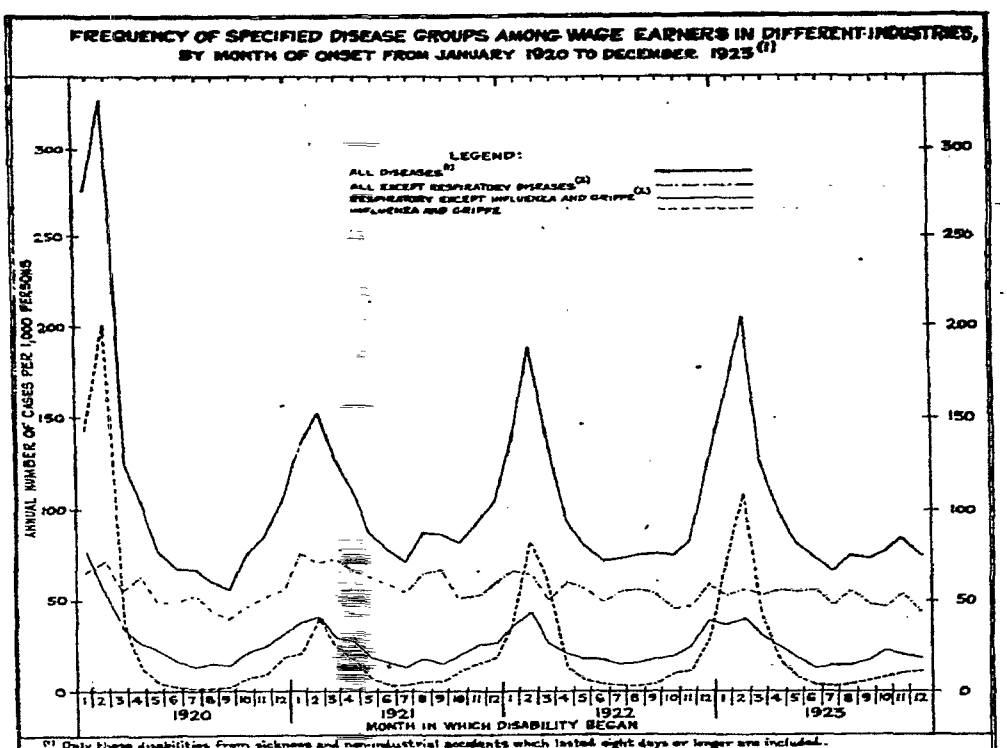
Notations on the Sickness Statistics for 1920-1923

In the statistics of sickness lasting eight calendar days or longer gathered from industrial disability benefit funds since January, 1920, not all of the disturbing factors have been eliminated. The character

of the data, however, has been gradually improved by weeding out the reports from associations which showed evidences of carelessness and inaccuracy, and those having the retroactive feature for the payment of benefits, and certain other disturbing conditions. The statistics *do not* include any data from societies which fail to pay for neuritis, lumbago, rheumatism, and other conditions which may be hard to verify.

The combined membership of reporting associations has been increased from an average of 48,000 in 1920 to approximately 100,000 in 1923. While a few have dropped out, most of the larger societies which started reports in 1920, are continuing them.

The rates of sickness representing the average experience include several reports from relief or medical departments of industrial companies, but these reports were made to conform as much as possible with the data from sick-benefit associations by excluding the venereal diseases and certain other illnesses for which sick benefits ordinarily are not paid.



In calculating the sickness frequency rates, the number of persons used as the divisor is the number of employees reported as holding membership in the association, or, in the case of relief or medical department reports, the number on the pay roll as of a given date each month. Males constitute about 90 per cent of the total personnel under consideration.

Seasonal Variation in the Incidence Rate of Sickness

In Figure 1 which exhibits the frequency of sickness from all causes and from certain causes by months from January, 1920, to December, 1923, the marked seasonal variation in the incidence rate of disabilities lasting longer than one week will be observed. That the peak of sickness incidence in each of the four years under review came in February also will be noticed, as well as the fact that the height of the peaks was largely determined by the number of cases of influenza and grippe. The other respiratory diseases also had their greatest incidence at the time that influenza and grippe were most rampant, so that the combined effect of all the respiratory diseases was to produce extremely high disease frequency rates in January, February and March. If the respiratory diseases could be eliminated, there would be relatively little seasonal variation in the frequency of illness which disables for eight days or longer, as shown.

The Principal Causes of Disability

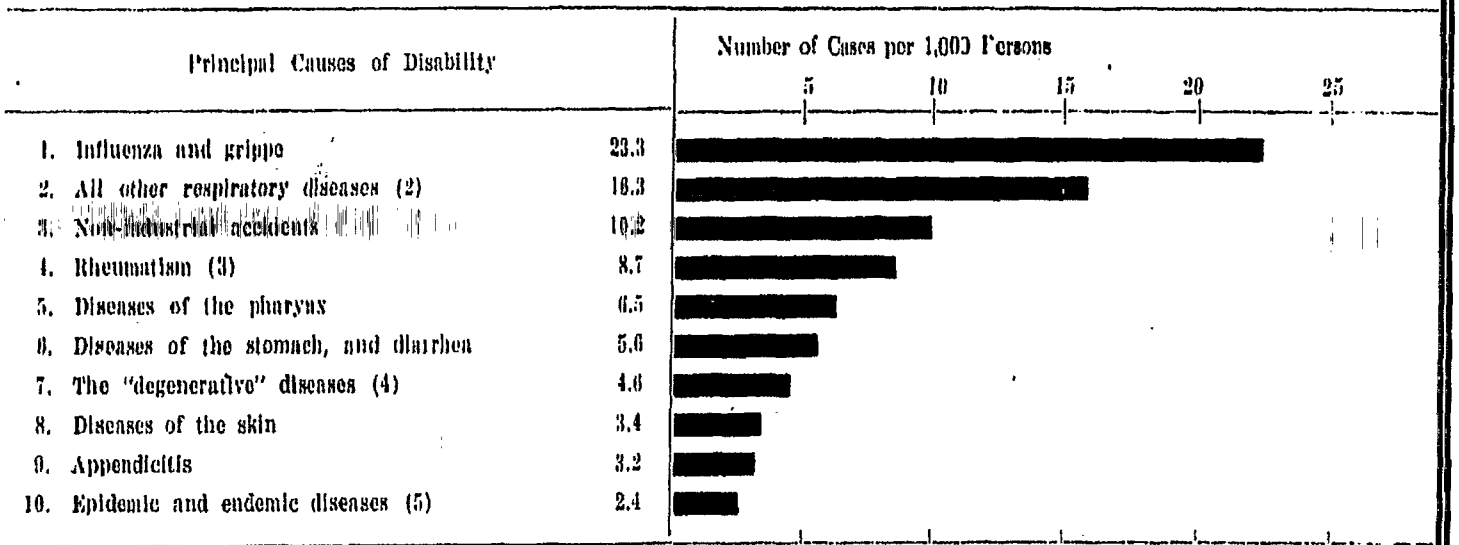
In Figure 2, the principal causes of disability in 1923 are exhibited. Again, the high frequency of influenza and grippe is outstanding. In 1923, influenza and grippe accounted for 24 per cent in 1922, 21 per cent of all the disabilities for which sick benefits were paid. Even in the non-epidemic year of 1921, "flu" or grippe caused a much larger number of claims upon the funds of industrial mutual associations than did any other disease. One out of every five claims for sickness benefits in the four years from 1920 to 1923 inclusive was on account of influenza and grippe.

Occupying tenth place in the list with a frequency of 2.4 cases per 1,000 persons are the epidemic and endemic diseases, with the exception of influenza and grippe. That the combined rate for typhoid fever, smallpox, malaria, measles, and all of the other epidemic and endemic diseases included in title numbers 1 to 19 in the international list of the causes of death (1909 revision) actually was less than the frequency of appendicitis is a record to which public health workers in this country can point with pride.

Frequency of Pneumonia in the Iron and Steel Industry

Among other interesting results, the analysis according to causes of disability disclosed that there were 2.2 times as many cases of

THE PRINCIPAL CAUSES OF DISABILITY IN 1923 AMONG 100,000 WAGE EARNERS EMPLOYED IN DIFFERENT INDUSTRIES (1)



(1) Only those disabilities from sickness and non-industrial accidents which lasted eight days or longer are included. Certain diseases are not reported as explained in the text.

(2) Including tuberculosis of the lungs, bronchitis (acute and chronic), pneumonia (all forms), severe cold (unqualified), laryngitis, pleurisy, asthma, etc., but not including diseases of the pharynx.

(3) Rheumatism, acute and chronic; also lumbago and other diseases of the organs of locomotion; neuralgia, neuritis, and sciatica.

(4) This category includes diseases of the heart, arteriosclerosis, and other diseases of the circulatory system, except diseases of the veins; non-venereal diseases of the genito-urinary system and annexa; cerebral hemorrhage, paralysis, and certain other diseases of the nervous system.

(5) Typhoid fever, malaria, smallpox, measles, scarlet fever, whooping cough, diphtheria, erysipelas, mumps, chicken pox, German measles, etc. (title numbers 1-19 except 11 in the International List of the Causes of Death, 1909 Revision).

Fig. 2

pneumonia per 1,000 members in the iron and steel industry in 1923 as occurred in the combined experience of all the other industries. This rate apparently was not abnormal for the industry inasmuch as the 1922 pneumonia rate for the reporting iron and steel companies was nearly as high (1.8 times the rate of the other industries). The employees of one large steel company experienced an excess pneumonia frequency in 1923, of 212 per cent.

In the two largest reporting associations in this industry, the data were available by departments. In one of these plants the departments which had the largest number of pneumonia cases in 1923 per 1,000 members were: (1) transportation; (2) open hearth; and (3) blast furnace. In the other plant the Bessemer department had the highest pneumonia rate. It should be pointed out that the number of cases in any one of these departments was not large enough to afford conclusive statistical evidence of an association of pneumonia with certain types of work or workers, but that a knowledge of the departments having the highest pneumonia rates is helpful in getting at the causes of the prevalence, even though definite statistical conclusions cannot be reached.

Sickness Frequency According to Establishments Reporting

Sickness rates according to establishment, irrespective of industry revealed some surprising differences. The plant having the highest sickness incidence rate in 1923 had four times as many cases per 1,000 persons as the plant which had the least sickness. Differences as wide as this suggest that a more detailed study in the establishments having the most sickness, in comparison with sickness frequency in the plants having the least ilness per 1,000 persons should prove illuminating.

Factors to be Analyzed

In the reports from co-operating industrial mutuals, only a few of the important factors affecting sickness are taken into account. We are endeavoring to obtain the age of the person sick and the age distribution of the membership so as to be able to adjust the figures for variations in the age constitution of different industrial groups when comparing their experience. The statistical researches of Rusher in England and Boris Emmet in this country have shown that age has the greatest influence on rates of sickness, and next to this occupation.* When it is impracticable to obtain morbidity data by occupation, a classification by departments in the plant is called for, since some means of observing, at least in a general way, the effect of different kinds of work should be provided.

The influence of sex upon sickness rates has perhaps not been sufficiently emphasized in the past. Tabulation of disabilities lasting

* *Rusher, E. A.: "Statistics of Industrial Morbidity in Great Britain", Journal of the Royal Statistical Society, Jan. 1922, vol. 85, p. 56; and Emmet, Boris: "Disability Among Wage Earners", Monthly Labor Review, Nov. 1919, p. 20.*

eight calendar days or longer in 1923, according to sex showed that the frequency of cases among the women was about 35 per cent higher than among the men. The higher female sickness rates were not due to diseases of the female genital organs, nor on account of the puerperal state, because only ailments common to both sexes were included. Moreover, it is probable that the women included were younger than the men. In one industrial establishment, for example, which is probably typical in this respect of industry as a whole, 19 per cent of the men on the pay roll are over 45 years of age, while only 3 per cent of the women employed are above this age. If the differences in the ages of the men and women were taken into consideration, the disparity in the sickness rates according to sex probably would be greater than 35 per cent.

Besides the three most important factors of age, sex, and occupation, the following other factors, judging from the few sickness studies that have been made, influence the number and duration of cases:

(1) Nationality, or racial stock.

(2) Length of service with the company.

(3) Marital status.

The effect of these factors should be measured, not alone on account of their bearing on the public health, but also because certain liabilities appear to be involved in these factors which sickness insurance properly should take cognizance of. A study from our Office which is soon to be published shows, for example, that a certain nationality lost on account of sickness three times as many working days per person as the native Americans in the association.

Special Investigations Needed

The present plan of getting current reports from different sick benefit associations all over the country, and of analyzing them from time to time, is uncovering sickness problems and defining them in terms of statistical ratios or percentages. The analysis cannot be carried very far toward ascertaining the causes of high sickness rates, because the reports do not cover all of the factors involved. Along with the general, current studies of industrial morbidity, a few special investigations are needed.

If the factors about which we know comparatively little are taken into account, and the experience of one or more large industries is divided into its constituent parts, showing the influence upon health of different occupations and processes in the industry, we should probably obtain better appreciation of the conditions causing serious sickness in industry.

Through the extension of knowledge which may lead to more effective ways of controlling and preventing disease, organizations for

sickness insurance have nothing to fear. From the economic standpoint alone they should co-operate to the limit. It is scarcely necessary to point out that the disease rate has a profound effect upon the state of their finances.

DISCUSSION

MR. DEAN K. BRUNDAGE: The Public Health Service is receiving reports from a group of sick benefit associations. These reports are tabulated and analyzed in the statistical office. We have probably a 150,000 membership now in the associations which are operating, but we still could handle satisfactorily a few more sick benefit association reports. If there is any one here who would like to send in reports we should be glad to tabulate the reports and analyze them along with the others.

I might add that at the end of the year it is our practice to send an analysis to each co-operating association comparing their sickness experience with the experience of all the other sick benefit associations classified by diseases causing disability, so that each association will know its sickness frequency rate for each disease in comparison with that disease in all the other associations, and the table also shows the number of cases in that association that were above or below the expectancy. By expectancy, I mean the number of cases that would occur in that association if its sickness experience were the same as for all other associations. So you find then the rate for each disease, and, of course, the rate for all diseases. That is the total rate, and each association can tell exactly what diseases are above normal or what are below normal.

I might say that these analyses have proven very interesting, and I hope very helpful in getting at the causes of excess morbidity and of pointing the way to improve the disease rate and prevent sickness.

We have the standard blank forms, and we will be very glad to send them out to any one writing to us. The address, of course, is Washington, D. C., in care of the United States Public Health Service.

MR. WOEDTKE: I would like to ask for a show of hands from the fellows here who have mutual benefit associations and who do send in their data, or rather have been sending in data to Mr. Brundage. (Five.) By way of example, how many have associations and are not sending the data in? (Eleven.) Right with this small comparison it would seem to me it is evident that once this work, if it is going to be of the value we know it will be, will be of much greater value if you have all of the associations reporting their data. It is a very easy matter to do. In my own case I don't do it, but a junior clerk does it within one-half hour's time, once a month. The data is compiled anyway, and it is a very easy thing to send it in.

SHOULD PHYSICAL EXAMINATION BE COMPULSORY TO MEMBERS OF A MUTUAL BENEFIT ASSOCIATION?

Albert B. Tenney, President, Malden Electric Company, Malden, Mass.

In order that you may understand my reasons for the answer which I am to give to this question, it seems advisable to describe briefly my reasons for a mutual benefit association.

I am associated in a plan of central management for a number of public utilities, situated principally in New England. It has been my good fortune to have been connected in this capacity for nearly 25 years. Starting with but one company, today we are connected with 14.

During this period, I have been actively and intimately associated with the employees of many of these companies and count many of them as my personal friends. In my early days, I saw and felt the barrier that exists between those who work with their hands and those who direct; this barrier becomes greater the further removed the directing heads are from the workers. I saw and felt the lack of human kindness in organizations, particularly large ones.

Well do I remember my first impression gained in the factory of a large rubber company. One of the employees was sick. He was away from his job. He lost his pay and soon was in debt to his landlady. He had no money. His fellow workers raised a fund to help carry him along. The company contributed nothing, nor was such aid asked. More real human kindness was shown by these personal associates than by the company. It made an impression on my mind.

Another impression that I gained in my youth came to me when, as a clerk in a bank, it was my job to wash the ink wells, put clean pens in the holders, and place clean blotters on the desks and keep them all dusted. To me it seemed as though those in charge of my work took great pains to make me unhappy by their unkind and unnecessary criticism.

From these two experiences, I made up my mind that if I ever reached a point in my career in which I had to deal with employees, I would endeavor to show a little human kindness.

Accidents and sickness are with us ever—and how to compensate employees who are incapacitated by either is a most difficult problem; no one rule can be written applicable to all cases.

Human Responsibility

Workingmen's compensation for industrial accidents is devoid of any human touch. Beyond this, is a moral or, shall I say, human responsibility on the part of employers towards employees. As one becomes acquainted with his fellow workers he find that they are as human as you and I; they have the same sicknesses—appendicitis with them is the same as with us; they have the same displays of temper and

kindness; when sick, they would like to feel that their pay envelopes are waiting for them at the end of the week, even as you and I do our salary checks.

As employers, we see the other side—we see extravagance, misrepresentation, chicanery, etc., all of which affects our judgment in dealing with deserving cases.

That is why we believe the employees are in a better position to judge what is fair and just in each individual case than we are especially as they are interested in the net cost of the health insurance.

Each accident or sickness presents different situations: how much, if anything, an employer should do for an employee and for how long a period, and other difficult questions. Employees mutual benefit associations have helped, in part, to solve these problems.

We have 14 such Associations in active operation, covering about 1,500 employees. Every employee may be a member of these associations—none *must* be—their purpose is to develop friendship, good fellowship, co-operation, to supply educational and social privileges, and to offer group life, accident, and sickness insurance and physical examinations.

Everyone may be a member of the associations, but only those who pay the dues of 25 cents per week and take the yearly physical examination may receive benefits from the association and the company.

In 14 different operating companies, we found 14 different ideas as to how much the company should contribute beyond the aid extended by the association to help its employees during disability caused by accident or sickness.

Our association pays $10 a week sick and accident relief and $1,000 death benefit for all except accidents covered by workmen's compensation, the company and employee sharing equally the cost of this protection, with a limit of 25 cents per week per employee. In each case the company pays to all those who are members of the association and have had one examination each year since joining the organization, the following benefits in addition to the $10 a week paid by the association:—

First 4 weeks of disability—full pay.

Next 13 weeks of disability—one-half pay.

To those members having the examination but receiving compensation under workingmen's compensation the company pays such sums as when added to the compensation will equal:—

First 4 weeks—full pay.

Next 13 weeks—one-half pay.

and, in addition, the association may pay from its funds, so long as it has any, such portion of $10 a week as the funds will permit for a period not to exceed 52 weeks.

To those members who do not take the insurance and physical examination, the company allows the following:—

1st week of disability—full pay

Next 4 weeks of disability—one-half pay

and the association, ordinarily, nothing. The association, if it wishes, may pay something from its own funds, but it is believed that fellow workman will be very loath to contribute any considerable sum to an associate who has been unwilling to contribute himself to the association and to take the physical examination. In fact, experience has proved this to be the case.

Treatment of Particular Cases

This basis of additional compensation on the part of the company is elastic. In the first place, it is not mandatory, thus permitting the local manager some word as to the advisability of assistance. In the second place, it may, upon the recommendation of the manager and approval of the president, be extended. Thus, deserving and undeserving employees may be treated in a sympathetic manner, according to all the facts in each case.

This method of meeting accident and sickness compensation has been in effect since January, 1924.

We found from experience that it was quite important to treat those who were examined each year, and were putting themselves in better shape to do their work, differently from those who were not doing anything.

Already, two interesting examples have come under it.

In one, the individual had been a member of the association and had had the insurance and physical examination. For some reason, he became dissatisfied and cancelled his insurance and physical examination. A few weeks ago, he had to give up work on account of tuberculosis.

The company adhered rigidly to the above rule and paid him one week's full pay and three weeks' one-half pay. The association, acting on its own responsibility, gave the employee $50 from its funds.

It is not to be assumed that had he continued his insurance and physical examination tuberculosis would have been avoided, but it is apparent that he would have enjoyed disabilty pay for a much longer period, and for a much larger amount, with better chances for avoiding the disease.

The lesson had been learned, and since then a number of employees have taken the insurance and the physical examination.

In another case, an employee sustained a severe injury while prosecuting his work. The company paid such difference between his full pay and workman's Compensation for four weeks and one-half pay for

the succeeding 13. The association, from its own funds, is paying $5 a week, for 13 weeks; and the company is paying an equal amount.

These two cases are directly opposite—one employee, cancelling his insurance and physical examination and being obliged to give up work on account of tuberculosis and receiving but little aid from the company;—the other, being injured while at work, and receiving compensation under the workman's compensation insurance and, in addition, receiving $5 a week from the association and $5 a week from the company for 13 weeks, at least.

Of the two men, there is no doubt but the latter is entitled to greater consideration from the company and I may say that he is and will continue to receive it.

I believe that physical examinations are most desirable, and am strongly inclined to make it a condition of employment, but I am not yet ready to make it absolute.

If possible, I want to make the benefits of physical examination so attractive to members of mutual benefit associations that employees will seek it rather than shun it, and I believe that those employees who will take the examination yearly should be encouraged to do so by being rewarded with greater liberality in disability pay than those who do not, feeling that it means greater safety to both employee and employer to have the physical examination.

We believe we are going to get the benefits of having our people examined every year without having to make it compulsory. We find that they reason it out for themselves that they can't afford not to join the mutual benefit association, and take the examinaions.

SHOULD THE BENEFITS VARY ACCORDING TO A MAN'S SALARY OR BE BASED ON THE LENGTH OF SERVICE?

Seth L. Bush, Manager, Research Department, Crocker-McElwain Company, Holyoke, Mass.

Industrial groups organized for the payment of benefits have usually been successful. Where the result has been disappointing, the reason can generally be traced to some unsound principle. One of the determining factors in the final success of any such group is the method of apportioning benefits.

The choice of method is largely determined by the motive in the mind of the employer. This motive has often been a desire to create an incentive for length of service, but we must admit that the value of insurance benefits for this purpose has been greatly overrated.

In my opinion, length of service incentives are better when provided in a more direct manner. For example, the concerns which I represent reward continuity and length of service by a differential payment

in addition to the regular hourly wage. This service differential increases each year for the first four years of employment on a given job. The end of the fifth year of continuous satisfactory service with the company, brings a guarantee of full time work which continues as long as the employment relation remains unbroken.

If, then, the motive of service reward be discarded, what should be the purpose of the employer in helping to provide insurance benefits for his employees? I believe that the primary function of such benefits is to relieve the fear of the total loss of income in case of disability or death. This relief naturally encourages a better attitude, and results in greater attention on the work, through a more contented state of mind. In this improved attitude, lies the value to the employer. In addition there is a real satisfaction in being able to help in a sound and businesslike way toward the economic independence of his employees.

With this idea of the real purpose of group protection, it seems reasonable that the greatest satisfaction for all concerned can be expected from a combination of disability benefits and death benefits.

The sole value of the disability benefits, from the standpoint of the employee, lies in the fact that they compensate him in some measure for loss of wages. It would seem logical therefore that these benefits should be apportioned, according to the amount of wages, with reasonable minimum and maximum limits, and with a scale of dues in proportion.

With death benefits it is different, assuming the employer is to share in the expense. If it be conceded that for him the real value of the death benefit lies in the relieved attitude of mind on the part of the insured, it seems logical that his money should be used to relieve in largest measure where there is greatest need for relief.

An Illustration

Let us assume that A is a single man with no one dependent on him. He has been with the company for ten years and is receiving the highest skilled wages. B has been with the company only a year. He is receiving the prevailing rate for common labor, but he happens to be married, with four or five children. His family is solely dependent upon him. Both men die. Assuming that both have been adequately remunerated for length of service and work done, is it reasonable that for A, the single man without dependents, the employer should have provided insurance of, let us say, $1,000 to be turned over to relatives or others who do not need it, while the family of B receives only the minimum sum of, perhaps, $300? Would it not be more sensible to apportion the death benefits according to the number of dependents?

In the case of the man with a family, there might be said to be a thousand dollar hazard to be relieved in order to gain his best attention on his work, while in the case of the single man, there being com-

paratively no such hazard, there would be little need for relief. $300 should suffice in the case of A, while in the case of B, the $1,000 would be more adequate.

The total expense will be the same, yet we are enabled to make a larger contribution in the case of the needy family, without working hardship in the case of the single man. We must realize that in helping more largely for the relief of the fatherless children of today, we are really helping to build healthier and happier workers for tomorrow.

Some will immediately question whether this method would be acceptable to a group of employees. I can only say that it has proven acceptable with the employees of the Crocker-McElwain Company and the Chemical Paper Manufacturing Company of Holyoke, Massachusetts. We should remember that a death benefit, except in case of total and permanent disability, is of no tangible use to the employee himself. He cannot collect on it, he cannot sell it, nor can he use it to pay his grocery bill. Its monetary value is only for those who are some day left when he has gone.

Our insurance protection at the Crocker-McElwain and Chemical companies has been established on a fifty-fifty contributary basis, with disability benefits apportioned according to the amount of weekly wage and with death benefits apportioned to the number of dependents, in spite of two facts which might tend to make acceptance of such a plan difficult.

First is the fact that we have preferred to keep the death benefit at a comparatively low figure. The minimum is $300 graduating up to a maximum of $1,000 according to the number of dependents. It is our belief that these amounts are sufficient to tide over the first and most difficult period of readjustment. We would of course expect that unusual cases of need could be cared for in some special way, perhaps through a reserve accumulated in case of good experience.

Second is the fact that we have stressed prevention as well as relief, by adopting annual physical examination of all those within the insured group, through the cooperation of the Life Extension Institute of New York. This physical examination feature has been accepted purely on its own merits, by the insured employees. The examinations are now in progress and seem to be creating considerable satisfaction.

In a plan such as outlined, the equitable distribution of expense causes no difficulty. The employer should pay a small amount toward the cost of the disability protection for each and every insured employee alike; the major portion of the disability expense being assumed by the employee under a schedule of dues varying according to the indemnity amounts. The employees can then all share equally in carrying the smaller part of the expense for the death benefits, the balance being cared for by the employer. This leaves the physical examination feature to be shared equally between employer and employee.

After more than a year's study of group protection my conclusions are in favor of these triple advantages: first, disability benefits, apportioned according to the amount of wages, (50 per cent of the wage, with a safe maximum, being a reasonable figure); second, death benefits apportioned according to number of dependents in amounts sufficient to cover merely the first readjustment period; and third, the reduced need for benefits, made possible by annual physical examinations, combined with health education; the expense for all to be cared for jointly between employer and employees on a fifty-fifty basis.

DISCUSSION

DR. D. J GRANT: (C. W. C. Foundry Company, Muskegon, Mich.): I wanted to hear some discussion on whether it was compulsory to have physical examination or the benefit of having it compulsory.

CHAIRMAN LEY: I will tell you first my experience on this particular subject. We had no difficulty in finding employers who would offer examinations to their employees and pay the entire expense.

After two or three years experience I found a lot of employees would take it simply because they thought they were catering to the boss, and they would take the examination and let him spend his money and not do anything. The result was no good was accomplished. It was simply wasting the money. I came to the point of telling every employer, even after he agreed to give the service to one hundred per cent of the employees, "Give it to those who want it, and the only way to find out is ask them to pay part of the expense, if they want to take it." I don't know of any other acid test. The minute you ask them to put up the money it must be voluntary on their part, and if they show a desire and willingness to spend the money then you can rest assured they are going to do something to get something for the money, and the only possible way to get something for the money is to try and carry out the suggestions they get from the doctor.

MR. BUSH: The plan, as we now have it, is exactly as outlined with no choice of varying amounts at all. It may be that some time in the future we will find it wise to enlarge the scope of it. That has been the big bugaboo in the minds of most men whom I have talked with that the $300 amount being so small the single men wouldn't take it, but he does take it and if it is put up to him in the right way a large majority of them will take the $300 death benefit and the physical examination, and are glad to get both. They seem to really agree wholeheartedly with the idea that the expenditure of a given sum of money is better along the line of giving him only a little to cover burial expenses and nothing more, but leaving a big slice for the man who has the family. He sees the justice in the employer's money being divided up. Immediately he begins to see the justice of that. His sense of fair play to the fellow-employees brings him right into the association whole-heartedly. It isn't something you can put over to

the employees in a week. They don't scent it that soon, but live with them a few months and their own sense of fair play makes them come in and take the $300 cheerfully, and pay just as much for that as the man who gets the $1,000.

Married and Single Employees

MR. STIVER: I disagree with the speaker about the $300 to the single man and $1,000 to the married man. When you get a job it is immaterial whether you have 10 children or not—you get the same pay, and where you show a class distinction in the $300 and $1,000 it looks like the married man with four or five children ought to receive the same benefit when it comes to hourly pay or wages.

MR. LAW: From our experience a single man starts in on the service basis. He is a member of the organization for three months before he gets any benefit. He starts in at $600. A married man who starts in, starts in at $900. If he has any children you add $100 for each child he has in the family. He gradually advances, I think, up to $2,700 for a man with a large family.

MR. BUSH: The rate which the salaried employees pay is a lower rate than the wage-earners pay, but the salaried employees do not receive sick benefits, because they have the wages paid. We have always done that. We have always paid their salaries right through. We haven't changed that at all, and we didn't allow them to come in on the weekly benefit. We have no regular rule. We have kept it open to handle it according to the particular case. Sometimes it has run along for a matter of a year and sometimes six months, according to the needs and the demand.

The $300 amount is for a single man whether he be a wage-earner or salaried man, on life insurance. A salaried man with a family of a wife and five children gets $1,000, the same as the wage-earner with a family gets $1,000. The life insurance is distributed exactly alike.

ADJOURNMENT

American Society of Engineering---Engineering Section

October 1, 1924

A. J. VAN BRUNT, President, American Society of Safety Engineers, Public Service Corporation of New Jersey, Newark, N. J.

W. S. PAINE, Chairman, Engineering Section, National Safety Council, Aetna Life Insurance Company, Hartford, Conn.

W. D. KEEFER, Secretary
National Safety Council, Chicago, Ill.

CHAIRMAN VAN BRUNT: I asked a few moments ago whether this was a wedding or a funeral. At funerals there are very few of the attendants who are really happy and none of them dare show it. At weddings there are always some of the attendant persons who are very happy and some weep copiously.

But I think we should call this a wedding instead of a funeral and I hope the united pair will go through life living happily ever after, as the books always say.

I see by the program I am scheduled to announce the consolidation of the American Society of Safety Engineers and the Engineering Section of the National Safety Council. So I hereby make that announcement and we can consider the wedding ceremony completed.

W. Dean Keefer, secretary, read the constitution and by-laws.

CHAIRMAN VAN BRUNT: That finishes my duties as president of the American Society of Safety Engineers, and I hereby declare that office vacant and turn this meeting over to Mr. W. S. Paine, who will continue the order of business.

Mr. Paine took the chair.

CHAIRMAN PAINE: I am not on the program to make a speech but I agree with the message brought to us today by Mr. Ching that, through a consolidation of this type we have reached a point where the effectiveness and the efficiency of our work as safety engineers can be greatly increased. Rather than spreading our work out so thin and doing it

sometimes in a haphazard manner, we can now through one organization do an effective piece of work on every task we tackle and not call that work finished until we have gone the limit. Then we have really done something for the National Safety Council and for safety engineering work in general.

MR. H. W. MOWERY: May I call attention to continuing the work of several code committees that are now functioning, and make a motion that the Executive Committee continue those code committees or representatives where they are functioning properly.

The motion was seconded and passed by proper vote.

REPORT OF FLY-WHEEL RESEARCH COMMITTEE

MR. E. B. TOLSTED: The Fly Wheel Committee, unfortunately, hasn't much to report this year. We started our last year by attempting to get a larger committee, feeling that unless we had a sufficient membership we would have the work of but two or three men which wouldn't be representative.

Among the small things accomplished last year was the compilation of a bibliography on fly-wheel accidents, and explosions. We are promised a corresponding bibliography on turbine explosions.

CHAIRMAN PAINE: The Static Electricity Research Committee has not been fully organized. It is expected that this committee will investigate the explosions which have occurred when filling cars, where electric static charges, we believe, has set off the gas fumes and caused explosions. Professor Allen has given us a talk on the subject. We have gone in it with three or four other organizations and progress during the coming year is assured.

REPORT OF THE COMMITTEE FOR THE PROMOTION OF SAFETY EDUCATION IN ENGINEERING COLLEGES

Mr. R. McA. Keown: In 1918, conferences of prominent engineering educators and officers of the National Safety Council were held in New York City and Chicago, and the recommendations of these conferences led to the publication of two pamphlets by the Council for the use of engineering colleges.

The first of these two pamphlets was published in June, 1918, and it contained four main sections; (1) A list of the subjects and speakers that are available to give safety lectures in technical schools and universities. (2) A list of exhibits. (3) A selected bibliography on safety. (4) A paper by Mr. L. A. DeBlois stating the necessity for general safety education in engineering colleges. The second pamphlet was published in 1919. In addition to the material included in the first pamphlet, the new one contained outlined directions for

installing safeguards and establishing safe practices in school shops, together with the outlines of six lectures that might be presented by the engineering professors themselves.

After the publication of this second pamphlet, W. D. Keefer of the Council staff made two trips among some twenty-five eastern and mid-western Colleges. On the first trip he spoke at faculty meetings urging that safety be included in the instruction given to student engineers through the application of the Council's pamphlet. On the second trip, he addressed the Junior and Senior student engineers that were called together for that particular purpose.

The Council's activity in this field finally led to formal recognition of the importance of safety instruction by the Society for the Promotion of Engineering Education and in 1923 a safety committee was appointed to prepare a report on the best method to use in teaching the fundamentals of accident prevention. This committee has as its Chairman Prof. J. O. Keller of Pennsylvania State College, W. T. Magruder of the Ohio State University, Mr. M. E. Cooley, University of Michigan, F. P. McKibben, Union University, H. J. Hughes, Harvard University, R. M. Raymond, Columbia University, and C. J. Tilden of Yale University.

It was the consensus of opinion of those who attended a meeting of this cmmittee in 1923, that courses leading to a degree in safety engineering were unnecessary, undesirable, and impracticable. They further agreed that there was no room in their present curricula for special courses in safety principles, and that such courses would be undesirable for most colleges. It was brought out, however, that the technical colleges are far behind industry in their "safety attitude" and that the progressive industries of today consider safety as an essential part, although a small part, of industrial management and industrial engineering. It was felt that engineering students should not be exposed to unguarded machinery nor taught unsafe methods so that they come out of college with ideas and habits antagonistic to the accepted standards of industry.

Charles F. Scott of Yale University, past president of the Society for the Promotion of Engineering Education, in outlining the work of this committee, stated certain points which need further consideration and discussion.

1. A basis should be laid for a rational program for safety instruction in the colleges. It is quite likely that this will not be a fixed course, but rather the cultivation of an attitude on the part of instructors and students toward the general subject of safety.

2. Presumably printed reports and charts of the National Safety Council, possibly selected and supplied to the reading rooms and bulletin boards of colleges, will be potent factors in disseminating education.

3 Some means should be determined upon to interest students in the subject of safety, so that they will make investigations of their own account and read papers on the subject to their fellow students.

4. It would be well to consider a plan by which the National Safety Council could publish small booklets that would describe safety methods for different types of laboratories and shops connected with engineering schools. These could be issued to the students as they begin their laboratory work, cautioning them in the language of the industrial safety codes against the hazards to which they are exposed in their experimental work. These pamphlets would serve the double purpose of inculcating the safety idea and informing the students as to where safety measures are demanded in industry.

The committee finally included the following three recommendations in its report presented at the 1924 meeting of the Society:

1. The committee recommends that emphasis be placed on the guarding of physical apparatus and equipment to conform to standard requirements both in shops and laboratories in order to impress upon the students the safety point of view. The details of safety devices and requirements should preferably follow the state requirements when such exist; and where there are no state requirements, follow the national codes which can be obtained from the National Safety Council, Chicago.

2. The committee believes that it would be well to include a minimum of two lectures or recitations on accident prevention in courses given in industrial organization and management.

3. The committee believes that it would be desirable to include the idea of safety as one of the factors to be given into consideration in courses such as machine design, electrical designs, building design and construction, hydraulic design, etc

It was further pointed out that some of the technical colleges which are doing good work in safety include:

State Agricultural College of Colorado
Columbia University
University of Illinois
University of Minnesota
Pennsylvania State College
The University of Cincinnati
Cornell University
Ohio State University

Following the suggestion of the S. P. E. E. our committee of the A. S. S. E.-Engineering Section is now at work preparing a new pamphlet for distribution to engineering students. This pamphlet will contain material that will help to do seven things:

1. Provide lecturers from the outside to speak at general assemblies of students or in classes in various related subjects.

2. To incorporate the principles of safety in regular courses in industrial management, machine design, mining, etc.

3. To teach and practice safety in shop and laboratory work.

4. To bring up the physical equipment of colleges to current safety standards.

5. To develop field inspection by students.

6. To organize faculty safety committees.

7. To provide safety exhibits, both permanent and special, together with the liberal use of bulletin board reports and charts.

We are also planning to have news articles written about the safety work in such colleges as the Ohio State University, Pennsylvania State College, University of Illinois, and others, for publication in the *National Safety News* and in the bulletin of the Society for the Promotion of Engineering Education. These articles should be a source of ideas and inspiration for student engineers and college professors.

REPORT OF RESEARCH COMMITTEE ON ELEVATOR HAZARDS

MR. H. W. HEINRICH: Your Research Committee appointed to make a report on Elevator Hazards is greatly indebted to the National Bureau for Casualty & Surety Underwriters for complete up-to-date data covering 1,789 accidents occurring on passenger, freight and combination elevators.

In working out its diagnosis the Committee interested itself in the study of this subject from the engineering angle based upon the accident severity and frequency data obtainable.

Heretofore many corrective measures relating to preventing elevator accidents have been predicated on a few outstanding specific accidents rather than upon a survey of this problem as a whole and from a country-wide scope. This research should be of value because the corrective suggestions are based on data of a country-wide extent.

The outstanding causes of these accidents were:

I. Fall of persons 713
II. Fall of car 415
III. Fall of objects 55
IV. Breaking of machinery or defective equipment, excluding cables 46
V. Door or gate accidents 252
VI Struck by car while looking down shaftway 18

1. Provide lecturers from the outside to speak at general assemblies of students or in classes in various related subjects.

2. To incorporate the principles of safety in regular courses in industrial management, machine design, mining, etc.

3. To teach and practice safety in shop and laboratory work.

4. To bring up the physical equipment of colleges to current safety standards.

5. To develop field inspection by students.

6. To organize faculty safety committees.

7. To provide safety exhibits, both permanent and special, together with the liberal use of bulletin board reports and charts.

We are also planning to have news articles written about the safety work in such colleges as the Ohio State University, Pennsylvania State College; University of Illinois, and others, for publication in the *National Safety News* and in the bulletin of the Society for the Promotion of Engineering Education. These articles should be a source of ideas and inspiration for student engineers and college professors.

REPORT OF RESEARCH COMMITTEE ON ELEVATOR HAZARDS

MR. H. W. HEINRICH: Your Research Committee appointed to make a report on Elevator Hazards is greatly indebted to the National Bureau fo Casualty & Surety Underwriters for complete up-to-date data covering 1,789 accidents occurring on passenger, freight and combination elevators.

In working out its diagnosis the Committee interested itself in the study of this subject from the engineering angle based upon the accident severity and frequency data obtainable.

Heretofore many corrective measures relating to preventing elevator accidents have been predicated on a few outstanding specific accidents rather than upon a survey of this problem as a whole and from a country-wide scope. This research should be of value because the corrective suggestions are based on data of a country-wide extent.

The outstanding causes of these accidents were:

I.	Fall of persons	719
II.	Fall of car	415
III.	Fall of objects	55
IV.	Breaking of machinery or defective equipment, excluding cables	44
V.	Door or gate accidents	282
VI.	Struck by car while looking down shaftway	18

Rule 122, Door or Gate Electric Contact (0)

(a) A door interlock shall prevent, first, the normal operation of the car.

Unless the hoistway door at which the car is standing, is closed and locked (Door Unit System); or

Unless all hoistway doors are closed and locked (Hoistway Unit System);

and second, shall prevent opening the hoistway door from the landind side except by a key or special mechanism;

Unless the car is standing at the landing; or

Unless the car is coasting past the landing with its operating device in the "STOP" position.

EXCEPTION: The interlock shall not prevent the movement of the car when the emergency release is in temporary use, or when the car is being moved by a car leveling device.

(b) The functioning of a door interlock to prevent the movement of the car shall not be dependent upon the action of a spring or springs in tension, nor upon the closing of an electric circuit.

(c) A hoistway door or gate shall be considered closed and locked when within four (4) inches of full closure, if at this position and any other up to full closure, the door or gate cannot be opened from the landing side more than four (4) inches.

(d) If a door closer of a type that will eventually lock the door is used, the interlock may permit the starting of the elevator car when the door is within three inches or less of full closure, provided that the door can again be opened up to four (4) inches from full closure from any position within this range except that of full closure.

(e) Each type and make of door interlock shall be tested and approved by some competent designated authority.

Rule 122, Door or Gate Electric Contact (0)

(a) An electric contact on a hoistway door shall prevent the normal operation of the car; unless all hoistway doors are within two (2) inches of full closure (Hoistway Unit System) or, the hoistway door opposite which the car is standing is within two inches of full closure. (Door Unit System.) An electric contact on a car gate shall prevent the normal operation of the car unless the car gate is within two (2) inches of full closure.

(b) The functioning of a door or gate electric contact to prevent the movement of the car shall not be dependent upon the action of a spring or springs in tension or upon the closing of an electric circuit.

(c) Door or gate electric contacts shall be designed so that they are directly opened by a lever or other device attached to and operated by the door or gate.

(d) Car-gate electric contacts shall be held open by the opened gate, unless they are installed so as to be inaccessible from the elevator car.

EXCEPTIONS: Neither the door nor car-gate electric contact shall prevent the movement of the car when the emergency release is in temporary use or when the car is being moved by a car-leveling device.

(e) Where electric contacts are provided on a hoistway door or gate, the lock or latch shall be so arranged that it will insure the door or gate being in a position to be locked or latched when or before the contact is closed.

(f) Each type and make of door and gate electric contact shall be tested and approved by some competent designated authority.

These devices will be far more effective if they are so constructed as to compel the operator to bring the car level with the floor landing and thus avoid accidents from tripping and falling.

(b) Since a large number of accidents might have been avoided by keeping the elevator car gate closed when the car was in motion. we would advocate the interlocking of the car-gate as well as the shaft-way doors by mechanical, electrical or electro-mechanical devices.

(c) The defective parts or machine failures can only be corrected by frequent inspection and we can correct this hazard by carrying out such inspections through a competent person or agency.

(d) The horse play; children playing in the elevator and like accident causes can only be eliminated by having a competent elevator operator at hand, who will stop immediately all acts which endanger the life of any person.

(e) All elevator operators should take and pass examination on lessons heretofore drawn up by the National Safety Council or its equivalent before such persons are given the license to operate an elevator.

WALTER S. PAINE, Chairman
H. W. HEINRICH
HOLGER JENSEN
O. J. SMITH.

REPORT OF RESEARCH COMMITTEE ON THEATER HAZARDS

(Mr. N. K. Howard read the report of Chairman Holger Jensen)

We are indebted to the National Bureau of Casualty and Surety Under-

writers for much of this data. The object of this study of 1,531 accidents in theaters and motion picture houses in 1921-22, was to arrive at engineering measures which would prevent the recurrence of similar accidents. Consideration has been given to "frequency" rather than to monetary losses. The outstanding causes have been divided as follows:

	No. of Cases	Per cent. of Total Cases
1—Falls	1012	66.1
2—Injury from falling objects	172	11.2
3—Fire	97	6.3
4—Door accidents	32	2.1
5—Injury from crowd	30	2.
6—Accidents to, from and on stage	24	1.6
7—Tripping on, or coming in contact with nails, bolts and sharp edges	23	1.5
8—Unguarded equipment or apparatus	18	1.2
9—Collapse of roof	11	.7
10—Accidents of general nature	112	7.3
	1531	100.0

This gives us a very good perspective of the problem for consideration.

The principal cause of "Falls" and in analyzing this, we find that of the 1,012 cases; 359 occurred on exit stairways; 185 on stairways in balconies and aisles; 94 on steps to and from seats or boxes; 167 on the auditorium floor; 43 in the lobby; 15 in the rest room; 69 from seats.

In addition to these, 28 occurred on unguarded openings inside and outside of theaters and 52 on sidewalks.

The causes of "falls" inside of theaters and on exit stairways were due to insufficient light, defective stair treads, defective floor coverings, slippery steps, foreign objects, high heels.

In the lobby, a few were caused by tripping over mats, and slippery floors; the latter, no doubt, being due to inclement weather.

"Falls" from seats were caused by collapse of seats, broken seats.

In two cases, seats were removed.

"Injuries from falling objects" have been separated into two groups—those which occur inside of theaters and those occurring on the outside.

Those in the theaters were caused by falling plaster, signs and other objects of a general nature, in most cases, dropped by patrons.

While 123 persons were injured in theaters by falling objects, only 49 were injured on the outside. These accidents were caused by billboards, signs, ladders, etc.

"Injuries from crowd" totaled 30, 20 of which were charged to poor management and 10 to panic.

Stairways

In considering the elimination of the great number of accidents due to "falls" on stairways, it is gratifying to note that a number of the large theaters which have been erected within the past year have supplemented stairways with ramps. Where stairs are provided, it is, of

course, of the greatest importance to have sufficient light, and the treads and coverings should be kept in the best possible condition.

Stairs leading from the main entrance to the auditorium floor should be uniform in height, not to exceed 7¾", and a width of 10½" is recommended.

Stairs leading downward from exits should have a space of at least 1' between the door opening and the edge of the top step.

All stairs should be provided with substantial hand rails, same to be between 30 and 36" above the treads.

Where stairs are built between walls, the rails should be firmly secured to the walls and have a clearance from the wall of about three inches.

In the theater, indirect system of lighting should be used. Soft, diffused light can be easily regulated. The effectiveness of this system can be controlled a great deal by the color and finish of the walls and ceiling. A glossy white will, of course, reflect the most light. A slight, creamy tint gives a very pleasing illumination to the eye.

The side wall and ceiling lights in the aisles should give sufficient light to enable the ushers to show persons to the seats without difficulty during the performance.

Theatres should be provided with storage batteries of sufficient capacity to operate at least the emergency lights. Some theatres have found it desirable to have storage batteries of a capacity that will furnish sufficient current for several hours in case of any electrical disturbances that might occur.

Stairs and aisles should be kept free from foreign objects. This, of course, is a housekeeping proposition and needs constant supervision.

The width of the aisles in the auditorium should be not less than 42 inches at the stage and should increase at the rate of 1½ inches for every 5 feet. Aisles having seats on one side only should be not less than 36 inches in width at the stage and increased in the same manner.

The seats should be firmly fixed to the floor by suitable castings. Loose and broken seats should receive immediate attention.

The distance between the rows, that is, from the back of one seat to the back of another should be at least 31 inches.

Sidewalks should be illuminated. There is an apparent tendency toward glaring lights, due to the advertising advantages, but too glaring lights are sometimes responsible for falls and stumbling of pedestrians.

Keeping the sidewalks in the best possible shape, without any projections or obstructions, is important. Many theatres have show cases attached to the walls, displaying pictures of the performers, which attract attention and are likely to cause stumbling or falls.

Prevention of Tripping

In the lobby, mats should be countersunk level with the flooring to prevent tripping, and abrasive or moisture absorbing material should

be used when the weather conditions cause snow or rain to be tracked in, especially if mosiac or marble flooring is used.

The placing of mirrors on the walls of lobbies is sometimes responsible for accidents, due to optical illusions.

The bulk of the classified accidents, due to falling objects, were from plaster. Utmost care should be taken in examining ceilings and decorations during the period in which the theatre is closed or when renovations are being made. A very small particle, dropping forty or fifty feet, might inflict a painful injury.

The placing of clothing, umbrellas, bottles, candy boxes, etc., on balcony rails, from where they may easily be precipitated, is a procedure that should be strictly prohibited. The use of brass railings on top of balcony rails has resulted in a number of accidents, due to sections of the railings becoming loose and falling on patrons on the main floor of the auditorium.

Accidents caused by fire are generally due to panic. Practically every theater can empty its entire capacity within a few minutes. City and State requirements demand at least 3 feet of exit for every 100 persons and each exit should be at least 5 feet in width and the doors should swing outward with the least possible effort. The self-opening arrangement, operated by pushing against a conveniently located bar, is becoming more and more in general use. Draw bolts, hooks and similar devices have been found undesirable.

Practically all theatres are constructed with a proscenium wall with self-closing fireproof doors and an asbestos curtain so that in case of fire on the stage, it can be confined entirely to the stage.

The stage should also be equipped with a metal skylight which will open automatically by heat from the stage or by the releasing or cutting of a rope. At the present time, most modern stages are also equipped with automatic sprinkler systems.

Theatres in the future will, no doubt, be built without balconies; the auditorium being on the ground floor with horizontal exits on all sides.

Panics

Panics in theatres, due to fire have demonstrated a tendency upon the part of the public to attempt leave through the main entrance. By training the public to leave by fire exits would in time get them into the habit of leaving by those exits. This, however, has in many instances been found undesirable on account of such exits being cumbersome and accident producers. Exits of this kind, of course, should never have been tolerated by the authorities. A number of moving picture houses located on street corners have attempted the practice of having the patrons use two doorways, one for entrance and the other for exit; the entrance being at the rear of the seats and the exit being on the

side at a level with the front of the stage. This expedites the handling of the people and causes the least disturbance among audiences where shows are run continuously.

All employees should be informed as to the location and method of manipulating the fire extinguishers and hose connections, and other fire fighting appliances. They should also be instructed as to the location of the nearest fire alarm box. They should be thoroughly familiar with all emergency exits and fire escapes throughout the building. They should also be familiar with the best method of dismissing audiences in case of fire or impending panic so that the theatre may be emptied quickly and in an orderly manner.

All switches and electrical apparatus should be enclosed and locked.

Radiators should be recessed into the walls or in screened enclosures.

No obstruction of any kind should be permitted in aisles or passageways.

All doors should be provided with checks, properly located, and also with devices which will hold them open without blocking.

Stairs on the stage leading to dressing rooms should be free from obstructions and kept in good condition.

If there are any runways, hand railings and toe boards should be provided.

A definite painted mark should be provided on the stage floor, or the performers should be given some guide prior to their first performance on the stage as to the location of the drop curtain.

CHAIRMAN PAINE: Mr. Jensen is not here but Mr. Howard will present the report of the Research Committee on theatre hazards.

CHAIRMAN PAINE: Dr. A. D. Risteen will report for the compressed air machinery code committee.

DR. RISTEEN: We held several meetings of the committee of which I am temporary chairman. The American Society of Safety Engineers and the American Society of Mechanical Engineers are joint sponsors for the code but up to the present time the A. S. M. E. has not appointed its members on the Committee. Our work cannot proceed nor can we even organize the committee until some action is taken by the A. S. M. E.

REPORT OF MEMBERSHIP COMMITTEE

MR. J. I. BANASH: At the 1923 Annual Safety Congress, your Membership Committee reported 174 members and 95 associate members, making a total of 269. Today there are 213 members and 110 associate members, making a total of 323.

Two hundred and fifty-one former members of the A. S. S. E. will automatically become members of the consolidated organization.

Twenty-eight of these men are already members of the Engineering Section so this will make 546 the total membership of the A. S. S. E. Engineering Section.

CHAIRMAN PAINE: I hope this year no man, if he possibly can avoid it, will shirk the duty of doing something in developing the codes which are being worked out by the American Engineering Standards Committee.

There is a piece of work to be performed. A lot of men are anxious to get on the Committees, and having once gotten on they just fan themselves leisurely away and melt out.

I want to bring that home now because I have seen some things, and I want to follow up this work with these codes we are responsible for. They are now in one specific state awaiting one of the codes upon which no work has yet been done, or at least no work has been done to a degree that it looks as though there would be anything forthcoming in the shape of a code.

These are the codes on whose committees the A. S. S. E. and the Engineering Section of the National Safety Council have taken membership: building exits, construction work, lighting factories, floor and wall openings, piping systems, ladders, elevators and escalators, walk-away surfaces, lighting school buildings, abrasive wheels, foundries, refrigeration, power press, machine tools, power transmission, compressed air machinery, conveyors, forging, electrical wiring, electrical safety, electrical power control, aeronautics, traffic signal, gas safety, textile, head and eye protection, industrial sanitation, laundry, woodworking, paper and pulp, rubber.

On a number of these codes there has been some effective and efficient work done, but on others there is much that needs our attention.

MR. AUEL: Several years ago I attended two meetings in Washington which eventually resulted in the formation of the American Engineering Standards Committee. I have acted as chairman on two code committees; in both cases the codes have been completed. I have been particularly concerned with the lack of push on some of these code committees, and don't think men should take positions on these code committees, because they are real honest positions, unless they are willing to give freely of their time and experience.

To my way of thinking the one thing that contributes more to the present high cost of living than any other one item is the almost total lack of standardization in this country. We now have the machinery working which will bring standardization very much to the fore; machinery that we should not let go by the board. Next year we must push ahead on every code with which National Safety Council has anything to do.

Yesterday I mentioned a new thought (new to me at least) for a way in which we could look at these codes. For example, on one of the

code committees on which I served there were 22 men, all mature. I figured they averaged $5,000 a year salary; some undoubtedly got more and some less. They had an average of 20 years' experience. We thus had a group on whose education over $2,000,000 have been spent; a group equipped to do the most effective work possible.

Even after we have developed a code and had it passed by the American Engineering Standards Committee, our work is not done; the next job is to promote their use and adoption in various states. We don't want hodge-podge of safety regulations over this country the way we are at present afflicted with different compensation laws.

New Jersey has already adopted our transmission code; Pennsylvania seems to think they ought to have another transmission code for the textile industries, and we are going to try to swing Pennsylvania around to use the transmission code as it now stands. A few exceptions can be made as applying to the textile industry but a totally new transmission code need not be developed.

So I beg of you fellows who are serving on code committees to give your best, and after codes are turned out, whether you serve on those particular committees or not put forth every possible effort in your respective states to bring them to the attention of the proper parties.

REPORT OF NOMINATING COMMITTEE

CHAIRMAN PAINE: We will now have the report of the Nominating Committee.

MR. MOWERY: Mr. Chairman, in the absence of Mr. DeBlois I have been requested to make the following report: I move you the report be accepted and a unanimous ballot be cast by the Secretary in favor of those nominated. (The motion was seconded and carried.)

CHAIRMAN PAINE: I know of no man who is better fitted to take on this work and who will command your hearty co-operation than Dr. Risteen, and I am delighted that you have elected him chairman of this section.

(Dr. Risteen took the chair.)

CHAIRMAN RISTEEN: The first congratulation I received was "God help you," and I hope he will. There is an old question in theology and philosophy as to whether Paine is beneficial to us or not. He has promised to be helpful to me anyhow. We both live in Hartford, and so I hope we can have some good team-work there for the benefit of the section.

This meeting today is sort of a cement meeting, I suppose, to consolidate. I am not going to make you people miserable by talking to you now. Perhaps I will make you miserable by and by.

MR. WELCH: I would like to make a motion expressing our appreciation of the excellent work that Mr. Paine and Mr. Van Brunt have accom-

plished this year, as chairman and president of the section and society. (The motion was seconded and carried.)

CHAIRMAN RISTEEN: I am sure Mr. Van Brunt and Mr. Paine know that was not a formal or perfunctory motion at all. We all appreciate your work very much.

I will ask our secretary, Mr. W. D. Keefer, to make a statement with regard to our future program. He has studied it, I haven't. Although he has kept me informed, he knows it a great deal better than I.

MR. KEEFER: Dr. Risteen is very modest on this subject, but we have had an opportunity to talk it over several times and I think I can state that your officers and executive committee, during the coming year, will devote particular attention to three activities. In the first place we will carry on our code work more actively than even before. Secondly, we will give particular attention to the organization of regional conferences like the ones held last year in New York, Chicago, San Francisco, Pittsburgh, and Cleveland. The third activity is the development of local chapters of the ASSE-Engineering Section. We already have one application for chapter recognition from Boston, Massachusetts. This will be acted upon by your new executive committee tomorrow morning, and as our plans are developed we will have additional chapters to add to our roll.

CHAIRMAN RISTEEN: I will ask Mr. Van Brunt to make a statement regarding the New York office.

MR. VAN BRUNT: In the reading of the constitution it may not have struck you men that the fact stands out prominently that we will have a New York office with an Assistant Secretary, Mrs. Wood, in charge, to work under Mr. Keefer's supervision. The office is yours and you are perfectly welcome to make use of it at any and all time.

CHAIRMAN RISTEEN: We will hold a meeting of the Executive Committee tomorrow morning. All past presidents of the American Society of Safety Engineers and all past chairmen of the Engineering Section are most cordially invited to sit in with us. At all times will we consider them part of our executive committee.

ADJOURNMENT

LUNCHEON SESSION

TOASTMASTER VAN BRUNT: I want to introduce to you Mr. C. S. Ching, of the U. S. Rubber Company, New York City. He has charge of the personnel and industrial relations departments.

THE FUTURE OF THE A. S. S. E.—ENGINEERING SECTION

C. S. Ching, U. S. Rubber Company, New York City.

I am not an engineer. Possibly that is fortunate, because I will not get into technical subjects to start an argument. However, I want to take this opportunity, merely as a layman and as an outsider, and representing a corporation that helps to pay the bill, of congratulating the American Society of Safety Engineers—Engineering Section of the National Safety Council in getting together.

I assume that consolidation was not brought about without considerable hard work, with possibly a few sore spots, and somebody's feelings being hurt. I had the most delightful omelet for breakfast, but they had to break the eggs in order to make the omelet. Sometimes you have to do a little damage in order to accomplish the great big definite results at which you are aiming.

We are in the era of consolidation and of efficiency. In the past the American public, and American industry have run absolutely wild in some of their organizations. We have organized all kinds of things for the carrying out of certain purposes, and recently I put it to a vote among several of the large American industries as to whether or not they would join another association. I got one hundred per cent support, when I explained that its purpose was to suppress useless organizations.

We sometimes forget who pay the bills. We lose sight of the fact that organizations like the U. S. Steel Corporation, the U. S. Rubber Company, and others pay tremendous sums for the support of outside organizations.

Last year we cut down considerably in our outside organization memberships, but when we got through cutting down, our company, even then was paying $57,000 annually for memberships in organizations throughout the country. If you analyze it you might agree that the company was not getting $57,000 worth out of the organizations. I think, gentlemen, we have reached the time when it is necessary to get several large live organizations with definite purposes in view and the biggest men in the country back of them, instead of hundreds of starved ones. A half starved organization looks like a half-starved horse, it doesn't have any pep and never will have any.

So I think the move in consolidating and knitting together these organizations has been one of the biggest moves that has been made in connection with the National Safety Council work. I think it is a

splendid move, and I tell you you are going to secure the hearty support of the people paying the bills.

Since you arrived here last Monday, people have been telling you about accident prevention, and I don't suppose any new tune can be played in regard to safety work. But I want to make a little statement in regard to safety, which is apart from its economic aspect and apart from its financial side.

What Restricted Immigration Has Accomplished

Last year I served as the chairman of the immigration committee of the National Association of Manufacturers and had to appear in Washington in connection with the immigration legislation. Our newspapers and many of our large manufacturers were very much concerned about the restriction clauses in the immigration law. I don't believe there are any of us, regardless of how badly we think we need employees, who would ever want to see unrestricted immigration into this country. In figuring up how many immigrants we got into this country that were available for industrial work, we found that for the past ten years there had been an average of approximately 50,000 people per year.

I was talking to Mr. Beck, our supervisor of safety, in regard to this matter and made the statement that possibly we might have to turn elsewhere for labor, and might have to do a lot of thinking, and he said, "For Heaven's sake, think of it in these terms. In the same year you are talking about 50,000 people coming into the country as immigrants there were 757,000 man-year's lost in the country as a result of man-accidents. Preach safety. Tell people to prevent accidents and they will have 10,000 men without any immigration at all."

That was strong enough for me, and when I went down to Washington the next time I saw fit to present that point.

Safety work is in its infancy. We are expanding our industries; I don't mean in number of employees, but in increasing the amount of horse-power per man in the plant. We are using what the man has above his shoulders and less of what he has below. With this development we are going to need more safety engineering. We are going to carry our safety engineering right back to the people who are manufacturing the machinery; we must show them how to make machinery that is safe.

We are developing a safety atmosphere to counteract carelessness. Preventing accidents isn't the function of the safety engineer alone; it isn't the function of the superintendent, but it is the job of everybody from top to bottom.

The rubber industry, gentlemen, has been looked on and talked about in our churches, in our colleges, and in every place people could talk about it, as one of the most hazardous industries, very menacing to the health of the workers.

On May 18 I was over in a rubber plant that had about 850 employees. Of this number 100 people had been in continuous service for over twenty-five years. They were a husky looking bunch. I won't quote any figures, but I will ask you to look up statistics in regard to the various industries, and if you don't find the rubber industry pretty close to the top I will eat the statistics.

The rubber industry is awake to the situation as many of the other industries are, and we fully realize it is necessary for us to keep up with the times. March 1, 1923, one of our factories was turning out a given number of tires with 2,880 employees and on March 1, 1924 they were turning out five per cent more tires with 1,550 employees. That was brought about by more efficient labor, by new methods, and conveyors, but each method introduced a hazard.

Health Service Section

October 1, 1924

DR. C. F. N. SCHRAM, Chairman,
Medical Director, Fairbanks, Morse & Company, Beloit, Wis.

DR. C. L. FERGUSON, Secretary,
Selby Shoe Company, Portsmouth, Ohio

CHAIRMAN SCHRAM: You probably have noted on your programs that we are down for only one session at this meeting. That was planned purposely for the simple reason that we found that physicians coming and talking to physicians did not get very much out of it, so we have changed this year and placed 11 medical men, aside from those speaking this afternoon, in various sections, trying to sell you and to sell your organizations good medical health service along the various lines.

Appointment of Nominating Committee

I want to appoint Dr. Shoudy, Dr. Colcord and Dr. Slater as a Nominating Committee to report later this afternoon.

INDUSTRIAL HEALTH AS A PURCHASABLE COMMODITY

C. F. N. Schram, M. D., Medical Director, Fairbanks-Morse & Co., Inc., Beloit, Wis.

The man who is sound and healthy steps out on life's highway with a song in his heart, looking forward eagerly to life's adventure, curious to see what is around the next corner. To him life's struggle is stimulating, attractive. The man out of health fears every turn in the road. There is no song in his heart, but a continual flutter of apprehension. He avoids rather than seeks life's struggle.

Good health is the foundation not only of business success, but of successful living. Its influence on personality is profound, and in urging that one's health assets be examined and improved to the highest degree we are seeking to accomplish that which will make life more colorful, more satisfying, and in every way more livable for the great mass of

people. In order to attain this there is required a remedial and constructive program that shall provide for an organized, well-balanced attack on the enemy, directed with full force and precision toward definite ends. These are days when tremendous efforts are being directed against particular forms of disease; tuberculosis, cancer, heart disease, typhoid, etc. This is good work and must go on; but it will easily become apparent to anyone who critically examines the evidence presented that all forms of disease and of physical deficiency can be combated, by a thoroughly organized, comprehensive campaign. In addition to detached battles with particular tribes of enemies, there should be one great battle line driving backward all enemies that assail our power to live and work and be happy. The problem of fatigue must be solved at its source.

The pitiably brief health span and the unmercifully short work span of civilized men must be extended by better breeding and by better teaching. Man must be taught better how to live and better protection must be provided for the community in which he lives, and better conditions in the place where he works. In no branch of public or personal hygiene can the proper rate of progress be made unless certain fundamental principles are accepted. *Youth and vigor and working capacity are not functions of time, but physical states influenced by what happens in the course of time.* It is within the power of man's intelligence profoundly to influence these cycles; and unless those working in hygiene and preventive medicine are governed by these principles, such work will be lacking in full vigor and driving force. The acceptance of average conditions as representing a fixed law is the greatest obstacle to progress in all sciences concerned with human betterment.

We have probably the highest ingenuity and efficiency in the operation of our industries of any nation. Yet our industrial machine is far from perfect. The wastes from unemployment during depressions; from speculating and over-production in booms; from labor turnovers; from labor conflicts; from intermittent failure of transportation of supplies of fuel and power; from excessive seasonal operation; from lack of standardization; from loss in our processes and materials all combine to represent a huge deduction from the goods and services that we might all enjoy if we could do a better job of it.

To these important causes of waste in industry named by Mr. Hoover, we must add the greatest cause of human failure and unhappiness,—ill health. Its enormous burden of preventable misery is borne not only by industry but by all mankind.

The physical sufficiency of civilized man is very much taken for granted until, as in case of war, some extraordinary demand is made upon him. His physical insufficiencies then become glaringly apparent and he is not put into battle even though eligible for service until he has been physically trained.

There is no such physical training, especially in industry, for the long-drawn-out battle of life.

Lack of Physical Development in Man

To a limited extent men are sifted and sorted physically and mentally for industrial work and some are rejected or penalized by limited employment. The accepted are, however, put at once in the firing line and until they break down or call for aid they are assumed to be healthy.

Leading biologists assure us that there is no evidence that the physical type of existing races has improved during the historical period of about one hundred centuries and there is considerable evidence to show that man has so eased his struggle for existence as to halt the progress of natural evolution.

There is no evidence to show that man has today more muscular power, bodily symmetry or freedom from physical defects than was exhibited by the warriors and hunters of old.

There is plenty of evidence in other animal fields showing wonderful development in physique and health. We do not hesitate at all to appropriate money to root out cholera in hogs, tuberculosis in a herd of cattle, etc. It is quite a step from the long-horn of five or six hundred pounds to the beef of one ton and yet it has occurred within the memory of some of us. The history of the horse is familiar to us all. In fact we have taken what we would from animal life and developed it in muscular power and bodily symmetry, except ourselves. We have even taken pride in the hybrid mule, because we have made him sixteen (16) hands high and have made him weigh sixteen hundred (1,600) pounds.

The time has come when, if the White Race is going to continue to be a real factor on this earth we must sell to ourselves some of the same material that we have been selling to the mule. We have felt that a man's health was a purely personal question, possibly so, but you do not wish an employee's poor health to be a menace in your shop either to a fellow workman or to production irrespective of personal feelings. We went up against that argument when we first began to enforce quarantine laws, but we learned that personal health was community health, that community ill health was racial ill health and that sickness affected us all and that it concerned us all. Some have solved their interest in this proposition to their own satisfaction at least by merely dropping from the pay roll that employee, who on account of sickness was not able to do his work. This method solved the employer's problem, but not the employee's and I question its efficiency. Manufacturers and employers generally are not as hard hearted as they are often characterized and I know that this method is only used after much time has been spent trying by other means to solve the problem. It is often quite a task to get to the real reason for an employee's falling down on the job. Often he does not know himself. He feels mean, the world is not going right, the foreman has it in for him, etc. He asks for a transfer to lighter work, to another foreman, but it does not solve the problem and unless he solves it himself by realizing and admitting that he is sick, he is finally transferred to the employment department, etc., there to be told that when some job showed up that he could do he would be notified.

It is no more right or efficient to discharge a man who is slipping in his work because of ill health than it is right or efficient to scrap a machine that is out of condition because of needed repairs. Production depends principally upon men and machines that are in good condition. Do not understand me here to refer to the physical handicapped, by the loss of an eye, an arm, a leg, fingers, etc. A careful survey of any plant will prove that this class of the physically handicapped if healthy, are very efficient and are not really handicapped at all for the job on which they are working. Many employment men hesitate about hiring the man with one eye but as they cannot see the inside of the heart, they hire a crane man who is a menace to himself and every man working under every lift he makes. They turn down the man with two or more fingers off and hire the man with tuberculosis who cannot do a real day's work and is a focus of infection in the shop. They will hire the man with two good appearing eyes, who may not be able to see the largest letters on the test chart. It is not my intention here to tell you that your employment department is inefficient. It without doubt is not only efficient, but it is without doubt extremely human.

Defects Not Always Noticeable

If there is a job open for a man with only one arm and the man needs the job, your employment department will go out of its way to hook up that handcapped man to the job, but on the same day they will hire a man with a flail jointed elbow for the labor squad in the shipping room. Do you know that there are many more men applying for work in the average industry whose eyes appear all right and yet are almost blind in one eye, then there are those whose eye defects are noticeable? Your millwrights would not set up a machine that was dangerous to the employee that was going to run it and if he did do such a thing knowingly, you would get some new millwrights, but your employment department is hiring dangerous men. If a man whose eyes appear normal, but who is actually blind in one eye is placed at crane work and strange as it may seem, we examine men frequently who state that they never knew anything was wrong with their eyes and yet in one or both eyes their vision is so poor that they are legally industrially blind, that man is more dangerous than the dangerous machine that the millwrights set up. Are you employing men with high blood pressure and setting them to work as carpenters, brick layers, or in fact any work where there is any climbing. They are dangerous men anywhere. Some may scoff and say that they will not harm anyone, that they are not crazy. No! but if one such employee gets dizzy and falls when he is holding on to the end of a piece of construction or if he drops tools or a brick, I believe that you will concede that he's a dangerous man, both to himself and his fellow workmen.

What are you doing with the man who is over-tired at night, is easily fatigued, is running an afternoon temperature, not high but above normal. He has night sweats and therefore does not sleep well. I will tell you

what you are doing. You are employing him and he is doing his best to stay on the pay roll and hold down his job. If you know of such a case among your men, you would see that he had the proper care. You would see that he had the proper job in the bright sunlight. I have even known of hard headed, supposedly money grasping, hard hearted business men and manufacturers who have hunted up such a man's family and carried them financially through a long sickness, on the part of an employee. Would you be any less hard hearted if you avoided such a contingency by making such cases one of the rarest occurrences. Would you be any less of a business man, if you spent time and money on your employee's health as you do to keep your machines in the very best condition. That family would rather have Daddy's wages than your assistance. That man would rather work and earn those wages than be sick and be under obligation to you. He appreciates your kindness, but if he's a real chap and your employment department has been trying to pick real men, he wants a chance to give a real day's work for a real day's pay.

Instances could be multiplied showing the man with the hernia and a bad heart on a heavy lifting job and he may not be cognizant of his condition, in fact, often he is not. Of course, under our compensation laws, there are some men floating from place to place who have been paid several times over for a hernia, for a bad heart, for a poor eye, and they are not deserving of any consideration on your part, but that does not make it any less important that a record of their condition be made

I have placed more emphasisis on the invisible handicap because it does not need medical training to properly place in industry most of the men whose physical short comings are plain to the eye, and it is these with invisible short comings which are the more frequent, the more poorly placed and the most often most dangeorus to themselves and others.

Increase in Life Span

I wish to call attention to the ages 18-31 given as the Health span and the work span from 20-41. We have increased the length of life expectancy in the last 150 years by 20 years, but the increase has been entirely in conserving infant and early childhood life. We have not increased life expectancy for the man of 40. The degenerative diseases, cancer, nephritis, heart, circulatory diseases and chronic infections are on a steady increase.

As to disabling illnesses we have about 40,000,000 gainfully employed in the United States and these men lose approximately 342,000,000 days annually; one-half of this is preventable.

That the human life cycle is subject to wide variation, according to conditions, determined either by heredity or environment, is easily demonstrable. An infection leading to valvular heart defect, if it does not kill it places the individual in a class with from 50 to 150 per cent extra mortality. Other conditions, often loosely regarded as not materially

shortening life, have been shown by medicoactuarial studies of 2,000,000 insured lives in this country to have a profound influence. Syphilis with a history of thorough treatment and apparently cured ten years prior to application shows a mortality of more than double the normal; gout, within five years, shows 90 per cent extra mortality; rapid pulse 90 to 100, no other impairment or assignable cause, 72 per cent above the normal; rapid pulse 100 or more, 105 per cent above the normal. At the age 45, 50 pounds overweight, shows 50 per cent extra mortality; 70 pounds overweight, 75 per cent extra mortality. Average weights at age 45 show a mortality 5 per cent above the optimal rate, which is found at 20 pounds under the average weight. So much for your average man.

In order to put the savings of a real health program of prevention into figures, we have a saving of $29,000 for each 1,000 population and Dr. Fisk adds: also excess dividends of health, happiness, satisfaction in living, prevention of pain, prevention of sorrow and prevention of discontent and industrial unrest.

The figures herein presented relate to saving that have been effected in representative groups solely by the operation of a system of periodic examination, general instruction and guidance in hygiene and information as to needed medical treatment. The saving from other causes such as public health administration is, of course, not included.

To these possible savings from analysing the human organism and instructing it in self-government must be added the possible savings from community hygiene, from state and federal organization for protection of the mass of citizens from epidemic infection, from endemic infection, from impure food; from the organization of industry to improve the environment of the worker, safety provisions and safety education. The influence herein dealt with has been chiefly that of personal hygiene and guidance.

With better organized facilities in the medical profession to follow up and co-operate with the agencies, whether private, state or national, that provide these periodic examinaions, a much greater saving could be accomplished.

So much for the financial side, now as to the actual accomplishments in the prolongation of human life. In groups that have come under the care of the Life Extension institute, where periodic annual physical examinations and instructions in personal hygiene have been given we find that adult life has actually been lengthened. That life expectancy of 65 years is actually accomplished. That the death rate of the poorer risks in this group were decreased 67 per cent. The same thing has been accomplished among certain groups of college graduates, where records have been kept. They were sold "health" at college and this has given them a longer life.

We may accept, therefore, a life expectation of 65 years as having already been attained by large groups of people as a fact beyond the range of debate. We are still at liberty to look forward to greater

gains through the wider application of existing knowledge and the acquirement of important knowledge in fields as yet almost untilled.

The Plague of Disease and Infection

While the human organism has very properly been compared in some respects to a machine, it differs radically from an inanimate machine in that in a state of complete health, with adequate nourishment, there is provision in the body for maintainence of parts. The body does not simply wear out; it is infected out, poisoned out, starved out, or deficiencied out.

In industry the general death rate is 10.10 per 1000 living. In 1922 this means a loss of 500,000 lives out of the 42,000,000 workers in industry.

These deaths are accepted by most people as occurring in the course of nature but it can very clearly be shown that at least half of them occur as a result of neglect to utilize human will power and intelligence in the application of available scientific information.

It is no safer to assume that the present death rate in industry is fixed than it is to assume that the death rate in Panama was fixed in the days prior to a sanitary cleaning up of the Isthmus and the protection of its population from the disease-carrying mosquito.

There are disease organisms working less in the open than the malarial or yellow fever mosquito that can be conquered with even less trouble and expense than was required to cut in half the death rate in the Canal Zone.

The industrial population has already felt the influence of improved community hygiene.

In 1921 the mortality of industrial policy holders of the Metropolitan Life Insurance Company was 8.54 per 1,000 lives.

When we analyse causes for lost time due to sickness we find the same diseases and in practically the same order of frequency that we find as causes of death among this group. Of the sick workers in industry, three-fourths of them lose time and one-fourth do not, which means that in a plant of 1,000 men there is an average sick list of 75—57 of whom are off the job and 18 are further depleting their vitality by staying on the job when they should be home or in the hospital.

Space need not be given to analysing the physical defects of the gainfully employed of today. Our memory of and the emphasis placed upon the draft figures will tell us that the human machine in industry is far from perfect.

Infection is the source of our largest problem in health building and chronic infection the greatest barrier to life extension. Self prescribing of drugs is one of the largest wastes that effects the worker directly and indirectly in industry. Good treatment is economy and self medication seldom is good treatment.

Improper food and its improper preparation is another economic waste that directly effects the physique and well being of the worker. It is a terrible arraignment of the American Housewife when we find that one-fifth of our school children are suffering from Mal-nutrition. The child that is not nourished bodily is not well nourished mentally. If we follow his educational career, we find that he drops out of school at the age of 16. He has no standard as to amount of education. His standard is the legal age set by the State, and he puts very little energy into his last years in school. He applies for his first job, unequipped mentally and physically, but if he gets a job it's one requiring muscle. In this way he joins the ranks of the ordinary labor group.

Heredity's part in producing imperfection is mainly along mental lines. Like produces like and it is hard to establish good Hygienic habits or good health in the individual of only fair or low mental type.

The Progress of Preventative Medicine in Industry

What can be done to remedy this general condition as it affects industry? Let's divide the subject into two parts. The large manufacturer or employer and the smaller employer. That this is an indefinite grouping I am well aware, but it seems to be the best one. An employer of 1,000 men due to the more dangerous conditions of work being done might require more medical supervisory work than an employer of several times that number, where the employees were working at light, healthy, unexposed occupations. Nevertheless generally speaking the large employers have placed more emphasis on medical service than has the employer of a smaller number of men, and the reason has, on the surface, seemed to be good. The employer of the many could afford it and the employer of the lesser number did not have enough work to keep a doctor busy. Think that this is unsound reasoning for it takes a very small amount of work to keep some doctors busy. The old time "Company Doc" was of this variety. He was looking for a soft place on which he could place, for long periods, that part of his anatomy which Nature designed for such purposes. He saw those who came in to see him. His patient said he had a headache, and therefore, he treated a headache. Another said that he wanted a dose of salts and so he got salts, etc. If that was practicing medicine it is not to be wondered that Industrial concerns have been slow to take it up. There was no attempt to sell health to the employers. It did not present itself to him that he could do something in a preventive way. But, thank heaven' a new day dawned and men of vision and a real human purpose in life entered the field of Industrial Medicine and large companies have seen their way clear to invite such men to join their organization and become a real economic factor in it. With such men as Shoudy of the Bethlehem Steel; Quinby of the Hood Rubber; Barr of the National Cash Register; Mock of Sears, Roebuck; Farnum of the Avery Company; Geier of the Cincinnati Milling Company and a host of others, entering the field it is no wonder that Industrial Medicine and Surgery became a reality. They

put up the proposition that men off the job were not producing and they also said that the men off on account of sickness or injury were unnecessarily off. Besides this they said it was the Doctor's job to reduce this to a minimum and this is exactly what has been accomplished. The employer of large numbers had vision and by employing a physician with vision, he showed us what could be done. He showed us that lost time from sickness could be cut from 9 days per man per year to 13 hours per man per year. Dr. Barr of the National Cash Register made this record. It has been shown in one plant that out of a total sickness of 450 employees in one month, 350 reported their sickness early i.e. when they first began to feel sick, and that 350 lost no time. They took the necessary time to get a constipation, a diarrhoea, a headache, a cold treated early and they stayed on the job. The rest, 100 men, for some reason or another did not report for early treatment. They "did not think it was going to amount to anything" a phrase that the Industrial Surgeon hears more often than he hears any other. Some were taken ill at home and so for various reasons received no prophylactic treatment and these averaged 3½ days lost time per man. At this rate these men would each lose almost two months annually. When we had a mild recrudesence of the influenza in 1922, during the month of March the reported cases of Flu in the state of Wisconsin increased 823% over the previous month. The total reported cases of sickness Flu and all others causing lost time on this plant increased only 52% for the same period.

The trouble has been to apply good medical service to the smaller plants. The smaller employer would like to be told how he can reduce his lost time from sickness and injury.

He would like to be able to make this saving in time. Now that State Industrial Commissions are leaning toward making Industrial disease compensable, he would like to know that his men are rightly placed in his shop. Not only because of possible future compensation claims but because of efficiency. And then too, he does not want any of his men to be sick or injured, even if a more efficient man could be hired immediately to take his place. And I do not believe that a man within the sound of my voice, ever fired an employee who was off the job on account of sickness. We wait until he gets back to work or we ascertain that he is not sick but only lazy. You want healthy employees working full time, but you have not made it a part of your industrial program.

Employment of Physicians

To the large employer the answer is: employ an Industrial Physician Get a good one, one who is intensely human, one who can talk shop talk Hire an Ethical practicioner of Medicine, pay him salary commensurate with his earning capacity. Make him accountable for lost time due to injury and disease. Give him the same co-operation you would any other highly trained technecian and then follow his advice.

The best plan seems to me to be for the employer of the smaller number to interest some local physician or group of physicians in the health problem of his plant. This is not an easy thing to do for it may be that the local physician or physicians are not interested, paradoxical as that may appear to you, but there is a reason for it. Preventive medicine is a new departure and those attending the Medical schools of today are receiving much more training in the treatment of disease than they are in the prevention of it.

Our medical students are now receiving far better training than in former years.

The entrance requirements are higher, the second rate schools are being eliminated, and on leaving school the student is well grounded in medical science. The chief trouble lies in the ideals that they have when graduated, the ideals of disease rather than health. A great deal is said to them about preventive medicine, but they vizualize it chiefly on sanitation and community hygiene, personal hygiene is seldom adequately taught. The science of analyzing human being in order to ascertain what they need in the matter of hygiene, correction of defects and the ordering of life in keeping well is not intensively taught in any school so as to make it a part of the equipment of the average practitioner.

Scattered through the curriculum, the detached scientific facts may be taught, but the knowledge is not integrated in such a way as to render it easily applicable to human needs. The fault lies almost wholly in a survival in our teaching methods of the mediaeval ideas of medicine, the notion that disease is an entity; that a physician is not only expected to sit in his office and wait for people to become ill before his usefulness begins, but that when they do seek medical aid in order to improve their health, a diagnosis must be made of some particular form of "disease." Otherwise the patient must be declared healthy, or merely a "crank."

The mediaeval notion that disease is an entity instead of a manifestation of certain infections or toxic agents still envelopes the practice of medicine in a haze.

Perhaps some of you wish to know just how a Medical Service Department should be organized. Will not go far into detail for each plant has its own individual medical problem. The first requisite is the physician. You must have all or part of his time. The second requisite is that he must work directly for the owner or general manager. Do not put him under the Employment Department. The Safety Department, or the Welfare Department. If you go into this do not do it from a Welfare motive. Your physician, if he is the right one will do a lot of welfare work but if you do not think he is going to pay dividends do not invest. His education, his training, and his job make it imperative that he work for the biggest executive you have got, for this executive must be sold health personally first. Also, his status on the plant requires that his requests be considered by the men with the power of decision. Do not think I am going to recommend the General Manager have more to do.

The physician you employ is going to work with you and seldom is he going to trouble you, but there arises sometimes a question, an opportunity for service and it must have your rejection or approval. Beginning with a physician on part or whole time, the situation works itself out just as any other addition of a new department would. Your new departmental head and you get together and arrange your plans. Your physician wants to go into health work extensively, that is his job, his department, and to him all important, and it is all important, but to your business it is a part of the whole and therefore, you plan together. The doctor hires one nurse or more, if nursing services are needed. He lines up with the Safety Department to consult with them about accidents and their elimination. He arranges with the Employment Department for the physical examinations. He checks up on the sanitation and here his word should be law. I can think of only two occasions arising in industry where no one should question the physician's opinion and those two are: first, in regard to sanitation, and second, no one should be allowed to work who the physician says should not be at work.

Latitude of Medical Work

As to the latitude of the Medical Department's work. We find industries varying in this service, from doing just enough to be within the law, to complete Medical, Surgical, Obstertrical and Dental Services to all employees and dependent members of their families. Those that just work within the law, i.e. just take care of the compensation cases, consider this Medical and Surgical service an expense and the other extreme make it as an investment and say that it pays big dividends. Periodic examinations are essential, frequently for the substandard and annually for the standard. My advice would be to go a long way into preventive work but a short way into curative, except as to those conditions which arose in the shop. Should never recommend that your Medical Department do anything that smacks at all of paternalism. Were I the employer or General Manager my attitude toward employees would be "I hired you because I want your time. As your time is worth more to me when you are in perfect health, I have provided a department whose job it is to keep you well. I expect you to use it and keep well." With this there must be a human sales propaganda for health. The service of the Medical Department will sell itself if it is intensely human and top notch service.

Your physician should make regular trips through your plant to check on sanitation and to meet the employees on their home grounds. Your employment department should keep accurate records of absenteeism and the records that pertain to sickness and injury should come to the Medical Department to be used, not compiled.

As to the cost of such service, it will vary as to type of manufacturing type of employees. The extent of service and the managing ability of your physician are other factors. Probably the figure of about $5.00 per employee per year is the average.

You can find a physician or group of physicians who will see not only the service idea but you can sell this idea because you can afford to pay well for it. If you buy this idea it will be because you are interested in your employees and because you believe it pays. Sell it to some physician, you may have to import him, but get a live one and then demand of him the same service that the larger employer demands. Tell him that you believe in the Chinese system of paying a doctor when you are well and when sick that he pay you, and apply it to the men in your plant. If he tells you that any system of health preservation begins with a physical examination which is repeated periodically, you are on the right track. Do not ask him to tell you about a man's disabilities except as it relates to the placing of that man in your shop, but insist on his telling that employee all about himself and selling health to him. Knowledge gained at an examination which the physician cannot ethically give to you and which is not imparted to the examinee is absolutely useless.

Industrial health is purchasable. Within natural limitations, your industry can control its own sickness rate and vital capacity. Will it pay you to extend the lives of your present employees? Will the addition of an average of ten (10) years or even five (5) years service of your present employees pay in dollars and cents to you? You can purchase it.

THE FATIGUE PROBLEM IN INDUSTRY

Mrs. Frank B. Gilbreth, Montclair, N. J.

The fatigue problem in industry is no new problem. I think many times we have the idea that this is something absolutely new, and that, therefore, we must set out for absolutely new people to solve it, and in this way we make a great mistake as we always do when we fail to utilize what we already have at hand. For those who are working in the fatigue field are so closely allied in many ways to other groups of workers, primarily perhaps to the safety people, who have been most co-operative from the very start in this work, who have included fatigue in their programs and who have encouraged investigations, that there is much they can do together. When we go into plants, we find complaint of fatigue, yet we are given machines which are tested to the nth degree. If the plant is very progressive, often it allows us some psychological tests of workers, but in most cases we have absolutely no idea what type of a worker is furnished to us for observation. Is it fair to set up any standard at all of what output is or can be when you have no earthly idea what the physical health of this man is, what amount of fatigue he brings to his work in the morning, or in what condition he is to go through a regular day's work?

It is for that reason that I welcomed so gladly an opportunity to come before a group like this to tell you how absolutely essential your work is if we are going to make any progress at all in investigating fatigue in industry.

I am just back from a short but very intensive trip abroad with perhaps unusual opportunities to get quickly in touch with what is being done in this field. In England there is a fatigue research board of doctors, of psychologists, of psychiatrists, of engineers. Perhaps they are repeating work which need not be done again. At least they are all co-operating. There is no reduplication of effort; there is no idea of not utilizing what has been done.

In Holland, right in the plants there is the plant physician, there is the psycho-technique work, as they call it, the laboratory where men and women are being tested to find their averages and their possibilities. There is the housing proposition allied with the health department, where the health workers can go and see for themselves how the workers live, what the workers eat, and in what condition they come to the plant, what they really have of service to offer when they come in in the morning to the plant.

In France we find scholarships, not only for college boys but for graduate boys in the industries, so that they may go back to the old journeyman idea and go from one plant to another, to the silk industry and the other industries of France to see what the other people are doing, to gather all the information together to go on where the other people have left off.

Finally, in Czecho-Slovakia, that very new sister republic, they have an institute especially constituted to do this type of work, the Masary Institute, founded for the sake of scientific investigation and named for their president. The members are scientists, physicians, psychologists, engineers, physiologists, psychiatrists, chemists, physicists, and there when a problem comes up in industry, it is brought in to the academy it is brought in to one of the laboratories or workshops, with the people involved, with the equipment and the tools so far as can be, and everybody who can throw any possible slant on that thing is invited to come and talk about it.

The academy is organized in sections. Each section takes over its own investigation, and when they are through they come together and put the findings together, and then they go into industry they have the endorsement of all the specialists in the field.

The Need of Co-operation

What we are doing here is not exactly that sort of thing, but the great amount of waste lies in the fact that so many of us are all groping for the same thing, for the solution of this fatigue problem, and we are not getting together on it properly. Perhaps you don't realize how far-reaching the effects of it are and how very directly the whole thing falls into your field.

Have you examined school records? Do you know (you probably do but many of us in industry don't) that the children who make low grade

do it because they have not had enough food or they have not had enough sleep or they have not eaten slowly enough, or a thousand and one other such things? The problem of keeping up the weight and keeping up the school record at the same time is most serious. Among the foreign people here who have not the education and apparently have not the sense, the weight chart stays up, the school record stays up, and so on, yet I know of a very prominent high school where as a matter of pride it is boasted that the lunch room is used for recitations up to the very last minute before the lunch hour, that the children are put through at an efficient rate which delights the hearts of the authorities and where they are proud that a certain number of children can be made to bolt their luncheons in a certain amount of time.

Of course, we mothers know that the cross child is very often the hungry child, that the lazy child is very often the sick child, and we in plants who have to deal with these people trace back so much of this fatigue to something that is exactly the thing that you men should remedy and would remedy certainly if only you were given the opportunity to do it.

What fatigue is is a matter perhaps to be solved in laboratories, but how it is to be prevented is a very different thing. We talk so much about eliminating fatigue. It is just like so many other things, it is not a case of eliminating primarily; it is a case of preventing so much of it. What is the use of these elaborate devices for curing, for providing rest and amusement and recreation when just a little bit of science put at the other end of the thing before the collapse would straighten the thing out?

From the engineering standpoint, it comes to us with the greatest amount of force in trying to derive the one best way to do work. There has been a queer idea that the aim is to find one person who does the work in one perfect method, and then go down through the plant and force this method up and down the line on every one else. Of course, that is perfectly absurd. You would absolutely eliminate the individual or the human variable if you did that. The idea is to find the man best fitted for the work, and the very best method that he can use, and then add your individual percentages of one kind or another until you have a proper general method.

The difficulty here, as I have stated, has been in finding this one best person, in being absolutely sure that you have some one who is physically, mentally and even morally fit to do the work.

Fatigue Dependent on many Things

As you know, fatigue depends on many things. You apparently may be exhausted, and something interesting or stimulating or splendid comes into your life and fatigue absolutely drops out. You may be doing something that is the most monotonous job, and one of several things may happen, all of which seem to be instrumental. One is that you

assign that work to some one else who has been trained to it, som one of less mental capacity, and you find all of a sudden that, to him the job is not monotonous at all. Another is that you find you have wha is really a scientific investigator on the job, only he never knew it an you never knew it, and you explain to him that he has there a probler in motions, that he has an opportunity to find a better method, an you will find that, what to him has appeared the most monotonou thing in the world, is suddenly fascinating.

In installing methods of fatigue study or fatigue elimination, firs of all use all your activities, and second pick a place where you ca arouse a great deal of interest and where you can get results. Thi is always good, sane, safe advice. In the second place, if possibl choose some non-controversial place. Fatigue elimination work, lik health service work, ought to succeed from the start because it is som thing that hurts nobody but helps everybody, that does not enter in the question of rates, and things of that sort. If you choose a pla for your fatigue work, like the office of the chief executive where ever body in the plant but the chief executive feels sure you should start, y will find your results going through with a great deal more succe than if you choose some place that will cause a little discussion a doubt if not controversy in the organization.

Suppose, for example, each one of you was to go back after this Co gress and, if not to study your own office, because it is awfully diffic to study your own things, study a very small office of some one who near enough for you to observe. You know we are all, practically, hon as far as mere honesty goes, but to be intellectually honest enough study your own methods, to study what you are doing, not what y think you are doing or wish you were doing or what you are going do next week, but to put down in black and white what you do now, calculate your motions in fatigue, is rather serious.

You go into the small office and look at the perfectly obvious thin the light, the heating, the humidity, the ventilation, things which, course, are A B C's, yet it is astounding how few offices, small or lar in this country will bear intensive investigation in this respect.

Then you begin to look to the equipment, the very ordinary eq ment, the desks, the chairs, the filing cabinets and everything else. wonder how many roll top desks you will find, yet a roll top desk no excuse from any possible management standpoint. You find, perha if you are fortunate, a flat desk for the executive and flat desks for the workers. How many of these people spend any prolonged period these desks during the day? If they do, why are they not working p of the time standing and part of the time sitting? It is not a diffi thing at all to fix the equipment properly, but how many stand height desks in the ordinary office of the executive in any part of country will you find? Yet the problem is simple enough. You pl your worker standing. You put your work bench at the height his elbows. That is done. You make your chair of such a height

you keep his elbows in the same relative position when he is sitting. That is done. Your chair, of course, if you are human these days, will be adjustable. There is no excuse in the world for standardizing chairs in offices or plants or stores or anywhere else when such a little bit of expenditure will mean that each worker has the proper chair according to height. There is absolutely no excuse for that.

Arrangement of Equipment

Now look at your equipment. Is there any standardized place on that desk for the equipment, or does it wander over the desk? How much equipment is there? What are the necessary things to do business with? They are the supplies, the pencils and pens and papers, and there is a telephone within reach and there is a dictaphone, unless the man you are observing is still in the medieval stage of forcing somebody else to act as audience when he dictates his letters; there are filing stands, there is an "in" basket for the incoming mail and an "out" basket for the outgoing mail. Look at these things a little more closely. There must be for us at least one best method of arranging this equipment. Are you willing to cross-section your desk in four-inch squares and to arrange your equipment the way you want it once and for all? We will have it anywhere you say; we will see that it is back there every morning and every noon. We will put for you a pencil rack, which will position your pens and pencils where you want them, and we will put the rack where you want it; we will have in front of those pencils the supplies that you need to reach with one motion; we will put your talking machine so that you can look at your papers and put out your hand and bring the mouthpiece in front of you; we will even teach you how to use it.

If you want to spare your time, we will simply cut the handles of your rubber stamps flat for you so you can get them without sending your eyes on a message where only your hands can go. If you are ultra-finical and don't want to put them back into place, we will simply tie a knot at one end of a string on the stamp and put a little bag of sand at the other, and when you are through the stamps will slide back where they belong. We will put all your supplies in the top drawer in such a way where you can get them without looking at them, because they are always in the same place. We will put them in two boxes for you. When you finish your top box, throw a card in the basket that says "More supplies" and put your second box on the top and go happily along. All these things we will do for you if you so desire, not because you really save any great amount of motions, not because the fatigue that you cut out in your day's work in anything remarkable, but because you just begin to think along lines of motion saving and fatigue elimination and the one best way to do work, and that is the simplest of propositions. It does make work interesting.

I hope that in the discussion some of you doctors here and some of you psychologists, if there are some in the audience, will bring out this

relation of interest to fatigue and of automaticity to fatigue and of the feeling not only of good health but of buoyant health and all these other things, because it is on those relationships and the way they are worked out in detail that we are going to be able to put this thing across.

Methods of Arousing Interest

When you make your installations, do not make them merely as simple as possible and use all the existing means, but remember that simple laws of psychology are habit forming. Put them in as James says, with some sort of a bang; make a sort of event out of it; make yourself remember that you start at such and such a time. I have a small girl who says, "I have to do it because I promised myself." That sounds sort of funny, but it really is at the bottom of all of Dewey's philosophy. In the same way, if you start a habit of that feeling of "I promise myself that this thing is going through," you are very apt to get there, and keep doing it, maintain it. Of course, the great thing in making all changes and installations is not getting them in (we are great on getting them in in America); it is maintaining them and keeping them in that troubles us.

You remember, of course, that it takes quite a long time to get a habit thoroughly. In the first place, you never allow an exception to occur, and in the second place you just keep digging at it. The trouble with so much work in fatigue has been that these laws of habit have been disregarded. People put in a chair that they think is a fine chair. The girl doesn't like it. They put it out again. They haven't kept it there long enough for her to know whether or not she likes it.

If you are in a plant where there is not a good chart, the first job you do when you go back is to have the chart put in. You never can prove the results of your fine work until you have a chart department which proves through a long period of time what actually happens when you make your changes.

But you have got to go over this period until the new habit has gotten a stronger hold than the old habit has, and that is a long period. Unless you can put your changes in and hold them through that, no one has a right to expect these wonderful results of you. We must put back of all this not only the scientific belief that it ought to be done and the practical belief that it can be done but this great passionate desire that it shall be done.

Waste in industry, unnecessary fatigue, all these things are not words on paper. To us who work day in and day out in industry watching the people, they are very real things,

HEALTH EDUCATION OF OUR FOREIGN FAMILIES

A. W. Colcord, M. D., Carnegie Steel Company, Clairton, Pa.

If we would teach a subject we must know 10 times as much about it as we would teach. If we would teach health we must have a defini

idea of what it really is. We must be full of our subject, in love with it, enthusiastic about it. It is more than the absence of disease; more than an adjustment to our environment; more than the rhythmic working of all our organs, though it embraces all of these. It involves mechanics. Health means proper posture of body; correct position of all our organs with adequate support; strength of muscle; firmness of bone; smooth working of joint. It reaches into the domain of chemistry and physics. Health means balance of acids and alkalies. The tearing down and building up must go on unceasingly. There must be osmosis of gases; solutions of proper specific gravity; the production and regulation of bodily heat; pumping of blood and circulation of fluids.

To know health, we must know physiology—secretion, excretion, digestion, assimilation, ferments, nerve reflexes, cell production and cell destruction. In the light of modern research, the old saying, "A sound mind in a sound body," is only half true. A sound *mind* is a sound body for every living cell in our body helps to make up the organ of the mind. Thought, emotion, will power only comes in response to stimuli from without and that mind is most healthy which has developed resistance to stress and has learned to work in perfect harmony with and with perfect adaptation to its environment. The healthy man has not only enough power in his heart and other vital organs for the daily round of work and play, but a large reserve for the severe accident with resulting shock; for the attack of pneumonia; for the long run to catch a train. In the same way he has a wide margin of resistance to fatigue, hunger, heat, cold, infection, or powerful emotion. It is health that gives power to the athlete; health is the source of the grace of motion and symmetry of body. When we admire beauty in male or female we are unconsciously paying a tribute to perfect health. If Annie Laurie's "cheek was like the dawn," it was because the blood of perfect health was shining through. Health is our greatest source of pleasure and without it we are miserable. If you were told today that you had an incurable disease—must spend the rest of your life a hopeless invalid, what would you give for health? If you had a million dollars, wouldn't you give every cent of it? You cannot count its value—it is priceless—something well worth having. And the one who teaches health really goes about selling it—making people want it—and that so badly that they are willing to give up something to get it and keep it.

Health is "abundance of life." Christ said, "I came that ye might have life and have it more abundantly." The healthy man is full of the joy of living; every nerve atingle; the rich blood bounding through the arteries; the mind alert, the muscles strong and ready for action. It begins in heredity and depends on prenatal care; on being born of a clean mother, in a clean room and bed, attended by a clean nurse and doctor and fed with clean food; on the formation of right health habits from the start carried on and developed all through infancy, childhood, adolescense and adult life. It means that the doing of the right things

must be fixed, so automatic, so much a matter of our subordinate reflexes that we do them either unconsciously or without effort, as a matter of course. The man who thinks too much about his health, who becomes a slave to it, is not a healthy man. Health is not a thing to *have;* it is a thing to *be, to do, to live.*

Why Should We Teach It?

Organized preventive medicine is less than 100 years old. It has passed through three great stages: first, the clean-up era, 1840 to 1890 when the idea of dirt as the chief source of disease prevailed; second the policing era, 1890 to 1910, when in our early enthusiasm over the discovery of many disease germs, we thought we could stamp out contagious disease with a law, a placard and a policeman; third, the stage of education of the masses along health lines, 1910 to the present. We have continued the clean-up and the quarantine but we have learned by experience that we must fail unless we can get people really to want to be healthier and live longer. We must not only teach them what causes sickness and how to prevent it; we must enlist them in the campaign for better health. We have in the past 25 years reduced the annual death rate per thousand in the United States from 25 to 12 and have correspondingly reduced the amount of sickness. Yet we know that about one-half of the sickness of today is preventable. We must cut it in two again. There are, on an average, 3,000,000 people sick in the United States. The beds, if strung out in a long line, could touch and yet reach from New York to San Francisco. One-half of it is unnecessary and, hence, criminal. You and I are to blame. I would not for a moment belittle the splendid work that is being done in many cities and states, but as long as present conditions prevail, *we are not doing enough.*

Methods of Health Teaching Now in Use

One of the most powerful factors in teaching the foreign father and mother cleaner and healthier ways of living is the school child. He learns our language, our ways of living, our view of things in general and takes them home. His contact with his teacher, the school doctor, school nurse, domestic science teacher, physical director and fellow pupils help to make a good American of him and this little leaven leavens the family leavens the whole mass. The various organizations that teach health do much good and reach the foreigners in many ways—churches, clubs, Y. M. C. A., Boy Scouts, Lodges, Insurance Companies, settlement houses, hospital or state clinics—all spread the gospel of health. The efforts to teach health to the masses through the lay press, however effectual to the English reading public, do not reach the class of foreigners under discussion. The conscientious family doctor can do much in their homes. The profession as a whole is not aroused to the needs and to the possibilities of this home health teaching. The right type of health officer—who is more than just a policeman—

also be a power for good in such a community. The effort to train health officers, such as is being done in the Johns Hopkins School of Preventive Medicine, is working wonders in Maryland. I believe it offers the one best solution in Pennsylvania. The great health object lessons that also have had such a bearing on the attitude of the public are almost wholly lost on these foreigners. The Panama Canal health demonstration means nothing to them. Neither do Framingham, the work of the Metropolitan Life nor vaccination, nor typhoid, nor dyphtheria immunization. If we would teach them health we must come into personal contact, get their confidence, study their ways, even their way of thinking, and with tact, perseverance and infinite patience, win them over. Besides the public schools, the two other great factors in this work are the company surgeon and the welfare nurse.

Special Problems in Teaching Health to Foreigners

The foreign laborers of our mills are made up largely of the downtrodden of Europe. They and their ancestors have lived for centuries in poverty and want. Their homes were crowded and dirty. Their food, often unclean, was poor in quality and lacked variety. The air was foul in living and sleeping room. The pig, cow, and chickens sometimes occupied the same building as the family. They were usually far from a large town and could seldom have a doctor; with them a trained nurse was almost unheard of. In sickness, they used home remedies handed down often from the middle ages. Babies were born with the aid of the midwife, untrained, ignorant and dirty, an institution they learned to love and to which they still cling tenaciously. Mixed with their meager knowledge of medicine, sanitation and hygiene was a strong vein of superstition. All this they have brought with them. Poor as their old country home was, they loved it and all that went with it. Their language, manner of thinking, code of morals, habits, customs, ideals, likes, dislikes—all differ from ours and they are going to prefer their own until we can give them a good reason for changing. The process of change we call "Americanization" and our health teaching is but part of the wider field summed up in this term.

The men are Americanized with surprising rapidity. They mix with their fellow foreigners who have been here many years and already have adopted our ways; they come in close contact with Americans in the mill; they learn our language, often go to night schools, take out citizen's papers, and soon with them, the question of teaching health is no longer a separate problem. The children who attend school are, as we have seen, also rapidly Americanized. This leaves the mother, the baby and the children of pre-school age. The mother clings longest to her customs from over-seas. We may find her after twenty years' residence here without a knowledge of twenty words of English. She frequently resists efforts to teach her our language or ways. She keeps her children, while small, speaking her native tongue and seems to feel that if they become Americanized she will lose them. She is a hard

worker, continues this during her frequent pregnancies up to the last minute, when she calls the native midwife and passes through the ordeal with help that violates every law of hygiene, medicine, surgery or common cleanliness. Once the baby is born it is washed and has arms and legs tightly bound in the manner that has prevailed among the primitive people from the early dawn of history. It is dosed with teas, fed on sugar plums and given a pacifier, which may be picked up from the floor and replaced in the baby's mouth. Luckily the baby that can nurse the breast, for the bottle-fed baby in these families must take fearful risks—irregularly fed with the most improper mixture—frequently condensed milk—little or no attempt to keep the food, the bottle or the nipple clean. Long before it gets teeth it may be fed such things as green corn, tomatoes, bologna sausage, ice cream cones, cakes from the corner grocery, all-day suckers, candy, pop, coffee, grapes, beer and food from the common table. These houses are usually swarming with flies which breed in the nearby stable, feed on the garbage, privy or dirty back yard and enter the house through the unscreened doors or windows to light on the baby's nipple or on the exposed food.

Do you wonder that Pittsburgh with its large foreign labor population, had for many years an appalling infant mortality? But this death rate for the first year of life is rapidly falling—has gone down during the past five years from 13 per cent to about 8 per cent and is still going down, thanks to the splendid work of our settlement houses, prenatal clinics, baby clinics, welfare nurses, school nurses, insurance company nurses, Americanization teachers and an aroused, earnest medical profession.

The Company Surgeon

No man in the average industrial town has greater opportunities for health teaching than the company surgeon. If there is a physical examination for employment, he can then and there get the confidence of the employee, convince him that he and the company take a personal interest in him and stand ready to help him. The surgeon can tactfully call attention to faulty habits of posture, gait, diet, over-indulgence in tobacco or alcohol. He can suggest the cleaning up of a foul mouth, the correction of eye defects, the curing of skin disease and so on through the long list of minor defects we meet in our daily examination. Unless we can convince the employee that these examinations are for his good we have wasted our time and only served to antagonize him. In most mills those taken sick on the plant come to the emergency hospital for first aid treatment and advice. Here is another chance for the company surgeon and nurse to find out the way he lives and start him right. The lectures on first aid should include instruction in health matters. The safety organization of the mill should include health and the safety committees should also be health committees. The company surgeon should look after the general sanitation of the plant, the cafeteria, bunk houses, toilets, rest rooms, eating places, drinking water,

ventilation, heating and lighting. In doing so he comes in contact with superintendents, foremen and men, and should never miss an opportunity to drive home a health lesson. He should be a leader in the health of the community; he should direct the work of the welfare nurse and should be willing to serve on the board of health, school board, council or in any capacity where he can make his influence felt. He should, if possible, organize the doctors of the town for work along this line, getting each one to do that particular line of work for which he is best fitted. One may run a G. U. state clinic, another a tuberculosis clinic, another serve as health officer, another as medical school inspector and all be urged to teach health at every opportunity in the homes of their families.

The Welfare Nurse

In successful health teaching almost everything depends on the personality of the welfare nurse. She must have a natural aptitude and love for the work and special training. She must be attractive in appearance, dress, habits and bearing, and must have infinite patience and rare tact. She must have a definite idea of what health is, what conditions cause disease and must know about how far she can hope to approach the ideal of perfect health in the material at hand. Thus equipped, each family becomes a separate problem.

In order to study this problem systematically I have prepared an outline for a sanitary survey of each home. This survey is not made on her first visit—only a very small part of it. The object of this visit is mainly to get acquainted, to get their confidence and show that she came only to help. Then at each subsequent visit, more and more can be learned and the blank gradually filled in—always in the nurse's office, never taken into the home. As she sees the needs and finds the opportunity, she drives home the health lessons. This blank, properly filled out and filed, tends to make the nurse systematic, accurate and thorough. It gives valuable information to the company surgeon or welfare supervisor. It is a good measure of what the nurse can accomplish in improved sanitary conditions; it is of great use when the question of needed financial help arises.

For the nurse's own use I have prepared another outline of thirteen health lessons containing about what each housewife should know, bearing in mind that this is elastic and the nurse must modify it to suit the needs of each home. Some of this teaching can be done best in groups, classes of ten or twenty women in a neighborhood, gathered in a home, or better, in a room rented and kept for the purpose. We have such a room fitted up with scales, charts for teaching and baby weight, a nurse's desk and seats for the classes. We have found that people of one nationality hang together and do not mix well with those of another nationality.

A class of adolescent girls makes a very interesting and useful group (girls from 12 to 15 years), and is a rare opportunity for the nurse to

teach them the things they ought to know. You will find in every neighborhood a few who are cleaner, more intelligent, better disposed, more public-spirited, and more willing to take an active part than others. These natural leaders must be captured and put at work. Then there will be a few who are careless, indifferent, lazy, immoral, dirty in their homes, jealous, malicious, quarrelsome, stingy, etc. All these must be handled with patience and tact. Our nurse has found that it pays to serve an occasional lunch of cake and ice cream, to have an annual picnic of each group with their friends and, in general, to do everything to show that she is their real friend

Duties of Welfare Nurse

To sum up the work of our welfare nurse, her duties are:

1. To visit the sick or injured for any doctor practicing in the community, and under his directions look after bathing, diet, enemas, dressings or any nursing that can be done in a daily visit of an hour or less.

2. To make inspections for the welfare director as to economic home conditions with a view to giving financial aid.

3. To keep in touch with county poor directors, and the various charitable institutions, schools or hospitals with a view of getting aid for individuals as needed.

4. To keep a list of pregnant women who are not under the care of a doctor and aid and instruct them.

5. To keep a baby list where not closely watched by a doctor. These are visited regularly and watched for slight ailments. Where really sick they are urged to get a doctor at once. If unable to employ one, a doctor is secured. Their feeding and general care is directed and, if possible the mother brings the baby once a week to the baby clinic for weighing inspection and charting. These come every Thursday at 2 P. M., and this, with others invited in, forms the mothers' class for health teaching

6. Let me emphasize the fact that the most of health teaching is done best right on the spot where its need is so apparent—in the home In the type of minds we are teaching, only the concrete appeals. This is done by the nurse while making the sanitary survey or while making sick, prenatal or baby calls.

7. To keep a record of conditions found and of work done, making monthly reports to the chief of welfare work. This part of the work is often overdone and too much of the nurse's energy and time is wasted Too many high-priced welfare workers are spending time sitting in swivel chair devising intricate charts and report blanks to puzzle the brains and consume the time of the field worker.

In conclusion, like any other teacher, the welfare nurse to be a success must be a born teacher, must be trained for her work and must be in love with it. She must learn to work in harmony with the doctor of the town, never usurping their work, and always acting under the

instructions when working in their families. Doctors are often jealous of the company surgeon and, so, antagonistic to the welfare nurse who works under him. She must win her way by tact and real help.

What I have said of the poorer class of foreigners was said by way of diagnosis, and not in unkindness. I have spent thirty years among them, speak a smattering of their languages, have learned their way of thinking and can see things from their viewpoint. One develops an affection for them as for a wayward child and, with this, a great desire to do them good. What I have said of them applies to only one social stratum. We have all grades from the lowest type up to the well educated foreigner with a clean home and an aptness for rapidly picking up our language and ways.

I often drop into the welfare room on Thursday afternoon and give them a little talk, stressing some needed point suggested by the nurse. It keeps the nurse on her toes and pleases the class.

The company surgeon who shuts his eyes to the useless suffering and loss of life in our foreign quarters is missing a splendid opportunity for doing good. The question of community health is bound up with those of housing, water and food supply, sewering, board of health organization, community house, public schools, public libraries, amusement places and town hospital.

Make the home and the home town so attractive that the boys and girls as they grow up will love it and want to stay in it. Give them so much wholesome amusement that they will have no time, no desire, for those pleasures that leave a sting.

Twelve Health Lessons for Foreigners

Lesson I. General View. Dirt

1. Importance of health.
2. Unnecessary sickness.
3. Everybody must help to stop the sickness.
4. Causes of sickness—dirt: on our floors; in our food; on our tables, cupboard, dishes; on our bodies; on our clothing; in our beds; in our front and back yards. Garbage, sewer, cellar, privy.
5. Other causes to be talked of later such as: flies, bad habits, wrong food, catching cold, bad air, impure water, contagious disease, etc.

Lesson II. Flies

1. How do they breed? In manure, the dirty street, the privy, rotten garbage. The maggot: how many in three months?
2. How carry filth and disease germs? 1. Feet and mouth. 2. Kinds of dangerous filth it lights on. 3. How it poisons food. 4. Some diseases it can carry; erysipelas, common blood poison, baby diarrhoea, dysentery, typhoid fever, tuberculosis.
3. How prevent breeding: Keep yards clean. Keep stables clean. Cover manure. Keep garbage covered. No open slop drains. Keep streets clean.
4. How kept out of our houses: Screen doors and windows. Starve them (no exposed food—clean tables—floors—dishes).
5. How killed. Fly swat (In spring). Fly paper. Sprays. First frost—sweep down.

Lesson III. Clean Bodies

1. The bath: How often. The tub, shower, sponge. Use of soap. The cold bath. Clean heads, ears. Clean feet—smells.
2. Clothes for sleeping—clean beds.
3. Underwear.
4. Keeping the child clean: On coming to table. Going to bed. The school child. Training in clean habits.
5. Some diseases from dirty bodies: Itch, lice, ring worm and barber's itch, hook worm disease, impetigo.

Lesson IV. What we eat and wear

1. Buying food: how much at a time? Kinds—meats, vegetables, starches, fats.
2. Storing: kinds best kept on ice. Kept from dust and flies.
3. Keeping food clean: handle with clean hands. Clean cupboard, etc. New or dirty table. Never picked from floor and eaten.
4. Danger from spoiled foods: meats, fish, oysters, milk, cheese, bread.
5. Tinned foods: not so good as fresh. Danger of spoiling. Empty when open.
6. Cooking: frying in grease. Danger from raw meat.
7. Serving: clean table, dishes, floor. All eat at table. Sweets come last.
8. Don't—allow children to eat candy between meals. Eat mushrooms unless sure of them Eat unripe fruit.
9. Clothing: buying, making, summer clothing, the gradual change for colder weather, winter clothing, clothing the boy and the girls for school, night clothing, foot wear, underwear, washing clothing.

Lesson V. Prenatal Care and Childbirth

1. Prenatal care: importance of doctor early and constant care. Choosing a nurse; the midwife. Diet, clothing, bathing, exercise, care of bowels. Baby clothes and maternity outfit. Selection of room, bed, etc. Importance of clean body, bed, clothing, room, nurse, doctor. Slight ailments. Danger signals; convulsions, blindness, swelling, headache, dizziness, prolonged vomiting. The prenatal clinic.
2. Childbirth. Send early for doctor and nurse. Importance of cleanliness. Sterile pads, binder, time in bed, breasts, nursing, nipples, diet, bowels. Early care of baby; eyes, cord, first bath, clothing, sleep, first nursings, drink, urine, bowels, mouth.
3. Some "don'ts" for baby: don't rock, shake, sing. Don't keep too warm. Don't use long tubed nursing bottle. Don't give teas, sugar plum or pacifier.
4. Some "don'ts" for mother: Don't allow company. Don't keep too warm. Don't starve. Don't feed too much. Don't allow up before nine days.

Lesson VI. Care of Baby

1. Nursing. Intervals, night nursing, nipples, alternate breasts, baby vomiting.
2. Supplemental feeding: milk mixtures; sugars and starches; baby foods. Boiling milk, keeping milk, nipple and bottle clean. What not to give.
3. Artificial feeding: increase in strength; the hungry baby; too rich mixtures, the emaciated baby.
4. Second Year Feeding: when begin other food, kinds, intervals, etc.
5. Increase in weight.
6. General care: Ventilation, outdoor air, clothing, bathing, constipation, diarrhoea, colds, skin eruptions, etc.

Lesson VII. Teeth—Tonsils—Eyes

1. Teeth. The two sets, care of baby's mouth and teeth, care of child's teeth, care of milk teeth, prompt pulling when loose, care of permanent set, the six-year molar, choosing family dentist, twice year examinations, work of dental hygienist.
2. Tonsils. Causes of bad tonsils; effects; importance of frequent examination; when needing removal; adenoids; mouth breathing.
3. Eyes. Watch child's eyes for poor vision, sore eyes, cross eye, foreign body. Consult family doctor if in doubt. Danger of neglect of foreign body, wound of eye, puncture of eyeball, powder grains, burning with acids, lye, pus in eye of new-born.

Lesson VIII. The Pre-school Child

1. His diet: balanced, three square meals. Lunches; what not to feed.
2. Clothing, bathing. Consult family doctor for what may seem slight trouble with teeth, tonsils, ears, eyes, skin, or general health.
3. Sleep: regular and plenty; night air; night clothes.
4. Play: importance, place for play.
5. Forming right habits. Personal cleanliness, regular bowels, eating right, posture, gait, speech, etc.
6. Prevention and cure of lice, impetigo, itch, etc.
7. Importance of this period of life in building for health, strength, beauty, and best manhood or womanhood.

Lesson IX. The Adolescent

1. The boy is a problem for parents, teacher, church, boy scouts, etc.
2. The girls from 12 to 15 can be grouped and taught simple sex matters, clothing, diet, health habits, and the rudiments of baby care, cooking, sewing, housekeeping, home nursing and morals.
3. The welfare nurse fills out what the school, school nurse, and mother do not do.

Lesson X. Fresh Air—Sunshine—Warmth

1. Fresh Air: effects of bad air; how to get fresh air into our homes, the sleeping room.
2. Sunshine: effect on disease germs, effect on plants, animals, human beings, danger of living in dark basements. How it helps cure diseases.
3. Warmth: room temperature (68), evils of room too cold or too hot, danger from pipeless stove, danger from cold hall and the hot room.

Lesson XI. Slight Ailments

1. We may keep in the house as home remedies: castor oil, castoria, talcum powder, sterile vaseline, a mixture of mag. sulph. 1-4 lb., alcohol, 1-4 pt., and water 1-2 pt., bandages, sterile gauze and cotton.
2. Drugs that may be dangerous or habit-forming are: carbolic acid; tr. iodine; concentrated lye; opiates as morphine, paregoric, laudanum, chloral, cocaine, headache powders, patent medicines, whiskey, gin, etc.
3. Constipation; diarrhoea; vomiting; coughs and colds; fits; cuts, bruises sprains, burns, apply wet dressing of soda bicarb. and water or mag. sulph. alc. and water as above. Keep fingers out of wounds or burns.
4. When in doubt always consult family doctor.
5. Many severe or dangerous kinds of sickness began as slight ones. Don't delay too long.

Lesson XII. Health Habits—A Review

1. Best formed during childhood or infancy.
2. Never too late to begin.
3. The basis of all real health.
4. A few bad habits: tobacco, alcohol, opium or cocaine, headache powder, aspirin, too much medicine, patent medicines, late hours, over work or over play, over eating, going without breakfast, hasty eating, sitting, walking or standing in bad position; candy, ice cream or fruit between meals; worry, fretting, scolding, anger, sulking, fault-finding, despondency, thinking too much about one's own sickness.
5. A few habits worth forming: regular times for work, play, rest, eating, sleep, and bowel movement; sitting, standing or walking in a position easily erect; eating a mixed diet of fats, starches, and sugars, meat or milk, and vegetables; eating sweets and candy only at the end of a sensible meal; sleeping by the open window; the daily tooth-brushing and the daily bath; never eating with dirty hands or after touching anything unclean, or after touching the sick. Scrub hands first.

Lesson XIII. The Board of Health and Health Officer

1. They and their laws are to help keep us well.
2. We must help them all we can.
3. They will ask us to clean our cellar, fix our drain, clean our stable or hen house, clean our back yard, keep garbage in covered can, not use water from dangerous well or spring, not to sell meat or milk that is dangerous, etc.
4. Contagious diseases: how caught; how prevented; names.
5. Names of common ones: measles, mumps, chicken pox, scarlet fever, diphtheria, small pox, whooping-cough, german measles.
6. Quarantine: why necessary; duties of health officer; duties of every one to help; disinfection; uses of antitoxin.

HOW TO MAKE A SANITARY SURVEY OF AN INDUSTRIAL PLANT

C. L. Ferguson, M. D., Selby Shoe Company, Portsmouth, Ohio

Most of us recognize sanitary conditions in a general way, but only the expert, who has spent years studying this particular subject and who then serves as an apprentice, is competent to solve the many technical sanitary problems found in industry today.

Every plant has its problems peculiar to itself. One may be thoroughly qualified to make a sanitary survey in certain types of industries, but thoroughly disqualified to make a complete and scientific survey in others.

In the absence of a full time or part time sanitary engineer, as a rule the physicians in industry are consulted or held responsible for sanitary conditions, even though this specialty requires just as much time, if done properly, as that given to safety engineering.

Before attempting to answer the question propounded, one should familiarize himself just as thoroughly as possible with the standard requirements of sanitation. These come under the heading of codes or

laws which either recommend or demand that certain conditions shall or must be as stated. With this information at hand it is comparatively easy to make a report which excludes the highly technical data. Let me dispose of the technical data immediately by saying that all such technical problems should be considered just as medical and surgical problems should be considered. If you have a surgical problem, call the surgeon. If you have a case of trachoma or a foreign body in the anterior or posterior chamber of the eye, call an eye specialist. In other words, if you have health hazards which are beyond your ability to cope with, seek the services of one who is thoroughly competent, or learn by study and consultation how similar problems are solved elsewhere.

The fundamental standard requirements for an industrial plant consider general cleanliness, drinking water, ventilation, lighting, exhaust systems, toilets, cuspidors, wash rooms, dressing rooms, rest rooms and restaurants.

In order to become familiar with the above it is imperative that you know your plant. This can only be accomplished by frequent visits through it. The safety engineer does not and cannot make a complete safety inspection in one visit. The wide awake observer can always find some accident hazards, regardless of the number of visits he makes. The sanitary inspector is not at all unlike him. To depend upon a guide to usher you from plant to plant or from one department to another cannot be absolutely satisfactory, because he may purposely or inadvertently avoid places which he knows to be hopelessly beyond favorable comment. I once had a doctor tell me that he was invited to make a sanitary inspection tour, but that he was led through the plant so fast that he got his cue before fairly under way. He continued to say that he felt sure, after completing the inspection in a limited time, that his guide had undoubtedly avoided places which were not open for public inspection. Although this may not have been true, he received the unfavorable impression just the same.

If you are a stranger in a strange plant, camp on the job long enough to become familiar with every nook and crook of the plant. This is an advantage that the industrial physician has over the casual inspector who is not thoroughly qualified.

General Cleanliness

In taking up our fundamental standard requirements we find that it is general cleanliness which first attracts and pleases the eye. A clean plant is always impressive. While making a survey don't forget to interview some of the employees. When they have been thoroughly sold they take pride in showing you through the plant. Just recently I listened to an enthusiastic report by a foreman who had visited a factory in a small, isolated inland town. His enthusiasm was a manifestation of the enthusiasm demonstrated to him by the employees. He reported the plant free from dirt, and the employees ever ready to explain how the

plant was kept so clean. This foreman is not a sanitary engineer, nor did he visit this plant with the idea of even making a casual inspection, but general cleanliness stood out so prominently that he apparently saw nothing else. He said the floors were spotless. Not even a drop of oil was allowed to run off the oil can spout to the floor when the machines were oiled. The cleanliness of the blacksmith shop, he stated, would compare favorably with the cleanliness of any well regulated medical department. Even the ceiling of the round house was painted white and kept in this condition. So proud are the management and the employees of their clean plant that it is always open for inspection even on Sundays. So, while making a survey, ascertain the entire personnel's attitude on sanitation. If the management is indifferent and the employees spit all over the floors than general cleanliness is bound to be neglected.

Drinking Water

The supply of drinking water of any plant must necessarily be pure. First, determine its source. If water from the city mains is used the necessity for its inspection is not so urgent, because this is daily examined by a chemist at the water-works plant under supervision of the local or state health departments. If water from a privately owned driven well is used, it should be inspected at frequent intervals and a sample of this water should be collected by the inspector and sent away for an examination.

The drinking of plenty of water is highly essential, therefore note the number of drinking fountains. Are they conveniently located and are they are of the sanitary type? Are the conditions around the fountains conducive to free drinking?

Ventilation

One important requirement of a sanitary plant is good ventilation. See that the air is in motion. Is there fresh air entering the room constantly while the bad air is being taken out? In the summer time, it is comparatively easy to determine whether or not the air is moving. Witness the lifting of the blinds or the moving of any loose paper about the room. In winter, however, movement of the air is not so easily detected.

Look to see if there is a ventilating system of some kind. If there is some central system run by motor and fans, see if it really *works*. There are various ways in which to determine the effectiveness of a system. If there is a register near the ceiling where air is being drawn from the room, hold a very thin strip of tissue paper before the register. If the system is functioning properly the paper will be drawn into the opening of the register. Another method of determining air movement is to close the room tight and hold a lighted match at the crack under the door. If the motion is right, the flame of the match will be extinguished immediately. Note carefully the effectiveness of systems which are supposed to force air into and, at the same time, draw air out of a room or building.

Is the air in the room of the proper temperature? The required temperature of a room depends upon the kind of work which is being done. The range of temperature should be from 60 F. to 72 F. The temperature of the air in the offices should be within the range of 65 F. to 70 F. In wash, dressing, and locker rooms during working hours, 60 to 70 F.; and in toilet rooms 55 to 69 F. In rooms where hard manual labor is done the temperature, of course, should be much lower than that of an office where the work is sedentary. In order that the temperature may be kept as nearly right as possible, and that the employees may be kept interested in having a temperature which is neither too low nor too high, see that thermometers are placed at a convenient height at various places about the plant. Be sure to find thermometers which register correct temperatures. Those which do not should be discarded. The relative humidity of the air must not exceed 65 per cent, except when outside weather conditions prevent or when there is a special reason due to work in the room. If there are fumes resulting from any cause, special ventilating systems should be installed.

Illumination

As you pass through the plant do you find it difficult to see? Is there enough light, natural or artificial, to enable the employees to work without eye strain? This may be determined by the use of the valuable instrument, the foot candlemeter, which will register illumination intensity in foot candles. With the use of this instrument and a standard table showing the exact candle power required for the various kinds of work an accurate check can be made. Then, note the distribution of light on the work. Are the shades on the employees' lamps at the right angle? If this desk were turned another way would the shadow across this man's paper be better illuminated? If that reflector were turned at a slightly different angle should the glare on that glazed paper be removed? All the various conditions should be noted, and in order to see these things the inspector must be busy every second with active eye and brain.

Exhaust Systems

There are many operations in industries which generate various kinds of dusts, gases, fumes and vapors. These dusts, gases, fumes and vapors cause, directly or indirectly, many occupational diseases. Note if there is an exhaust system. If there is one does it function properly?

Toilets

Toilets need special consideration because they are too often sadly neglected. Before making your direct inspection here make sure to ascertain the number of men and the number of women in each department or on each floor. The number of toilets necessary for each sex can be determined readily by referring to a building or industrial code.

The ratio of the number of toilets to the number of people varies from 1 to 15 to 1 to 25. In your inspection of the toilets note carefully the cleanliness, the ventilation, the lighting and the temperature. Toilets should be cleaned every day. Ventilation should be adequate without producing drafts. Natural ventilation by the use of windows which open to the out door air should be used wherever possible. If such ventilation is not available, then ascertain if there is an adequate exhaust system working. Natural lighting by window or skylight is advisable, but adequate artificial lighting should be available whenever needed. The temperature during cold months should never be below 50 degrees.

Cuspidors

Note the amount of promiscuous spitting, for herein lies the danger of expectoration. After it dries on the floor, walls, or equipment, it is potentially dangerous because it can be converted into dust which in turn can easily be carried to an innocent host. Take particular notice of all dark and dirty corners. Remember that any place that is not sanitary invites spitting.

Not only should cuspidors be conveniently placed but there should be a sufficient number. This number depends mainly upon the number of expectorating employees.

These cuspidors should be cleaned every day. Whether or not this is done can be readily learned from the employees. The degree of fullness of the cuspidors is a good index as well. Note if the cuspidors contain water. The use of a germicide in the water is optional.

Wash Rooms

As you enter the washroom does it impress you as being clean or dirty? Are there paper towels strewn over the floors? Is there water running or standing on the floor? Are the windows clean? These questions are important; however, there are other things to be noted.

First, is there a sufficient number of wash basins? This should be determined by the number of employees using the basins in question and by the type of work performed. One basin to 25 people may be sufficient in some cases, but in industries where food is prepared or manufactured, or in glue factories, foundries, machine shops and other industries where the employees become greasy or dirty, one wash basin to every five employees is recommended. The basins of every washroom should be cleaned immediately after use. A large trough without stopper, where each person washes in running water from an individual faucet is considered better than individual basins or towels. In connection with the above not if individual towels are used. How do the conditions check up with the requirements of the state code?

Has the washroom both hot and cold running water? It should have Are there enough shower baths for the men? These men, coming hot and perspiring from their work, should be provided with the facilities

for a hot shower followed by a cold rinse to close the pores of their skin and thus prevent their taking cold. Is there enough light in this room?

The floor of the washroom should be of a smooth surface which is not porous in the slightest degree. This is necessary that the water may not sink into the floor to become stagnant and unsanitary.

Dressing Rooms, Rest Rooms, and Locker Rooms

In order that the employees can give attention to personal hygiene there should be dressing rooms, rest rooms, and locker rooms. While inspecting, these should be looked for and notations made regarding their size, proper lighting, ventilation and the temperature. Cleanliness is very essential here so that they should meet the strict requirements of any sanitary code.

Restaurants

Carefully inspect the restaurant maintained for the employees. At all times this restaurant should be run under the most sanitary conditions. Each person who cooks, serves, or handles food or utensils in any way, should be given a thorough examination every three or four months. Inquire if this is being done. If possible, inspect the restaurant when dishes are being washed. Note whether or not each dish is sterilized in scalding water or steam. Send a sample of the milk used, preferably to the health department, to be tested.

Flies are a known menace to health; note whether or not they are excluded by proper precautions.

In order to get a thorough report on the food conditions notify your local or state health department to have an investigation conducted by one of their food inspectors.

Do these things:

1—Acquaint yourself as thoroughly as possible with the fundamental standard sanitary requirements.

2—Know your plant.

3—Seek expert advice whenever necessary.

PHYSIOTHERAPY AND PHYSIOTHERAPEUTIC RECONSTRUCTION

A. J. Pacini, M. D., Chicago, Ill.

We owe our origin and upkeep to the energy of the sun. The study of how we originated from, and how we are maintained by, the sun's energy is the subject matter of physiology. The study of the purposeful application of the sun's energy to the alleviation of disease and to the reconstruction of the maimed human organism, is the subject of physiotherapy.

The sun is a huge broadcasting station sending out a variety of wave-lengths. These wave-lengths may be grouped into three categories, depending upon their measure. Wave-lengths longer than 8,000 Angstrom units are sensed as heat; wave-lengths between 8,000 and 4,000 Angstrom units are sensed as light; and wave-lengths shorter than 4,000 Angstrom units are sensed as ultra violet radiation. Heat, light and ultra violet, then, are constantly broadcasted from the sun.

As far back as it is possible for us to trace, we find evidence that points to a significant fact; that all our animal and vegetable evolution owes its origin and progression to the environmental energies of heat, light and ultra violet. It is not surprising if we are able to discern physiological mechanisms in the human body that indicate most certainly our indebtedness to this natural environment.

Think of the significance of heat and its importance to the organism. Without heat there could be no life. The savage froze under the chilling icyness of the cold age as he stood upon a ground that carried tons of stored-up heat in the form of coal; and, yet, for lack of understanding, the warmth dissipated from his body, and as it fled it carried with it the energy of life, the body remaining cold in death. Our very warm-bloodedness, therefore, is definitely a characteristic that helps to distinguish life from death, activity from inactivity, and signifies clearly our inheritance from the heat of the environment.

There is much to be learned, also, from the behavior of the moth towards a flame. The moth represents a structure common to most, if not all, animals—a structure of bisymmetry. On each side of an axial line there are distributed bisymmetrical muscles that carry the organs of locomotion. When the moth comes into the field of light—activity radiated from the flame, one set of muscles slackens or relaxes, the other set tightens or contracts; so that now, although the same locomotive power is supplied to each wing, the resulting excursion performed by the wings is unequal, and the moth begins to encircle the flame. But as the circle is begun, the light influence becomes greater; and as the light influences becomes greater the moth's orbit becomes less, until, finally, it reaches the flame, singes its wings, and falls to its destruction—a slave to light. We are all slaves to light. We all seek light in preference to darkness. We all associate instinctively cheerfulness and health with light, and depression and disease with darkness. And we have a specialized portion of our body sensitive particularly to light, the retina of the eye, another relic of our indebtedness to the natural environment.

Only recently, the ultra violet portion of the sunshine has been correctly appraised. This chemically active, invisible radiation, enters into the body and into foodstuffs. Like Baldwin's phosphorus, it glows for hours after a few seconds of exposure; and with this glow, a revitalization of the body is clearly manifest. Steenbock, at the University of Wisconsin, seems to have proved that the sunlighted body

truly radiates good health. It is this same ultra violet light that attends to the calcium metabolism of the body, I think mainly through the sympathetic nervous system, and that is therefore responsible for the cure of many conditions, particularly fractures, bone diseases, and even such apparently unrelated diseases as hay fever, bronchial asthma, rickets, infantile tetany and a score of similar abnormalities.

Heat, light and ultra violet, therefore, furnished naturally by the sun, form the triad of radiations that are constantly broadcasted throughout the universe; and when they reach our little earth, and strike our receptive bodies, they find a number of physiological adjustments ready to "tune in" on the necessary wave-length. Some receiving stations can "tune in" to heat; others, to light; and still others, to ultra violet. Once "tuned in", the messages are quickly conveyed along the nervous branches that scatter and disperse so as to reach every cell in the body, and in this fashion, even the tiniest and most hidden recess of the human body is influenced by the wavelengths.

How poetical, yet truly expressive, are the meaningful words of Vignard who said that "the skin of the body is a vast key board, like that of a piano, upon which the fingers of the environmental overseer constantly strikes chords that ring a blending harmony of health in our organism".

We have seen, in a most superficial way, how modern physiology considers man as a physical entity, living in a world of physical objects, and subject to the same laws and influences that govern the physical and chemical course of all events. What, then, is physiotherapy?

Adaptation to Industrial Clinic

Physiotherapy is derived from two Greek words, physio and therapy which together mean the treatment of disease by the use of natura agents. In its newest form, in which it has emerged as a produc from the cauldron of the World War, physiotherapy means the treat ment of disease by the use of electrically generated heat, light or ultr violet.

Heat is derived from the use of high frequency currents—a metho called diathermy, or "heating through". When a part of the body, a for example a joint, is "heated through", certain important physiolo ical effects are produced. The nerves are quieted, so that pain is re lieved; tense muscles under strain become normally pliable; the bloo vessels and lymph vessels fill and produce a hyperemia. It is th hyperemia, always produced naturally by the body in the case of i fection and many diseases, that high frequency currents bring on almost any desired amount; and in so doing, promote a rapid healir in every way similar to the natural manner in which the body a tempts healing its injured parts unaided.

Heat, therefore, in the form of diathermy, is speedily effective in the treatment of joint and muscular disorders. Sprains, strains, injuries and many joint diseases are promptly benefitted, as are also wry necks, lumbago, myalgias and similar muscular conditions. The pain and discomfort attending neuralgias is oftentimes quickly relieved by heat applied in this form.

Light, used as phototherapy and obtained from an incandescent 1500 watt tungsten filament bulb, is chiefly sedating in its effect. It dispels pain in very short order. A curious observation has been recorded by Carl Sonne in connection with light. Sonne appears to have found that when heat is accompanied by white light, the penetration of the combined radiations into the tissues is much increased over what would be the case if either heat (invisible) or light were used alone. In the clinic, this seems to hold true; for it is certain that the phototherapy lamp (combined heat and light) furnishes better and earlier results than any form of "infra-red" generator, such as electric heating pads and many variations of this device, can furnish. At any rate, pain is the great indication for the use of phototherapy, for which symptom phototherapy offers much relief.

But it is ultra violet radiation that impels the attention of the industrial clinician, mainly through the unique capacity that this strange radiation has in influencing calcium metabolism.

Ultra Violet Radiation and Calcium Metabolism

It is commonly known that ultra violet radiation, striking the skin surface, induces in the body a rise in the calcium intake and assimilation.

The exact region of the ultra violet spectrum responsible for calcium metabolism was isolated by Pacini and separately by Hess. It includes the wave lengths between 3022 Angstrom units and shorter.

How the ultra violet radiation affects calcium metabolism has not been satisfactorily explained; but there is much evidence in favor of the sympathetic nerve stimulation theory. Briefly, the theory advanced is this: that every cell in the body has its nutritive functions presided over by two sets of nerve supply: First, a sympathetic nerve supply; second, a parasympathetic nerve supply.

Stimulation of the sympathetic nerve supply so changes the osmotic tension of the cell as to make the cytoplasm take in calcium from the surrounding fluids, and give up potassium.

Stimulation of the parasympathetic nerve supply so changes the osmotic tension of the cell as to make the cytoplasm take in potassium from the surrounding fluids, and give up calcium.

It happens that the parasympathetic system arises from the midbrain and from the sacral regions of the central nervous system; and that the sympathetic system arises from the cervical, thoracic and lumbar segments of the spinal cord. But, in the cases of the sympathetic

nervous system, the filaments end on the skin surface, forming the pilomotor and pilosensory terminations. These terminals give rise to the zones of hyperesthesia so adequately described and investigated by Head, and useful in the diagnosis of visceral painful symptoms.

Briefly, then, the calcium metabolism stimulating system (sympathetic) comes to the skin surface; while the potassium stimulating system (parasympathetic) remains imbedded in the mid-brain and in the sacrum, out of reach of external stimuli.

Therefore, when the little penetrating ultra violet radiation strikes the skin, the energy selectively stimulates the sympathetic to the exclusion of the parasympathetic nervous system, and this results in an increased metabolism of calcium.

Not all externally applied stimuli can bring about this sympathetic nervous system response; and it seems quite clear, though it is premature to announce the belief before the conclusion of some biophysical research now under my direction, that the selectivity of action may have something to do with the susceptibility of the corpuscles of Pacini to ultra violet influence. Just as these same corpuscles are known to respond to thermal influence.

To begin with, the control of calcium metabolism is, in a large measure, an efficient way of preventing the intoxication of the body by certain poisonous substances. There is strong evidence that the sympathetic nervous system is involved in the acute attack of infections. The reaction following an injection of vaccine is in the main a sympathetic nervous system response, and is similar in many details to the onset of an acute illness. Also, in chronic infections, the same causes are at work, only in less degree, and chronicity in disease can be interpreted, in one sense, as a failure to re-establish a normal equilibrium between sympathetic and para-sympathetic nerve system balance.

Dr. Tisdall's Discovery

Working at the University of Toronto, Tisdall and his co-workers made certain fundamental discoveries. They observed that during the period of growth when the epiphyses become united to their regional bone, the blood serum is found to contain much calcium and phosphorus as compared to the quantity present in later life. For instance, in the early years of child life, the phosphorus reaches about 6 milligrams per hundred cubic centimeters of serum. This quantity drops year by year until at 26 years the low level of 2 or 2½ milligrams obtains; and from 26 years onward, the same amount is practically always found. At the 26th year all the epiphyses have usually united; and there is, therefore, only a minimum need for surplus phosphorus.

Tisdall then discovered that in a patient with a fractured bone induced by violence, the calcium and phosphorus content of the blood rises rapidly. This natural rising is a response, occurring naturally

to the increased demand placed upon the body for more calcium and phosphorus to assist in the healing of the broken bone.

Now, there are many occasions when something interferes with the rise of calcium and phosphorus in the blood following a fracture, and, consequently, the union of the fragments is delayed. By using ultra violet radiation, however, the calcium deficiency is overcome, and the healing proceeds as usual. It is impossible to estimate the great good that ultra violet radiation has accomplished in the industrial clinic alone in the case of fractures.

Recent studies appear to prove that many conditions, apparently unrelated, are associated with calcium deficiency in the body. Hay fever, bronchial asthma, ulcers, rickets, tetany in children are among the many. And in all of these conditions, leading American and European physicians have found ultra violet radiation to be often curative.

Physiotherapy and Physiotherapeutic Rehabilitation

We have seen the modern connotation of the word physiotherapy,—to treat with natural agents. We have seen the obvious relation that obtains between some of these natural environmental forces and nature's product,—man. It is clearly fitting that modern therapy should appeal more and more to the scientifically evaluated energies in its effort to correct the aberrancies of a natural organism, and to discard the ridiculous fetishes that have been handed down by tradition and mysticism of former dark ages represented in the use of such absurd drugs as the various bugworts.

Scientific surgery is necessary. Scientific medicine is necessary. Physiotherapy is a corollary to scientific surgery and medicine in that it fosters the spirit of evaluating the phenomena of diseased conditions occurring in the human body in terms of science; and then, when correction is possible, it appeals to surgery and to medicine, and when readjustment or re-equilibriation is needed, both surgery and medicine appeal to their newest and most scientific branch of treatment,—physiotherapy.

Physiotherapy is not a separate cult. By no means. It is a branch of medicine and a branch of surgery. But it takes the common sense view that a man is a physical object, living in a world of physical objects and therefore subject to the thermal, luminous and chemical forces that comprise the physical environment. The natural function of these forces, operating upon healthy man, is revealed in physiology. The purposeful function of these forces, synthetically prepared for the clinic and used upon man who is "out of tune with the infinite", is revealed in physiotherapy.

DISCUSSION

DR. O. P. GEIER (Cincinnati Milling Machine Company): Inasmuch as I happen to have been honored with the first chairmanship of this

section nine years ago, perhaps I may be pardoned for taking some special pleasure in the very splendid presentations that have been made here this afternoon before you industrialists.

It seems to me that it marks a tremendous progress in industry that we can have a group of men like this listen to these professional or semi-professional papers so attentively. It marks progress because you are ready to listen to the economics of health; it means that industry is beginning to appreciate the great value of the health of the worker and the need for cutting out this enormous waste in industry which is yet to be recovered because practically nothing has been done.

I made one or two notes to which I should like to refer just for a moment. Doctors heretofore have made slow progress on the matter of health teaching because they have been talking to themselves. It is when bodies like this carry the work back to the men who are on the firing line of life, who after all control the destinies of the great group of laboring men in this country who need this teaching most, that we can hope to make the best progress.

Dr. Colcord referred to the matter of the value of health habits. How can we better inculcate those except by making them a part of the workaday life? Then your man in his best working hours is in his best receptivity, he evaluates that because he sees the great industrial structure as added to his working program. I think we cannot stress that too much.

Better health, I believe, is the foundation of better relations. We have had an enormous discussion of the question of how to introduce better relations. I believe fundamentally the matter must begin with the consideration of better health.

Fatigue, so splendidly referred to by Mrs. Gilbreth, (and no one knows better than we what contributions Mr. and Mrs. Gilbreth have made) is still in its embryonic stage as considered by the industrialists. We must as physicians bring home to industry that tremendous fatigue that comes from ill health, mental and physical. That is, I believe, still the greatest factor in the matter of fatigue in industry and far outweighs the fatigues that we hear most of, those of posture, repetitive jobs, and so on.

Health personal pride, it seems to me, is the basis of something toward which we are striving as good citizens, and, that is to inculcate in the average American a love of his home city and a love of his government. I don't know how you can better make a man appreciate his community, his job and his government except by first making him appreciate himself; get him to have a self-respect for his body, and that seems to me must be the beginning of good healthful thinking about his government and his relationship to industry.

Dissipated Energy in Plant Medical Work

This morning in another section, I heard an industrialist troubled with the problem of how the small plant can introduce medical service. Later he related he had about 500 employees, two nurses on the job scattered in two plants within a mile of each other, a doctor on part time, one hour a day, and that in addition to that he had recently intro-

duced life extension work. The cost of that was borne half and half by the company and by the workmen. If you analyze that man's budget for a minute, he invested some $2,500 in two nurses, no doubt at least $1,500 in the part-time doctor; the life extension work was costing him $2,500, and so he had a total expenditure of $6,500, and I think he was getting about twenty per cent on the dollar in return for his work, because he had dissipated energy, whereas one physician of the type that you have been listening to this afternoon would have done all that work and far more and would have brought to industry a better relation, a real contact, numberless contacts every day that would have meant quite a larger return than the mere matter of health.

May I criticize Dr. Colcord, because he asked for criticism, after having appreciated the splendid paper that he has given us, for two expressions which I wish he might expunge forever from his vocabulary, and those are "welfare nurse" and "company surgeon." I wish he might wipe those two terms out because any one who uses the term "welfare" in industry today immediately destroys at least fifty per cent of his investment, no matter how he uses it or what it covers. "Company surgeon" should also be dropped from our discussions, because it does not give the worker nor the management a proper appreciation of the job of the physician who is in charge. After all, the type of work you have been hearing discussed today is a medical man's job, not a surgeon's job. It is a psychologist's job, the job of a man who is analyzing these human problems, a man with a good social background, a man with good economics of medicine and relations in industry. It seems to me we might make progress if we should do that.

I can't help but refer once more to the actual dollars and cents value of inculcating in the worker the habits of health and self-respect for his body.

Cleanliness of the plant is the obligation of the industry, and the man automatically comes to be a part of that clean system.

Only recently the company with which I am associated spent probably $14,000 or more in repainting the plant. I was very much struck by what one of the older workers said to me when he came by. He said, "Doc, can't we have an inspection day for our families pretty soon and show off this place the way we would like to?" That man had a feeling of possession; he took an interest, a pride in that place because of its cleanliness. If we as industrialists can get that idea across, I think we have made great progress.

REPORT OF NOMINATING COMMITTEE

DR. LOYAL SHOUDY (Bethlehem Steel Company): Your nominating committee reports that the officers of this section continue for the next year, namely, as chairman, Dr. C. F. N. Schram, of the Fairbanks-Morse Company, Beloit, Wis., and Dr. C. L. Ferguson, Selby Shoe Company, Portsmouth, Ohio, as secretary. (The report was adopted by unanimous vote.)

ADJOURNMENT.

Ice and Refrigeration Sectio

October 2, 1924

F. P. WALKER, Chairman
General Necessities Corporation, Detroit, Mich.

O. F. WILKINSON, Vice-Chairman
City Ice and Fuel Company, Cleveland, Ohio

BRUCE DODSON, Secretary
Casualty Reciprocal Exchange, Kansas City, Mo.

CHAIRMAN WALKER: One of the first things that we have to this morning is appoint a nominating committee. I am going appoint Mr. W. G. Stuck as chairman of that committee. And w Mr. Stuck, on the committee, I will appoint Mr. A. H. Wiedenmann the Casualty Reciprocal Exchange, Kansas City, Missouri, and Mr. W. Jacobs of the Steubenville Ice Company.

Most of you will have seen the bulletins that have been publis every month in the *National Safety News.*

One of the very essential activities of the section naturally is preparing of these bulletins. Mr. Chiles has been very energeti working up material for these bulletins and I believe has succeede getting bulletins second to none published. I am sorry that he is here, because I think he should know how much we appreciate efforts along this line.

The bulletin is one of the essential things in safety work, the not any question about it, and it is also the committee's opinion the most effective bulletins are bulletins produced from photogr covering the actual hazards attempted to be described. We hav tempted to do that, and with one exception, I believe, we have up all the bulletins from actual photographs, and there are still more in preparation.

I am not going to make any report as chairman of the sectio cept to say that the section shows a reasonably healthy growth to me very disappointing. It has probably increased in percenta fast as the other sections of the National Safety Council, but whe consider the potentials it is very disappointing. Now, what the re

are I really do not know, unless we have to admit that taking hold of safety in the ice industry is the same as getting the modern methods was 15 or 20 years ago. The ice man seems to be an overly conservative fellow, and does not like to take hold of new things without forcing it on him. If he does not wake up to the fact he is going to be left behind, particularly on the delivery end, and if he does not take hold of it, it is going to be forced on him.

I do think that the manufacturing end of the ice industry and refrigerating industry is fairly well covered from a safety standpoint. I think the manufacturers themselves, manufacturing this machinery are taking good care of that. However, when we come to the delivery end, I am sorry to say you find large members of the ice industry operating fleets of vehicles on the streets with one or two outstanding exceptions. They do not show any interest in safety on the streets, and that really touches their pocketbooks. We are still living in hopes. The National Safety Council did not get very far the first year or two, but after all, I believe in all the large movements in the world today the Safety Movement has made greater progress in the short time in which it has been organized than any other movement in the history of the world.

PLANT HAZARDS IN THE ICE AND REFRIGERATION INDUSTRY

Harvey T. Brock, General Attorney, Casualty Reciprocal Exchange, Kansas City, Mo.

That part which no doubt enters our minds most forcibly when we mention employer's negligence is defective equipment. Why? Because injuries which result from accidents caused by defective equipment are usually of a very serious nature. For instance, when a boiler or ammonia drum explodes, due to a leakage or defect in the container, everyone within a radius of 100 yards is killed or severely injured. He may be affected by flying particles, the shock caused by the concussion, or suffer ill effects from burns or fumes after an ammonia drum has exploded. When an employee comes in contact with an unprotected electrical wire the result is a severe shock or burn and oftentimes death. An elevator which is not properly guarded and an injury results from an accident at, on or near the elevator, one immediately pictures an unfortunate victim as having been crushed between the elevator and the floor of the building or having fallen to the bottom of the shaft, causing at least a broken arm or leg. It is unnecessary for me to mention to you gentlemen any of the countless number of accidents and the resultant damages which may be caused by loose nuts and improperly fitted bolts in your working machinery because that is one of the primary thoughts instilled in the minds of everyone having

dealings with running machinery and is constantly before him because nuts work loose much more often than a defect appears in a boiler, ammonia drum or electrical wiring.

Because of the seriousness of the injuries which result from accidents caused by the defective equipment just referred to, this thought should be brought most forcibly to our minds when we think of plant hazards, but I wonder how many of us actually see that there are no such defects in our plant. If you have any of these defects in your equipment you are negligent and thoughtless and when an elevator cable breaks, such as one did in the plant of the Henry Henke Artesian Ice & Refrigerating Company, Houston, Texas, and killed two men and permanently injured a third, you are as guilty of manslaughter as if you had recklessly run over a boy while driving your automobile. Accidents caused by defective equipment can be eliminated and if the employer does not remove the cause by proper equipment and proper safeguards, he is negligent, careless or indifferent, not only towards the welfare of his employe, but towards his own pecuniary business and selfish interests.

I have tried to lay stress on the necessity of proper equipment because of the seriousness of accidents which result therefrom, but I want to point out more forcibly, if that is possible, what I consider and what statistics show to be the cause of more accidents and ultimately more loss to the ice manufacturer than any other one thing. That is the lack of what safety men call *good housekeeping*. According to an analysis recently made at our office, we found that out of some 60,000 accidents, 26.5 per cent of them were caused from slipping or tripping. I suppose it is a matter of common knowledge that wet floors or foreign objects on the floor are the principal causes for one to slip or trip and fall. I realize that it is difficult to keep the floors in an ice plant dry but is it so terribly difficult to keep broken pieces of ice off the floor before they are permitted to melt or before some one steps on them and turns his ankle or falls and breaks an arm? It is not better to spend $10.00 or $15.00 for a rough rubber stair mat than to pay possibly $5,000.00 under the workmen's compensation law for a total permanent disability of an employee who fell and fractured his spine? The man who suffered a fractured spine when he slipped and fell on wet, slick steps is only one of the many accidents which may occur, but the others are of only a comparatively slight nature. Please ask yourself the question, "Do we keep the floors, docks, runways and stairs in our plant as dry and clean as possible?"

Protruding Objects

There are other things such as protruding objects which cause the employee to injure himself. Lose boards in the floor will cause a man to fall; nuts and bolts extending past the proper line, with which an

I could give you countless illustrations showing bad results on account of hiring the first man who applies for a job, but I won't take any more of your time that way. The point I want to bring about is, that every man should be thoroughly examined by a physician before he is hired. Such an examination will be made by your doctor for not more than $1.00 for each examination. Think of the dollars saved to your company and the suffering saved the individual because you did not put him to work at a job that he was not physically fit to do.

Employee's Negligence

I have been discussing what I consider a very important subject and which vitally concerns you in your executive positions, but the saddest and most difficult task is to eliminate the employe's negligence. You men are big enough to see whether you have been negligent and if you have you will admit it and take every possible step to better the condition of your plant due to your own short comings. How are we going to teach the plant employee to think?

First let us consider the tangible signs which indicate that the employee is not thinking about the welfare of his employer and therefore necessarily not thinking of his own welfare. An employe who has nothing to do directly with the boiler notices steam escaping in a very small place, but he never mentions it to the engineer or his foreman. He sees a loose board in the floor or some nails sticking up but he doesn't get a hammer and fix it or call it to the attention of his superior. It is a habit of energetic men in this age of ours, to want to finish a job that has to be done as quickly as possible. On account of this urgent desire, we hurry and extend every nerve in our bodies to accomplish that result. We never stop to think of the dangers that could be avoided if we took just a little more time. One day as I was going into Chicago on a car on the elevated railroad; the car stopped at a station and there was a car in front of the one I was on. The people began to hurry off the car I was on to get on the car ahead. A little Jap who had been over here for only a short time said to a nearby passenger, "Why are the people getting off this car onto the car ahead?" The other passenger said, "That car arrives at the loop three minutes before this one." The Jap said, "What will they do with the three minutes?" So in the ice business and in most other businesses, the men hurry unnecesarily and have nothing to do with the few minutes saved except smoke a cigarette or sit around and usually indulge in scuffling or horse-play.

Another very common cause of injuries to men who handle ice is through the use of ice picks and tongs. I have heard many ice manufacturers say that it is impossible to convince the men to use shields for their picks. It may be difficult to get men to use pick shields, but

I could give you countless illustrations showing bad results on account of hiring the first man who applies for a job, but I won't take any more of your time that way. The point I want to bring about is, that every man should be thoroughly examined by a physician before he is hired. Such an examination will be made by your doctor for not more than $1.00 for each examination. Think of the dollars saved to your company and the suffering saved the individual because you did not put him to work at a job that he was not physically fit to do.

Employee's Negligence

I have been discussing what I consider a very important subject and which vitally concerns you in your executive positions, but the saddest and most difficult task is to eliminate the employe's negligence. You men are big enough to see whether you have been negligent and if you have you will admit it and take every possible step to better the condition of your plant due to your own short comings. How are we going to teach the plant employee to think?

First let us consider the tangible signs which indicate that the employee is not thinking about the welfare of his employer and therefore necessarily not thinking of his own welfare. An employe who has nothing to do directly with the boiler notices steam escaping in a very small place, but he never mentions it to the engineer or his foreman. He sees a loose board in the floor or some nails sticking up but he doesn't get a hammer and fix it or call it to the attention of his superior. It is a habit of energetic men in this age of ours, to want to finish a job that has to be done as quickly as possible. On account of this urgent desire, we hurry and extend every nerve in our bodies to accomplish that result. We never stop to think of the dangers that could be avoided if we took just a little more time. One day as I was going into Chicago on a car on the elevated railroad the car stopped at a station and there was a car in front of the one I was on. The people began to hurry off the car I was on to get on the car ahead. A little Jap who had been over here for only a short time said to a nearby passenger, "Why are the people getting off this car onto the car ahead?" The other passenger said, "That car arrives in the loop three minutes before this one." The Jap said, "What will they do with the three minutes?" So in the ice business and in many other businesses, the men hurry unnecesarily and have nothing to do with the few minutes saved except smoke a cigarette or sit around and usually indulge in scuffling or horse-play.

Another very common cause of injuries to men who handle ice through the use of ice picks and tongs. I have heard many ice manufacturers say that it is impossible to convince the men to use shields for their picks. It may be difficult to get men to use pick shields, b

it is not impossible as we will discuss later. The ice pick injury, as we call it, is one of the most treacherous injuries with which we have to contend. In the majority of cases the employee considers such an injury of so little consequence that he either does not report it immediately or in any event, he does not go to a doctor for treatment immediately. Within a few days his hand begins to swell and before he realizes it a virulent streptococcic infection has developed and by the time he can consult a doctor, the infection has become so violent that the doctor has a difficult task to save the member and often times the employee's life. During the summer of 1923, the Crystal Ice & Cold Storage Company, Bartelsville, Oklahoma reported eight cases of streptococcio infection resulting from pick wounds in less than a month. Therefore, it behooves us to convince the men using ice picks to use shields and every other precaution to prevent wounds from ice picks.

When we refer to injuries resulting from the use of ice tongs, we at once think of cuts or incisions caused by the points of the tongs and those injuries should be guarded against just as religiously as the injuries resulting from ice picks. One of the most common causes of injuries through the use of ice tongs, however, is on account of the employe's failure to fasten the tongs securely in the piece of ice he is about to handle. The employe hurriedly and carelessly virtually throws his tongs at a piece of ice and if the tongs catch the ice securely, all is well, but if the tongs catch on the edge and a piece of ice chips off or the tongs slip, the piece of ice may fall on his foot resulting in a severe bruise, contusion or a fractured bone. There is also often the case where the man loses his balance and falls, either with the cake of ice on top of him or he may fall in such a way as to receive a severe injury inflicted by the tongs. The employe is also careless about throwing pieces of ice on the floor on which he is working, thereby making a place which is likely to cause him to slip or cause a fellow employe to have an accident. How many times, also, have we noticed a man pulling a 300 pound cake of ice while he is walking backwards or carrying a 100 pound block of ice on his back and talking to a fellow employe or looking in the opposite direction from which he is going?

Eighty-five per cent of the accidents that are reported are caused by the negligence of the party injured and this alone will indicate what a wonderful result could be accomplished if there was some way to cause the employes to *think*.

Suggestions For Elimination of Plant Hazards

I have been discussing quite at length the causes of accidents in the ice and refrigerating plant. Now that we think we know the cause of the most of the accidents, the next and most difficult task

is to remove the cause. Men in the field of safety work have been striving to do away with the cause of the accidents ever since the inception of the Safety Movement, just as medical and surgical men have been trying to remove the cause of so many dreaded diseases. I dare say that the safety men have been about as successful in their task as the medical men have in theirs, comparatively speaking.

In the first place, we should have proper and regular inspections of the plant by one who has made the work a study. When the inspector has gone through the plant and has called your attention to the defects in your machinery and equipment, see that those defects are removed immediately. Do not wait until you think you have time. Take time to do it now, because some poor man's life and the livelihood of his family may be hinging on the seriousness with which you take the inspector's recommendations.

I am a great believer in safety meetings; not with the idea of simply calling the men together and asking them to listen to a dry lecture on safety standards and quoting of statistics, but with the idea of bringing a closer relationship between the employer and employe. All of us by nature are selfish and egotistical to a certain extent. The average American today is saturated with the love of chance and competition. We all love to gamble; some of us don't gamble as much as we would like, because we can't afford to lose, but nevertheless the desire is there just the same. So why not offer small prizes, either in the way of bonuses or a day off from work for every one who goes for a certain length of time without having had an accident. In other words create competition and reward the victor in some way which will appeal to his selfish instincts. You say the offering of prizes has been tried without a favorable result. While we have many men who like to try for prizes, there may be just as many who are still indifferent and continue to have or cause accidents. This fact is to be recognized, regrettably, and in such instances we must "apply the rod or spoil the child". We must create a penalty for all men who have or are to blame for accidents. The penalty may be slight for the first offense, a little more severe for the second and so on. But we must have a limit and when a man has a certain number of accidents within a set period, his services should be dispensed with. You say he is one of our best and most valuable men. No he isn't. He may know how to manufacture ice and handle it more quickly than anyone else, but he is eating up your profits in doctors' bills and lost time on account of accidents. He is demoralizing your whole concern by the influence he has on the other men. After you discharge one or two men because of their failure to observe safety standards or have too many accidents, you will see the desired effect on the other men because they realize that you mean business.

Plant posters have proved to be beneficial in a great many instances but this phase of safety work must be given consideration and handled

properly. It does very little good to post a bulletin in an ice plant showing an injury to a man as a result of working on a bread mixing machine. A poster should not be left up too long because it becomes almost an eye sore to the men or at least it loses its affectiveness. Posters should therefore, be appropriate, posted in places where the men will necessarily see them while at work and they should be changed frequently.

In spite of everything we do to prevent accidents, accidents will occur and the employe will be slightly or severely injured. Our task then is to remedy the situation in the best possible way. We must get the man well and back to work as quickly and economically as possible. I am not much of an advocate of first aid given in the plant unless it is given in the proper way. We have had cases where a man would be injured by a particle of steel or dirt lodging in his eye. The first thing the injured thinks of is getting the particle out. He will either take a dirty, greasy handkerchief out of his pocket and begin to wipe his eye in an effort to dislodge the foreign particle, or he may call on Bill to take it out. Bill, with his trusty pocket knife that he has been using for scraping the grease off the engine will take the injured to the light and begin his delicate task with his knife and dirty thumb. If he extracts the particle without cutting the cornea and resulting in an infection, he has performed a miraculous feat. Such first aid treatment in most instances results in an infection, however, and the injured is necessarily compelled to suffer untold agonies and possibly lose the sight of the eye. First aid treatment if given by a trained nurse and bandages applied that are sterile and antiseptic are very helpful and will in many instances enable the employe to continue his work without any ill results. If the plant is not equipped with an up-to-date first aid room, the injured should be sent to a first class physician or surgeon immediately. If the injured is unable to go to a doctor, have the doctor visit him at the plant or call an ambulance to send the injured to a hospital.

Minor Injuries

We have little trouble on account of major injuries so far as immediate medical attention is concerned, but the cases that cause the most grief ultimately are the cases which seem to be minor and of little consequence. If a man pricks his hand on an ice pick or scrapes the skin off, he will pay no attention to it and in many cases he will not report it to his employer. Severe infection cases seldom result from major injuries because infection is guarded against by the doctor handling the case. Minor injuries result in infection because nothing is done to prevent them until it is often times too late.

I do not believe too much stress can be laid on the fact that only the best physicians and surgeons should render services to the injured employe. A great many incompetent doctors have entered the field of

Industrial Surgery and render services for a smaller amount per visit than the good surgeon can afford to charge. For this reason alone they appeal to a great many employers and insurance carriers. Our institution was no different from the other insurance carriers in this respect for a short time but we, after making a careful study of the situation, found that the best was the cheapest in the long run. A few moments ago I spoke of getting the man back to work as quickly and economically as possible. In practically all the states which have a Workmen's Compensation Law there is a maximum allowed for medical to each injured employe. We have found that the maximum figure allowed by the Law is oftentimes not sufficient to give the employe proper medical attention. In each case, therefore, we weigh the situation and if we believe that by giving the injured an operation which will cost more than allowed by the Law, but will enable him to return to work relatively sooner so that we will save money in compensation sufficient to equal or exceed the increased medical expense, we authorize the additional medical services. In this way we are not only saving money in the ultimate but we have done a good deed for humanity by making the man well sooner, and relieve him of his suffering.

DEVELOPMENT OF DOMESTIC ICE MACHINES AND RELATIVE HAZARDS OF REFRIGERANT GASES USED

E. J. Copeland, Copeland Products Company, Flint, Mich.

Mechanical refrigeration has been used successfully in the commercial fields a great number of years. The possibilities of a machine which could be adapted to household refrigeration, have always been tempting to inventors and manufacturers; consequently, hundreds of machines have been designed but only a limited quantity produced. The development of the manufacture of this type of equipment has been slow due to the exorbitant service and upkeep costs after installation. The unusually high cost of service affected not only the operating costs of the machine but also the manufacturer's cost of production; consequently, this type of appliance has been somewhat beyond the reach of the average householder until the last year or so. On account of the amount of progress made in that period, manufacturers have been able to lower the selling prices of their machines, and I believe that now any household with an income of more thar $3,000.00 per year in a large center, can afford to purchase and main tain one of these machines.

There are three points which prospective customers of this equip ment should and do take into consideration; first, the purchase price second, cost of operation; and third, safety. The first two points

will discuss only briefly as you are more interested in the safety of the domestic ice machine.

As was stated before, manufacturers have been able to lower their prices in the last year on account of the elimination of some of their service costs. Two years ago, the average household machines for approximately 100 pound ice box, sold installed for approximately $450.00. The average price of machines of this size, marketed by four of the largest manufacturers, averages $250.00. Some of these manufacturers are installing machines in apartment houses for less than $200.00 per unit.

Although there are a good many types of machines on the market, competition and price have largely limited the small ice machine to air cooled compression type. The four largest manufacturers are now producing a unit which is almost identical as far as type is concerned inasmuch as a reciprocating compressor is used, driven through belt by an electric motor, and the compressed refrigerant gases are cooled by air. Inasmuch as these four manufacturers produce 90 per cent of all the domestic machines made, it is useless to go into a discussion of other types, such as, absorption by electric heating element, or gas, or gear driven rotary types, unless someone present wants to make specific inquiry, in which case we will be glad to discuss them if time permits.

Refrigerant Gases

The greatest differences in the majority of machines now being marketed, are in the refrigerant gases used, the types of automatic control and the detail design of the compressor. You are not particularly interested in the last two items as every manufacturer has his own ideas regarding the most "fool proof" and positive automatic control. The differences in the design of the compressor are due also to the opinions of various manufacturers. They are attempting to obtain a very quiet operating unit, and at the same time, keeping the efficiency of the same in view.

You are interested, however, in the differences in refrigerant gases used. These are for the most part sulphur dioxide, methyl chloride, butane and iso butane. Sulphur dioxide has been in use for the longest period of time; methyl chloride gas was pioneered about two and one-half or three years ago; and butane has only been in use about one year. The physical properties of these gases are as follows:

		Operating Pressures with 70° Outside Temperature	
	Boiling Points	Head Pressure	Solution Pressure
Sulphur Dioxide	Positive 14°F	55 lbs. to 60 lbs.	1 lb. to 2 lbs.
Methyl Chloride	Negative 11°F	85 lbs. to 90 lbs.	8 lbs. to 10 lbs.
Butane	Positive 32½°F	35 lbs. to 40 lbs.	8 to 10 in. Vacuum
Iso Butane	Approximately Positive 10°F	55 lbs. to 50 lbs.	Positive 1 lb. to 2 lbs.

It is believed by most manufacturers that the ideal operating pressure for domestic ice machine is a slight positive pressure on the suction side of the compressor, and as low as possible pressure on the dis-

charge side. Sulphur dioxide and iso butane approach most nearly these ideal operating pressures. Methyl chloride runs slightly highe in pressures—only disadvantage of which is that the Installation Me must be more careful and thorough in their work, making connection so as to eliminate the possibility of leakage of gas due to poor pip or tube fittings. Simple butane is at a disadvantage in operating a a vacuum on the suction side inasmuch as an air leakage into th system will build up the pressure on the discharge side and eventuall overload the motor and burn it out.

Plant and Human Life: Sulphur dioxide is an irritating, relatively no toxic gas as compared to carbon monoxide. There is very little dange from sulphur dioxide poisoning, as the fumes are so irritating that th victim is compelled to seek air at once. In extreme cases of hig concentrations, when the victim cannot retire from the fumes, dea may result from respiratory spasms. Ordinarily a victim exposed f some time to a low concentration of sulphur dioxide complains of hea ache, spasmodic cough, sneezing, bronchitis, constriction of chest, gastr intestinal disorders, smarting of the eyes and anemia.

The effect of sulphur dioxide on plant or insect life is very disastrou A few pounds of this gas which would be an ordinary charge in domestic ice machine, would immediately kill all plant life and possib cause the death of insects or birds in the home. Methyl chloride u like other chlorinated solvents, is without poisonous properties. Th is also true of butane and iso butane, although with high concentr tions, suffocation results, and low concentrations result in anaesthe which soon passes away. A comparative table of data on these refr erant gases is made up by a manufacturer of methyl chloride which as follows: The amount of the concentrations cause death have n been determined.

	Very Serious Effects Produced by Breathing ½ to 1 hour Lbs. per 1000 cu. ft.	No Serious Effec after Breathing Hour Lbs. per 1000 cu.
Sulphur Dioxide	.08	.008
Methyl Chloride	6-13	2.05-4
Butane	8-15	3-4.5

The amounts of refrigerant gas used in domestic ice machines as follows:

Sulphur Dioxide—Flooded System	10-12 lbs.
Sulphur Dioxide—Dry System	2- 3 lbs.
Methyl Chrloride—Flooded Systems	10-12 lbs.
Methyl Chloride—Dry System	2- 3 lbs.
Butane & Iso butane—Dry System	12-16 oz.

The fact that thousands of small refrigerating machines using th refrigerant gases, are in daily service, and the fact that they practically without accident, should be sufficient evidence that the chines are properly designed, and that there is very little dange asphyxiation.

Corrosive Qualities: Sulphur dioxide is very soluble in water. The solution of the gas in water is strongly acid. Due to this property, all systems must be perfectly dry, also the gas and lubricating oils must be thoroughly dry. Methyl chloride is slightly soluble in water. One part of water will dissolve about four volumes of methyl chloride. The solution is acid—consequently, this gas is also corrosive to a certain extent. Neither butane nor iso butane are soluble in water, nor are they corrosive in the slightest degree. The corrosive gas is not particularly dangerous. Its only disadvantage is in its destructive qualities which mean high service and repair costs on the small machines.

Inflammability and Explosive Qualities: Sulphur dioxide is neither inflammable nor explosive when mixed with air. Although a few explosions have occurred in the use of this gas, it is purely through the carelessness of Service Men who have applied blow torches to closed drums which are filled with the gas. Both methyl chloride and butane are explosive and inflammable under certain conditions. A manufacturer of methyl chloride states that the gas is inflammable but it can only be burned with difficulty. Its ignition temperature is higher than hydro-carbons such as gasoline, etc., but it is lower than alcohol.

In a paper presented by Jenkin before the Faraday Society in December, 1922, statement was made that "methyl chloride was very inflammable and considerable care must be exercised to avoid fires." Butane and iso butane are inffammable at about the same temperature as gasoline. Because of the difficulty in any standard test for ignition temperatures, no accurate figures have been obtained.

In regard to the explosive qualities, methyl chloride is explosive with air between the percents of 9 and 16. Butane is explosive with air between the per cents of 2 and 6. Gasoline is explosive with air between the percentage of 1½ and 6. Although butane gases are slightly more explosive than methyl chloride, this difference has been offset by the fact that 1.4 to 1/3 as much gas is used in the system using butane compared with the methyl chloride systems.

Again I point to the fact that thousands of machines are in use and no serious explosions nor fires have yet been caused by leakage of gas or carelessness of service men on installation work. Manufacturers have overcome these disadvantages in the design of their machines, and in the training and cautioning of Service Men.

Odors: Sulphur dioxide is extremely pungent and possesses the smell of burning sulphur. The methyl chloride gases have an etheral odor. Butane and iso butane are practically odorless, although with high concentrations, there are traces of an etheral odor; therefore the gas is odorized by the manufacturers.

On the face of the facts given above, the ordinary customer is quite likely to be discouraged in the purchase of a domestic refrigerating system. They might have had good reason to be 10 or 12 years ago, but on account of the progress made by manufacturers in the design,

construction and training of service and installation men, the poisonous, corrosive or inflammable properties of these gases really mean little or nothing to the average user. The quantities of gas used in each machine are not sufficient to cause much damage of poison or fire if released, and service men have been so trained that the damage of corrosion is very slight. All reliable manufacturers take the safety precaution in insisting upon a service man from each distributing or sales organization, taking a course of instruction in installation and service work. This is done solely to avoid any possible accidents or dangers. The result is perfect safety in operation of these small machines, whose record for safety is very good.

Although the small ice machine has been on the market for a number of years, I do not think it has been really successful until the last two years. At the end of 1923, there were approximately 80,000 machines in use. Eleven thousand of them were built in 1922; and 26,000, or about one-third of the total installed, in the year of 1923. The year's sales, I believe have increased 50 per cent over last year's, so it is estimated that by the end of this year, there will be installed nearly 125,000 machines. It is also estimated if it were possible to build, sell and install these machines, that there is a market for three million in the next two or three years. These figures give you an idea of the present possibilities for this particular type of electrical appliance. This market will not be taken care of within the next two or three years, nor the next 10 years, but a large number of manufacturers will make immense strides in increasing their production and their sales because of these possibilities.

HAZARDS OF THE ICE SCORING MACHINE

W. G. Stuck, Superintendent, Lexington Ice Company, Lexington, Ky.

The ice scoring machine is a comparatively new adjunct to the ice industry, although its development has been in progress for several years. It is only within the last two years, that this development reached a point of perfection, universally recognized and warranting its general adoption, with the result, that practically all the large and many of the small ice companies have installed, or, are considering the installation of this machine, recognizing the prestige it gives to their business, and endeavoring to meet the ever increasing demand of the public for better service and full weight, at the same time, meeting an economic necessity of operation, and fulfilling an obligation due their employees by providing a more rapid and safer method of cutting and handling ice in its delivery to the household.

For the benefit of those who may not be familiar with the machine, a brief description follows:

There are several different types on the market, five or possibly six [illegible] recognized as practical. The object is the same in all types, that

of scoring or marking the ice into equal parts and of uniform size, thus increasing the factor of safety in handling, decreasing the time required for cutting and insuring full weight to the customer. This is accomplished by automatically passing the ice either on end or on edge, through a machine usually deriving its power from an electric motor with belt or chain and gear drive, and having a series of shafts which revolve at a very rapid speed, on which are several circular saws so arranged as to be adjusted to score the ice to sizes and depth required.

The hazards start with handling the block of ice (which is usually sitting on end) from the storage room to, and in placing it in the automatic feed to the machine. The hazard lies in the possibility of the block falling over and injuring the employee, if handled on end, or when being laid down, if handled on edge.

A conveyor should be used to reduce manual handling to a minimum wherever possible. Care should be taken to see that employees use only first class tools, and that these are kept in perfect condition at all times. This can be accomplished by frequent and rigid inspection. The floor over which the ice is moved, should be level and kept clean, free from broken pieces of ice, or other obstructions. The room should be well lighted.

The next hazard is at the machine, which like all other machines, more especially those in the high speed class, are subject to more or less failures, depending on design, capacity for particular class and amount of work being done, frequency and thoroughness of inspection, and lubrication. Seventy-five per cent of the accidents are due to carelessness on the part of the operators.

The most common hazards are hot bearings, breaking of belts, chains and gears and, more particularly, the breaking of saws.

In some types of machines, the liability of injuring the employee, due to any of the above failures, is of little consequence. In other types, they are more pronounced. However, the hazard of delay and interruption of service to the public, due to any failure, mechanical or otherwise, must not be overlooked.

Frequent and rigid inspection, plus eternal vigilance by the operator, will very materially reduce the hazards set forth above.

Hazards of Handling Scored and Unscored Ice

In handling scored ice, particular care should be taken in loading (especially if on end) to see that the blocks are held firmly in place. If allowed to shift and strike together with any force, there is a possibility of breaking at the score marks, and the exercise of good judgment on the part of the employee operating the wagon or truck is essential.

In cutting the delivering to the household refrigerator, scored ice is more economical and safer to handle than unscored, as the scoring

reduces the time in cutting and produces a square or uniform piece of ice, with all four sides presenting a solid even surface for the grip of the ice tongs, thus making it safer than the odd size piece with one or more rough uneven sides, from which the tongs may slip, as is usually the case with unscored ice.

To overcome carelessness on the part of employees:

Make working conditions safe, convenient and practicable.

Make wages such as will attract employees of high caliber and efficiency.

Select the man thoroughly capable of performing the duties required by the particular class of work he is expected to do.

Establish such relations between employer and employee that will insure respect, confidence and the fullest co-operation on the part of both.

These relations once established, dispense with the services of any employee who does not recognize the importance of observing them.

DISCUSSION

MR. W. G. STUCK (Lexington, Ky.): It might be interesting to the members here to know we have three scoring machines in service and have handled 50,000 tons of ice in 14 months with three accidents, none being directly attributable to the machine. Two were where ice fell over on the man, and a block got jammed in the machine and a fellow stuck his foot in and pushed it away and the saw cut into the heel of his shoe. He might have had a very serious accident. That is the extent of our accidents in connection with the scoring machine.

MR. DANIEL L. ROYER (Ocean Accident & Guarantee Corporation, New York): I would like to ask if there has been any trouble with broken or flying saws.

MR. W. H. TOWNE (Chicago, Ill.): I have talked with a great many people, users and manufacturers of machinery, and there has been practically no trouble with broken saws. There is a type of saw which we probably will put on our machine which is now being used on another type of machine, which we are very favorable to on account of certain results that can be obtained, and that is the split saw.

A split saw to most mechanical men is something you want to steer clear if; nevertheless the manufacturer of this machine made the statement to me that, since the change of the type of collar and also the chemical analysis of the steel saw, they have not had a broken saw and they use all split type. There is no question but what we probably will put a split saw on our machine, and I think others will in time, due to the ease with which you can immediately take a saw out and put in a new one and adjust it. It is really a very desirable feature of it is O. K. as far as safety is concerned.

MR. DANIEL L. ROYER (New York): I would like to ask Mr. Copeland if the absorption idea has been proved.

MR. E. J. COPELAND (Flint, Michigan): There is a great deal of money spent on the absorption machine. I think, fundamentally, it started over in Cleveland a great many years ago. It has proven too expensive for the household more than anything else, although in some types of machine we found this—in the use of ammonia as far as heat mounting, this is due to the varying water temperatures in the different seasons of the year.

The first machine I ever built was an ammonia absorption machine, which was too cumbersome to put in the home, had it worked satisfactorily. The second was a straight air machine and the horse power input was against the results. Then I went to sulphur dioxide and put thousands of the machines on the market. It is only in the past two years I have been using butane and now using iso butane. I feel the absorption machine is a question of cost, nothing else. More or less prohibitive for a large market.

MR. E. J. COPELAND (Flint, Michigan): In the early days I have had some accidents; fortunately in no case was any one hurt. I had a boy installing a machine in Detroit in a doctor's home on the boulevard. We use drums that are under the Interstate Commerce Commission ruling as to their character the same as you use in your large ammonia drums. I had an installation man who wanted to speed up the charging of the machine. He set the drum on a gas plate, went away and left it; that drum went straight through the dining room, and there was not enough of the gas plate to find. It has a hazard. That is in the men. We, all of us—I believe I can say for everybody in the industry—conduct schools and we have done so since the inception of the industry where we, as religiously as we know how, train men in the handling of the machine, and also with the gases, with reference to the danger of any of these gases to human life.

I would say, for sulphur dioxide, in a case of an acute asthmatic or a consumptive patient to get a charge and not be able to get away from it, it might result in death, but for you men here, you could get from it immediately and the odor clears itself quickly.

There is an opportunity of the gas being inflammable, a man making some serious mistake, as I have had one happen. Our service men are always instructed in all these gases, to hook up the tube of any machine that requires discharging and discharge it into the open air. One of our men who was not as good on the job as might be, disconnected a Pittsburgh heater stand about four feet away from a pilot light. He got a slight concussion without a serious damage.

The code committee of the Underwriters is working on a code that permits the use of the gases up to—the quantity has not been arrived at—eight or ten pounds in a room of 400 cubic feet with ventilation of a door or window that can be opened.

MR. CARL REITZ (Baltimore Safety Council, Baltimore, Md.): In two of the largest plants in Baltimore, one a dairy and a large ice cream manufacturer, they have complained, they have had a great many accidents in ice storage, because cakes of ice, after being put one on the other, slide off and fall on a man. They have tried educational methods, methods for proper storing, and despite that they have had quite a number of crushed toes.

I have made inquiries among supply people and I get no satisfaction; they have nothing in the way of a boot with a protective cap. I know I can put a steel cap on these boots but that does not do any good. It is probably worse than the hazard because if the cake does fall on the boot it would crush the cap.

CHAIRMAN WALKER: I can aswer that for you very quickly. Get a boot that has not a steel cap but has a reinforced toe. We use them. Any of the companies that manufacture safety shoes can supply you with that type of shoe very reasonable. We sell them to our men for $3.50 a pair, a heavy working shoe.

The first thing they want to do in that plant is to put in an order that no rubber boots shall be worn; sell shoes to them at $3.50 a pair and they will fall over themselves to buy them. They will be 50 per cent less than they would pay for a working shoe of good quality. It is oak tan leather and a real workman's shoe.

REPORT OF NOMINATING COMMITTEE

MR. W. G. STUCK: It is the concensus of the nominating committee that the vice chairman is selected as Mr. Towne, of Gifford-Wood Company, Chicago; Mr. Bruce Dodson of the Casual Reciprocal Exchange, Kansas City, Mo., secretary; chairman of the bulletin committee, Mr. Chiles, the present chairman. (Mr. Stuck was nominated for chairman.)

(The report was accepted by unanimous vote.)

ADJOURNMENT

Marine Section

September 30 and October 1, 1924

W. E. WELCH, Chairman
Safety Engineer, The Travelers Insurance Company, New York City

C. H. POTTER, Vice-Chairman
Potter Transportation Company, New York City

A. A. CLOSE, Secretary
William Spencer & Son Corporation, New York City

TUESDAY MORNING SESSION

CHAIRMAN WELCH: The chairman desires to report good progress in the Marine Section. As you all know, the conditions in regard to shipping on the East coast are not good. It has been very hard to get membership, which is the principal item that we have in forming a new section, but we are started and we are on the map.

Out on the West coast they seem to be a little ahead of the eastern owners and operators. Out in Seattle, the Waterfront Employers Association, a member of the Marine Section, employs a safety engineer in connection with the employers and the contract stevedores of that association.

Last February we had a membership campaign in New York and the American Steamship Owners Association backed the movement.

MARITIME CASUALTIES

Roy F. Edwards, The Prudential Insurance Company of America, Newark, N. J.

The fatality rate among crews of the British Merchant Marine is probably not less than 2.2 per 1,000 men employed. The rate decreased from 5.2 during the five years ending 1904 to 4.2 for the period 1910-1914, then to 2.0 during 1920. The greatest reduction occurred among crews of sailing vessels, or from 11.3 for the period 1900-1904 to 3.3 for 1921. For steam vessels the decrease has been decidedly less, ranging from 3.9 to 1.8 during the last two decades.

It is interesting to note that, on sailing vessels, wrecks and disasters to the vessel cause more fatalities than do other kinds of accidents while on steam vessels the reverse obtains.

From the data at hand it has been possible to ascertain that the fatality rate for the period 1919-1921 has been 3.3 per 1,000 for masters and mates, 2.2 for petty officers, 3.3 for deck hands, 1.0 for the stewards department, 2.6 for engineers and 2.2 for engine room and stokehold hands on steam vessels. Unfortunately these data are not available with distinction of steam or sailing vessels.

According to the British Workmen's Compensation statistics, the shipping industry experienced the highest fatality rate of any of the seven large groups of industries covered. On the other hand the disablement rate was 20.4 per 1,000 men employed or considerably below that for other industries. Sailing vessels show a disablement ratio of 31.6 and steam vessels 20.0.

During the period 1919 to 1922, the total amount of compensation payments in cases of accident was $3,253,644. This sum would be increased to $4,000,000 if medical, legal, and insurance costs were included. Over $3,000,000 of the amount paid was for employes on steam vessels. The average payment, however, was higher for sailing vessels, it being $186 as against $177 for steam vessels. Of the aggregate amount paid $1,177,104 was paid because of fatalities and $2,076,540 for non-fatal accidents. The average fatal accident cost for steam vessels was $1,041 and for sailing vessels $757; the average disablement payment was $121 for steam vessels and $115 for sailing vessel employes.

It may be of interest to point out that of the 4,963 deaths occurring among crews of the merchant marine during the period 1919-1921, 1,842 or 37.1 per cent were due to accidents, 2,876 or 57.9 per cent to disease and 245 to homicide and suicide.

Fatalities in the American Merchant Marine

A careful canvass of the situation failed to bring forth statistics relative to the American Merchant Marine which would determine the number of lives lost among crews of American shipping vessels.

From data at hand, however, it is possible to estimate that there are at least 300 deaths per annum due to accident and that the rate is not less than 2 per 1,000 men employed.

According to data compiled by the U. S. Coast Guard during the last four years there have been 3,659 vessels involved in casualties of a more or less serious nature. Of these 1,057 or 28.9 per cent of the vessels were a total loss.

Founderings show the highest ration or 97.8 per cent lost. Strandings are next in importance with 34.3 per cent lost and from collisions 7.9 per cent were lost.

That founderings are by far the most serious is shown by the fact that for ships which foundered 28 per cent of the crew were lost; for strandings less than 1 per cent of the crew were lost and for collisions 0.4 per cent. The seriousness of these casualties to ships vary with the region in which they occur.

MARINE CASUALTIES AND LOSS OF LIFE, U. S. VESSELS, 1920-1923*

Region	Vessels Involved	Vessels Lost	Vessels Percent Lost	Crews On Board	Crews Lost	Crews Percent Lost
All Causes of Disasters						
Atlantic, Gulf	1,381	414	30.0	25,685	335	1.3
Pacific	516	164	31.8	10,663	115	1.1
Great Lakes	550	88	16.0	13,097	123	0.9
Rivers	444	171	38.5	6,695	54	0.8
At Sea, Foreign	768	220	28.6	26,228	405	1.5
Total	3,659	1,057	28.9	82,368	1,032	1.3
Founderings						
Atlantic, Gulf	107	103	96.3	756	194	25.7
Pacific	19	18	94.7	72	31	43.1
Great Lakes	28	28	100.0	184	50	27.2
Rivers	38	37	97.4	126	4	3.2
At Sea, Foreign	82	82	100.0	936	301	32.2
Total	274	268	97.8	2,074	580	28.0
Strandings						
Atlantic, Gulf	284	134	47.2	7,049	30	0.4
Pacific	150	65	43.3	2,895	54	1.9
Great Lakes	152	13	8.6	4,097	..	..
Rivers	45	6	13.3	1,132	..	..
At Sea, Foreign	224	75	33.5	6,802	50	0.7
Total	855	293	34.3	21,975	134	0.6
Collisions						
Atlantic, Gulf	465	43	9.2	9,778	29	0.3
Pacific	140	14	10.0	3,755	11	0.3
Great Lakes	132	6	4.5	3,021	29	1.0
Rivers	122	6	4.9	2,367	8	0.3
At Sea, Foreign	66	4	6.1	2,281	6	0.3
Total	925	73	7.9	21,202	83	0.4
Other Causes						
Atlantic, Gulf	525	134	25.5	8,102	82	1.0
Pacific	207	67	32.4	3,941	19	0.5
Great Lakes	238	41	17.2	5,795	44	0.8
Rivers	239	122	51.0	3,070	42	1.4
At Sea, Foreign	396	59	14.9	16,209	48	0.3
Total	1,605	423	26.4	37,117	235	0.6

*Reports U. S. Coast Guard. Passengers and Crews not separated prior to 1920.

Dock Accidents in Great Britain

In 1895 the English Factory Acts were extended to include docks and wharfs so far as related to processes of loading, unloading, moving and handling of goods in, on, or at any dock or wharf and the processes of loading, unloading and coaling any ship in any dock, harbor or canal.

From this time on the number of accidents in more or less detail have been reported in the factory inspector's reports. These reported accidents were of such nature as would prevent a person injured from returning to his work or of doing five hours work on any day during the next three days after the occurrence of the accident.

On January 1, 1905, a special set of regulations pertaining to docks and wharfs were put into effect. Since that time special efforts have been made to reduce accidents and elaborate reports have been made

relative thereto, the latest of which is entitled "Report of the Conference on the Prevention of Accidents at Docks," published in London, 1924, by H. M. Stationery Office.

It has been possible to compile a table showing the number and causes of reportable accidents during the years 1906-1913. During this period there were 29,660 accidents reported, of which 767 or 2.6 per cent were fatal and 28,893 were non-fatal. All of the accidents included were of sufficient importance to be reported to certifying surgeons. The highest case fatality rate, 13 per cent, was caused by fractured machinery or gears. Of the 767 fatal accidents, 137 or 17.9 per cent were due to falls in water and 226 or 29.5 per cent were due to falls of persons otherwise than into water. Of the total number of accidents 5,639 or 19.0 per cent were caused by being struck by load or gear; 4,898 or 16.5 per cent were caused by falls otherwise than into water and 2,298 or 7.7 per cent were caused by fall of load or by articles becoming dislodged. It is unfortunate that the corresponding number of men employed are not available.

The British Workmen's Compensation statistics indicate that for the years 1919-1922, 463 fatal accidents occurred causing a fatality rate of 0.8 per 1,000 employed. 40,620 disablements were reported causing a disablement rate of 69.9 per 1,000 employed.

The fatal accident ratio among dock workers was higher than that in quarries. factories, constructional work and all industries combined, but lower than that in shipping and mining operations.

The disablement rate was higher than that of the shipping industry, factories, quarries, constructional work or the average for all industries. These data also indicate that, while the fatality rate has remained stationary, the disablement rate has increased from 63 per 1,000 in 1919 to 81 during 1922.

During the period under consideration $4,127,478 was paid for compensation in cases of accidents occuring to employes on docks and wharves; the average payment being $100; $515,411 was paid because of fatalities and $3,612,067 because of disablements. The average cost per claim for fatal accidents was $1,113 and, for non-fatal accidents, $89.

It should be borne in mind that these payments do not represent costs referrable to medical, legal or insurance carriage.

In the conference report previously, the dock accidents in the maritime district of Great Britain were tabulated for the year 1922: 5,049 accidents were tabulated, 74 or 1.5 per cent of which were fatal. The effectiveness of the existing regulations is best shown by the fact that of the 5,049 accidents only 38 or 0.8 per cent were due to breach of regulations.

Dock Accidents in America

A somewhat extensive correspondence was entered into in an effort to secure data relative to stevedoring accidents in this country. On the whole, the result was disappointing as there seemed to be some

reluctance on the part of stevedores to place the available data at the disposal of the Council.

It was possible, however, to secure a series of 499 accidents occuring in New York City during 1923. The causes of accidents in this series are shown to be very similar in frequency to those reported for London in 1922. Unfortunately these data cannot be worked out on the man hour basis.

It is interesting to note that machinery and gear accidents caused 20.4 per cent of all injuries. Persons slipping and falling caused 16.2 per cent, struck by falling objects caused 33.5 per cent, and cuts, scratches, and sprains caused 29.9 per cent.

Through the courtesy of the Waterfront Employers Association of Seattle, which employes a safety engineer, the following data are available. The causes and per cent of distribution of stevedoring accidents as reported by this association are—

Hatch tender giving a signal to move load before men were in the clear 20 per cent; lumber or other cargo falling from sling 15 per cent; improper stowing, lack of use of tie straps, or enough dunnage 14 per cent; load spreading as it was landed in the hold 8.9 per cent; faulty equipment or gear 7.4 per cent; carelessness of men 7.4 per cent; inexperience of men 6.6 per cent; weather conditions and men falling or slipping 6 per cent; inefficiency of foremen and supervising men 3.3 per cent; insufficient men to properly carry on work 3.3 per cent; poor lighting in hold 3.3 per cent; sack jumping a chute and striking men in hold 1.6 per cent; lumber falling off dolly 1.6 per cent; men getting something in eye 1.6 per cent.

When we consider the fact that in New York longshoring compensation payments were recently increased to $18.50 per week, it would seem that an organized accident prevention campaign, such as that carried on by the waterfront employers of Seattle, would be well worth the expenditure involved.

It is scarcely necessary to point out that the conditions under which the gangs work are not conducive to a low accident rate. Labor turnover, practice of changing the members of the gangs, fatigue, changes in the hazards according to the kind of cargo, lack of safety devices, carelessness, inadequate and indifferent supervision and possibly the lack of incentive to avoid injury are among the many features which scarcely need to be pointed out to the members of the Marine Section. However, studies of this problem have been made and it has been estimated that one-third of these accidents in this country are preventable even under existing conditions.

Health Hazards in the Maritime Industries

While we are principally interested in accident prevention it will be instructive to consider the health hazards incident to these employments.

The sailors' life at sea is usually hard. Exposure to climatic variations are conducive to rheumatism with its frequent heart involvement and pneumonia or bronchitis. On many vessels the seamen's quarters are overcrowded and poorly ventilated so that the beneficial effect of the sea air is neutralized. The habits of the seamen are not beyond reproach while on shore. Venereal diseases, alcoholism, and tuberculosis are frequently met with. Severe strain is commonly the source of hernia, emphysema, thoracic aneurysm, arteriosclerosis, and organic heart lesions.

Considering the mortality data at hand covering the experience of the British merchant marine during the period 1919-1921, it will be noted that pneumonia caused the largest number of deaths or a rate of 6.2 per 10,000 men employed. Circulatory diseases were next in frequency with a rate of 3.9 followed by tuberculosis with 3.4, malaria with 2.0, typhoid fever with 1.4 and alcoholism with a rate of 2.1 per 10,000. The death rate from diseases varied with the class of vessel or from 15.2 for sailing vessels to 36.0 per 10,000 for steam vessels. The corresponding suicide and homicide rates were 1.5 for sailing vessels and 3.1 for steam vessels.

In England during 1910-1912, the mortality rate of seamen is shown to have been 61 per cent in excess of that for all occupied males and 88 per cent at ages 25 to 64 inclusive. It is reasonable to assume a reduction in the rate has taken place during the last decade. During the period 1910-1912 the excess in the death rate of seamen to that of all occupied males from tuberculosis was 83 per cent; from circulatory disease 74 per cent; from bronchitis 36 per cent; from pneumonia 100 per cent; and from nephritis 67 per cent.

Comparing bargemen and lightermen with all occupied males, it is shown that the death rate from all causes was 38 per cent in excess of the normal. Tuberculosis was only slightly above the normal, however, the rate for circulatory diseases was 43 per cent in excess, bronchitis was 82 per cent or higher than that for seamen, pneumonia was 89 per cent above and nephritis slightly above the normal.

Among longshoremen, arteriosclerosis, organic heart disease, and hernia are of frequent occurence due, no doubt, to heavy lifting, fatigue or being the end results of rheumatism and syphilis. Dampness, dust, fumes from the cargo and poor hold ventilation are among the conditions met with that are detrimental to health.

Comparing dock and wharf laborers in England with all occupied males, it is shown that the mortality from tuberculosis, circulatory diseases, bronchitis, pneumonia and nephritis was considerably in excess to the normal. The mortality from tuberculosis and pneumonia was higher than that of barge and lightermen, also that from bronchitis and pneumonia was greater than that of seamen from these causes. With the exception of general laborers, the death rate is considerably higher than for others of this grade such as foundry laborers, carpenters, coalheavers, shipyard, builders, masons, etc .

Finally it remains to be pointed out that the leading life insurance companies charge an extra premium sufficiently large to permit of a mortality ranging from 25 to 150 per cent extra. This holds true pretty much throughout the entire maritime industry with the exception of the officers on the transatlantic, coastwise, inland, or lake steam and oil burning vessels of a dead weight tonnage of two thousand or over.

The experience of various life insurance companies with longshoreing and stevedoring risks indicate an expected mortality of 125 to 150 per cent.

This in brief is the general situation at the present time with reference to accident and health hazards in the maritime industry. There is very little doubt but that conditions could be improved by instigating supervised safety first methods in these industries.

DISCUSSION

MR. A. J. SMITH (Marine Office of America, New York City): Is ther any data on the passenger losses?

MR. EDWARDS: There is data, but I did not include it; we are inte ested in accident prevention and the employes more than the othe The passenger losses are very small compared to the number of me working. That is available, however, and I will get it to you.

MR. SMITH: The liability of the steamship companies for passeng accidents comes under the P & I just the same as the liability for cre accidents, while the stevedore is something entirely apart from vesse P & I and is usually insured separately.

MR. EDWARDS: I should like very much if you could give me son points as to how to better the statistics? It seems to be a difficu matter to get hold of the right people who are willing to give o statistics.

MR. PROUTY (Aetna Life Insurance Company, Hartford, Conn.): should like to ask if an attempt has been made to prepare a sta dardized form on which different concerns might report their acciden and if it would not be well to have such a form circulated among t members of the section and others who display any desire to cooper with the committee in the compiling of statistics?

MR. EDWARDS: The best way, as we all know, is based on the m power basis. That would, of course, give the nearest accurate infor tion irrespective of the fact you do have overtime in the steved operations. It is highly desirable, as I understand it, to separate frei handling, ship loading, and unloading, etc. When you get it down that degree of accuracy, the people don't want to give it to you.

REPORT OF NOMINATING COMMITTEE

MR. EDWARDS: After careful consideration, your nominating committee desires to present the following for your consideration as officers of the Marine Section for the ensuing year:

Chairman, W. E. Welch, Travelers Insurance Company, New York City.

First Vice-Chairman, C. H. Potter, Potter Transportation Company, New York City.

Second Vice-Chairman, Ellis Knowles, C. D. Mallory & Company, Inc., New York.

Third Vice-Chairman, Capt. R. C. Brennan, Pacific Steamship Company, Seattle.

Fourth Vice-Chairman, Robert F. Hand, Standard Oil Company, New York City.

Secretary, Capt. John W. Steele, International Freighting Corporation, N. Y.

(The report was accepted by unanimous vote.)

WEDNESDAY MORNING SESSION

CHAIRMAN WELCH: The meeting will please come to order. Mr. Hand was not able to be here yesterday, when his paper should have been read. I think we will allow Mr. Hand to have the floor at the present time.

PRACTICAL SAFETY SUPERVISION IN THE MERCHANT MARINE

Robert F. Hand, Assistant Manager, Marine Department, Standard Oil Co. (N. J.)

With the development of the modern steamer and the gradual disappearance of the fine old wind jammers, an equally marked change has taken place in the type of men who follow the sea, as a means of earning their livelihood. Seamen in the not very distant past took such pride in their calling that even an indifferent ship was trim and taut from truck to keel, and it was a poor sailor indeed who could not handle himself sufficiently well to keep out of careless accidents. This type, however, is passing with the sailing vessel and the frequent recurrence of preventable accidents is conclusive proof of the fact. Many of those who call themselves sailors today——I am speaking now of the average seaman, rather than licensed personnel—would be far better adapted and eminently safer elsewhere, and it thus not unoften results that thoughtless and inexperienced men aboard ship endanger not only their own lives

but the lives of the entire ship's company by careless handling of machinery or lines, or by performing in an unseamanlike manner the various duties which are assigned to them.

It is true, of course, that the very development in steamship building, of which I speak, has brought with it many new hazards to replace those encountered in sailing vessels, and it is also true that the conduct of routine work incidental to the operation of steamships will continue to result in accidents, some of them unavoidable and of a nature peculiar to the sea. It is, nevertheless, apparent that the manifestly increasing need for intelligent safety supervision in our Merchant Marine is primarily due to the failure, and in many cases. inability on the part of the individual member of the crew to take care of himself, and on the part of his superior officer to properly provide for the safety of those under him, and that, therefore, the problem of greater safety becomes essentially an educational, rather than an administrative one.

Careful analysis of the nature of accidents to seafaring personnel, which occur with greatest frequency, has led me to this conclusion and a brief review of some of them will perhaps serve to illustrate my point to better advantage.

Falls and Falling Objects

Undoubtedly a large percentage of personal injuries aboard ship results from falls, either on deck or below, many of which might be prevented by due precaution in the matter of rigging, gangways and pilot ladders providing proper protection from open hatches, and in the installation of hand rails, foot guards, engine-room gratings and floor plates.

Next in importance from the standpoint of their numerical recurrence are accidents due to falling objects. Such casualties result in many instances from careless operation of cargo handling machinery and other hoisting gear, thoughtless handling of tools at elevated points without due regard for the safety of those below, and only too frequently from lack of supervision on the part of the officers in charge of such work.

Many engine room injuries, which occur with almost as great frequency as those in the preceding group are of a nature that might be avoided by timely and proper instruction of watch officers to inexperienced men on their watches, and the same may be said of a large proportion of burns and other boiler room casualties, which result from flare backs and similar causes through improper operation and dangerous practices in the fire room.

As a matter of fact, when viewed from this standpoint, unavoidable accidents are relatively surprisingly few in number, for what has already been said of certain forms applies to almost all of the long list of casualties connected with the operation of steamships; thus, accidents caused by deck machinery may often be traced to the removal of guards or to inexperienced operator; injuries sustained while handling mooring lines [illegible] of watchfulness on the part of the mate in charge; injuri

to the eye while chipping or scraping, to the failure to provide or wear goggles; infection of minor wounds due to ignorance of the consequences thereof, or failure to administer or report promptly for first aid treatment.

There does not seem to be any doubt, therefore, that the question of practical safety supervision reduces itself primarily to one of educating both officers and men to the point where they think and automatically act in accordance with established safety principles, for safety regulations mean nothing if the safety thought is not implanted in the mind of the individual. This brings us logically to the very important step of determining the most advantageous form or forms in which safety instruction may be brought to the attention of the seagoing personnel in a manner best calculated to accomplish its purpose. In the case of licensed officers, who, of course, are in a position to profit by a more direct and personal relationship with management, the problem is not such a difficult one, but the necessity of focusing the attention of all hands in the forecastle to the question under consideration still remains, and constitutes, in my opinion, by far the harder job of the two.

Channels For Safety Expression

In any event, however, the simplest and most readily available methods by which seagoing personnel may be reached for purposes of safety education are, to my mind, three in number, namely; personal instruction, accident bulletins and safety illustrations, and I feel that by the judicious handling of these three modes of expression, properly co-ordinated, much can be accomplished toward the elimination of preventable accidents. The last of these being obviously best suited to reach all members of the crew, permits of the use in a more restricted manner of the former two, provision of which, as a result, may be confined to licensed officers.

Referring, for the moment, to the need of personal instruction, I believe it is a mistake, for example, to place a complicated device such as a gas mask in a ship and expect the officers to guide themselves by printed instructions thereon in cases of emergency. Wherever the use of such a piece of gear is considered advisable, at least one and preferrably several of the ship's officers, in addition to the master, should receive detailed instructions regarding its use from experts ashore, and there should be stipulated a fixed interval at which such apparatus should be thoroughly overhauled and an actual demonstration given of its operation by a qualified officer aboard ship. It is only by so doing the prompt and effective use can be made of such apparatus in times of emergency, when uncertainty and consequent loss of time on the part of the operator may mean the life of the victim.

Personal instruction in matters of this kind may be followed up to good advantage by safety bulletins containing accounts of specific accidents resulting in injuries to personnel, or setting forth in a convincing

style the danger of performing in a manner which experience has shown to be hazardous, routine assignments incidental to the maintenance and operation of steamships.

Safety illustrations may be issued independently or in conjunction with safety bulletins as a means of providing additional emphasis for the latter. In either case, their preparation requires considerable study and care, together with a strict observation of detail, in order that they may accomplish their intended purpose with a maximum degree of effectiveness.

In the Ship's Bulletin, a publication which is issued to the Seagoing Personnel by the Marine Department of the Standard Oil Company (N. J.), it has become the custom to run a safety illustration in every issue, and by close observation of the manner in which the men aboard the ship have reacted toward our efforts in this direction, we have been able to draw certain conclusions regarding factors in the general make-up of such posters, which we feel are best suited to maintain a high standard of effectiveness.

The essential factor in all such work is, of course, consideration of the mental characteristics and nature of the men for whose immediate benefit the posters are intended, and in case the marine posters, this fundamental rule applies with peculiar force. Seamen, as a class, are of a discerning and critical nature in all matters which pertain to their vessel. The purpose of the safety poster aboard ship would, therefore, be immediately defeated and the poster itself rendered ridiculous in their eyes by the inclusion in the picture of some trifling irregularity or technical blunder which would be considered of minor consequence to the landman but would surely appear a glaring error to the seaman.

Similarly actual photographs, rather than drawings, are now being used for safety illustrations in the Ship's Bulletin, for the reason that the former, having been taken aboard ship, have a naturally realistic appearance which cannot be duplicated.

Contrasting Proper and Improper Methods

It also appears desirable to contrast proper and improper operating methods on safety illustrations; that is, to present the right and wrong side of the question by picturing a particular source of danger as well as the correct operating conditions under which such danger might be avoided. This scheme has the added advantage of reducing in some cases the amount of printed matter required on the poster, it being highly desirable in any case to reduce the latter to the minimum necessary to convey the message in unmistakable manner.

I have dwelt at some length on the educational side of safety supervision, for the reason that it constitutes to my mind, by far, the most important phase of the problem. There still remains, however, the necessity of enforcing a few safety regulations governing the conduct of the seagoing personnel and certain operating matters.

Safety regulations such as those, for example, which provide for the use of goggles, proper gangways, guards for dangerous connections and moving parts of deck machinery, etc., are unquestionably essential, but I feel that their number should be reduced to a minimum and that nothing should be permitted to appear in them which it is not anticipated will be put into effect literally, for by enforcing few regulations to the letter, far better response is obtained than by laxly administering a greater number.

In line with this policy, I am of the opinion that all accidents to personnel of any nature and however trivial should be rigidly investigated as soon after their occurrence as possible, by authorized representatives of the management, and in case where it is revealed that the casualty resulted from failure on the part of an individual to comply with an established safety regulation or to observe the common principles of ordinary precaution that such individual should be dealt with summarily.

The value of the service contributed to an industrial plant ashore by a regularly assigned safety engineer cannot be questioned. It is doubtful, however, whether such individual would prove of practical value in the organization of a steamship operator, for it can readily be appreciated that a safety engineer training ashore cannot be qualified to pass upon marine hazards for the reason that the practice of operation on shipboard is dictated by peculiar conditions that can best be comprehended only by those who have had long practical experience at sea. Instead, however, it may be said that all members of a steamshnp company's shore establishment, concerned in the physical operation of the ship, should be thoroughly qualified to perform the duties usually accomplished by a safety engineer; that is, they should be on the alert constantly during the conduct of their business aboard the vessels to detect and remedy possible sources of danger. In furtherance of the efforts of the shore organization in this direction, both the master and chief engineer should be required to make frequent inspections of their respective departments, and they should be encouraged to report to the management all dangerous conditions in thir vessel which are beyond the capacity of the ship's force to remedy.

Following up all such reports, and penalizing carelessness as outlined above, will undoubtedly be of assistance in reducing the number of preventable accidents, but I regard both of these factors of secondary importance to the fundamental essential of impressing upon all officers and men the necessity for exercising constant vigilance to eliminate the dauger of casualty. Safety aboard ship should be the primary consideration of all persons engaged in steamship operation.

DISCUSSION

MR. GEORGE A. MARR (Secretary and Treasurer, Lake Carriers' Association, Cleveland, Ohio): Mr. Hand has definitely reached the conclusion, as we have, through experience, that the best prevention for

accidents is the education of the men involved. That is your first consideration, your first important one, and our experience has shown that. I don't think that accidents can be prevented from shore or by regulation nearly as effectively as they can by the education of the men concerned.

MR. MARR: How do you pass these pictures about?

MR. HAND: We have a monthly magazine that we put out for the shippers and these posters are in this magazine. nI addition, we issue half a dozen copies, depending on the size of the ship and post them in the mess room, in the pump room, and around the ship, so the men can't help but see them. There is so little reading matter they are bound to read what is there and see the pictures.

MR. MARR: What officers on the vessel have personal charge of the First Aid?

MR. HAND: According to merit, the captain is the only one that is qualified to take care of a personal injury. In his absence, the next officer in rank does it.

MR. JAMES F. FOUHY (Manager, Smith Insurance Service, Inc., New York City): What pressure can you bring to bear on the captain and chief engineer to cooperate in this matter of safety?

MR. HAND: By talking to them, and then in cases where they are very negligent the only thing to do is to discharge them.

MR. FOUHY: Do you attempt to hold the captain responsible for the accident record he makes?

MR. HAND: Absolutely. We have forms they fill out, and they must report every accident. The forms are quite elaborate, and every accident, no matter how small it is, must be reported on that form. In that way, we keep track of the accidents on the ship.

MR. MARR: Do you find sometimes they try to get by without making a report?

MR. HAND: Sometimes it comes to our attention some one is injured and we have had no report. Then we check up and there is the old scratch to pay.

SAFEGUARDING THE LIVES AND LIMBS OF LAKE SEAMEN

George A. Marr, Secretary and Treasurer, Lake Carriers' Association, Cleveland, Ohio

Coincident with the movement generally undertaken by large industrial concerns to reduce the alarmingly large number of personal injuries a few of the large fleets operating on the Great Lakes many years ago instituted accident prevention measures aboard the bulk freight vessels. Organization and coordinated effort to keep the subject constantly

the mind of the sailors were lacking, indeed, the movement represented little more than a printed set of rules, supplemented with warning signs conspicuously placed near the dangerous places aboard ship and the results were only what might have been expected from any immature or partially developed movement.

As the Welfare Plan of the Lake Carriers' Association had been conceived for the purpose of promoting the well-being of the men who man the ships, and inasmuch as other efforts had been encouragingly successful, the Welfare Committee in 1917 determined to give attention to an amplification and systematic prosecution of this movement to protect the lives and limbs of our seamen. In one sense, the time was never more opportune for introducing Safety aboard ship than at that period. Our country was then at war and upon no other arm of transportation did the government more firmly depend for results than upon our lake ships. They had to bring down the iron ore and the grain so essential to our success. The lack of qualified man power from which all industries then suffered, resulted in an increasingly large number of personal injuries and it was believed that a properly conducted safety movement was as essential to good steamboat practice as in any other industry.

In another sense it was an unpropitious time for testing out the Safety idea on shipboard, because the men were not ready to support an innovation of this kind. The high pressure under which the trade was conducted necessitated the employment of many inexperienced men and involved both managements and steamboat officers in a maze of extraordinary demands upon their attention. The rank and file were less responsive to the call of safety and supervision was more difficult because of the conditions prevailing and a lack of knowledge of just what was required in this new undertaking. Under the normal conditions of today with much of our personnel restored, thoughts are normal and the experience of service on the ship committees has trained the men to a practical and intelligent conception of the object sought and the method of its accomplishment.

Placing the Responsibility on Those Concerned

In the paper that I read at the Twelfth Annual Safety Congress in Buffalo one year ago, the plan of our Safety Movement was explained in detail, together with the difficulties encountered in establishing it and the results attained during the six years beginning with 1918. But I must repeat that the success of our movement rested, and the success of Safety established anywhere must rest, entirely upon placing the responsibility directly upon those immediately concerned. In other words, accident prevention efforts cannot secure the best results by the "absent treatment" method. To do this on the lakes where supervision is difficult, where the personnel of 25,000 men is, so far as direct contact is concerned, practically as out of reach as if located on the other side of the earth, presented a problem not easy of solution. Moreover, no counterpart could be found for our guidance. By all that has followed

it seems providential that our sub-committee on safety hit upon the idea of establishing aboard each steamer a Ship Safety Committee of six members to be composed of a licensed officer and two unlicensed men from the deck department and a similar complement of men from the engine department, these men to receive from their employers moderate compensation for attending meetings and at the end of the season a bonus as a slight reward, if the ship passed through the period of navigation without there having occurred to one of its crew a personal injury sufficient to cause him to leave his boat. How well this safety plan was originally conceived may be judged from the fact that it has stood the test of seven seasons of navigation without the Welfare Committee having found cause for changing any of the conditions or alterating the regulations under which the committees operate.

Annual Comparisons of Accidents

As to the results of operation, little comfort can be gotten from annual comparisons of the number of accidents. If our experiences of the past seven seasons can be taken as a criterion, he who establishes a safety system and endeavors to measure the success of the venture by comparing one year with another in the matter of a reduced number of personal injuries of a given kind, or, indeed, of the number of injuries of all kinds, will in all likelihood meet with disappointments. A season that furnishes gratification because of the fewer number of injuries reported is apt to be offset the next year by an increased number of casualties. Frequently, I have made such comparisons but have ceased to make further attempts. One year the majority of injuries may be sustained by those who slip and fall; another year injuries sustained while handling the cables may come in increased numbers with corresponding decrease in the number of injuries of a character that previously had prevailed. No cause can be ascribed for this and no solution of the problem is in sight. I can only say that here the personal equation enters and the increased number of injuries of one kind that seem to come in rapid succession, just happen. There is no basis for them, nothing in the conduct of vessel operations to cause them and experience does not lend means by which any further measures can be taken to forestall these periods of epidemic-like injuries, all of one kind.

Another difficulty encountered in making comparisons year by year lies in the fluctuating diligence with which officers report personal injuries occurring on their respective boats. Here, again, the personal equation must be dealt with. This is due for the most part to oversight. The master of a vessel has a multitude of duties demanding his attention both in port and at sea, and his business with headquarters is conducted largely by mail, necessitating much correspondence and numerous reports. While I believe we are receiving reports of practically all accidents occurring on the ships, and certainly all of a serious character,

[illegible] of eternal vigilance

The only convincing measure of results lies, therefore, in the comparison of the number of accidents by longer periods than that of single years and the best evidence of accomplishment lies in paralleling the entire reporting period prior to the institution of the prevention measures and the entire period following, and reducing each to its annual averages. Even into this there enters the factor of business conditions, a busy year bringing a large number of new men into the trade and a slack season restricting employment to the regular sailor, familiar with his work, and accustomed to the avoidance of dangerous places and dangerous practices. The statistics which I submit to you with this paper take these varying conditions into consideration and bear unimpeachable testimony to the fact that the Ship Safety Committee is doing a practical and valuable work in the safeguarding of the lives and limbs of the lake seamen.

I wish, too, to give credit to the masters and chief engineers of the vessels for the help their interest lends to the successful operations of the committees. The masters and chief engineers are not members of the committee but attend in an ex-officio capacity and by advice, suggestion and counsel, render a service worthy of grateful acknowledgment.

Improvement in Committee Reports

It is gratifying, too, to observe the character of the reports of the monthly meetings of the committees. At the beginning these reports were brief, indefinite and more or less confused. They are now, in the main, comprehensive statements, containing sometimes a detailed resume of the month's doings in a Safety direction and generally definite recommendations of a practical character for accident prevention. From these reports, then, we get a fairly accurate record of the progress made in each ship toward the elimination of personal injuries. One year ago we thought the point had been reached where little or no improvement could be looked for in the work of the committees themselves. In this we were happily mistaken. During the current year there has been so much of new and valuable suggestion as to justify the expectation of a reasonable improvement from year to year, indefinitely. A striking improvement is found in the keener realization by the committee members of the importance of personal safety and the value of work they are carrying on. This thought has been so frequently reiterated in reports received since the opening of navigation last spring that we feel the entire crews on safety committee ships have been inoculated with the habit of thinking in terms of Safety.

Owing to a lean year in lake commerce not all the bulk freighters have been in commission this season, and many vessels have at different periods been now in and now out of commission. The maximum number of steamers on which Ship Safety committees were appointed totals 185. During the five months that have elapsed we have received reports covering the proceedings of 858 meetings held. This approxi-

mately equals the monthly average for a total of 1,285 reports received for the full seven-months season of navigation in 1923 when all of the steamers were constantly in commission.

Other Evidence of Improvement

A collateral evidence of the improvement that has taken place in ship safety work and a contingent benefit to the ship, is provided by noting the amount of money paid by the vessel companies at the end of the season for this special service, and the bonus when earned. The committee members are paid two dollars for each meeting attended and a bonus of ten dollars for attendance at all meetings during the season provided no accident has occurred to a member of the crew. I doubt if at the beginning of our Safety movement there was a single committee which served intact throughout the season of navigation and it is certain that at the beginning few committees succeeded in keeping their vessels so free from severe personal injury that no man had to leave his boat with consequent loss of bonus for the committee members. Not only do we now have committees that serve without change in personnel during the season but we have committees that serve intact through consecutive years. Last year the Pittsburgh Steamship Company paid the bonus to the committee members on 57 of it ssteamers. This represented 74 per cent. of the company's fleet. The Interlake Steamship Company paid the bonus to committee members on 33 of its 49 steamers. This means that on 57 of the Pittsburgh Steamship Company's vessels and 3 of these belonging to the Interlake Steamship Company there was no a personal injury serious enough to interrupt the service of a single member of the crews of these ninety ships, and, further, that some of all members of the safety committees of these 90 vessels served on the ship and on the committee throughout the season without change.

Naturally the Ship Safety committees center their efforts on safeguarding the lives of their shipmates. In years gone by the heavier toll in lives on lake ships resulted from falling through open hatches into the cargo holds, falling overboard, falling off ladders or from the dock into the water and by being caught in machinery or cable. Such accidents have been greatly reduced—some nearly eliminated. Value improvement has been made in the prevention of the loss of life, which after all, is the real yardstick by which to measure the value of our Ship Safety committees. I have no statistics as to claims paid by vessel companies on account of accidents but the reduced cost to the underwriter is perhaps indicated in the record of the death benefits paid through provisions of the Welfare Plan which was established in 19 A compilation shows that in the nine years from 1909 to 1917 inclusive preceding the organization of Ship Safety committees, death benefits as a result of fatal accidents (excluding loss of life from shipwreck) were paid for an annual average of 14 men in the forward end of the ship and for an average of 18.1 men in the after end, or engine department. This privilege extends only to employees who accept registration. D

ring this period the average number of sailors registered figures out at 16,584. Thus, the average cost in death benefits paid was $129.67 per thousand registrations. In the six seasons, 1918 to 1923 inclusive, during which we have used Ship Safety committees on about 50 per cent. of the steamers in the membership of our Association, death benefits as a result of fatal accidents were paid for an annual average of seven men in the forward end of the ship and for an average of ten in the after end. With an annual average of 15,930 registrations during these six years this shows that the average cost per thousand has been reduced to $79.77.

Another illuminating compilation shows that in the nine years preceding the adoption of the Ship Safety Committee program there was one person killed for every 940 enrolled in our registration system, while in the six years of the committee operations the number of enrollments to each accident fatality is 1761. The following tables are merely amplifications of the above figures, to show the details for each year:

Death Benefits Paid Exclusive of Deaths in Shipwreck.

1909	9,752	12	$1,500.00	3	$ 900.00	15	$2,400.00
1910	14,348	8	700.00	9	1,200.00	17	1,900.00
1911	15,106	12	1,475.00	1	100.00	13	1,575.00
1912	18,194	15	1,475.00	4	700.00	19	2,175.00
1913	19,553	16	1,950.00	11	1,825.00	27	3,775.00
1914	15,145	14	1,475.00	2	200.00	16	1,675.00
1915	15,935	10	825.00	3	600.00	13	1,425.00
1916	19,777	21	2,000.00	3	300.00	24	2,300.00
1917	21,449	17	1,650.00	2	500.00	19	2,150.00
Average	16,584	14	1,450.00	4	702.77	18.1	2,152.65
					Average cost per 1000 members		129.67
1918	11,220	4	325.00	1	100.00	5	425.00
1919	11,863	10	1,025.00	1	400.00	11	1,425.00
1920	13,094	8	1,100.00	6	525.00	14	1,625.00
1921	14,002	5	800.00	3	575.00	8	1,375.00
1922	19,097	10	975.00	5	425.00	15	1,400.00
1923	26,305	5	800.00	3	575.00	8	1,375.00
Average	15,930	7	837.50	3	433.33	10	1,270.85
					Average cost per 1000 members		79.77

Relation of Fatal Accidents (Exclusive of Shipwreck) to the Number of Sailors Registered.

1909	1 accident for each	650	enrollments
1910	1 accident for each	844	enrollments
1911	1 accident for each	1,162	enrollments
1912	1 accident for each	957	enrollments
1913	1 accident for each	724	enrollments
1914	1 accident for each	946	enrollments
1915	1 accident for each	1,226	enrollments
1916	1 accident for each	824	enrollments
1917	1 accident for each	1,128	enrollments
	Total.	8,461	enrollments
	Average.	940	enrollments
1918	1 accident for each	2,244	enrollments
1919	1 accident for each	1,078	enrollments
1920	1 accident for each	935	enrollments
1921	1 accident for each	1,750	enrollments
1922	1 accident for each	1,273	enrollments
1923	1 accident for each	3,288	enrollments
	Total	10,568	enrollments
	Average	1,761	enrollments

Moral encouragement is given to the work of the committees through **The Bulletin**, a magazine of the Lake Carriers' Association that is freely and gratuitously circulated on the boats. In this are published their suggestions to further safeguard life and limb on the vessels, and each month brief statements of the circumstances of the personal injuries that have occurred and such other matter of Safety interest as may prove of value to seamen in general. These publications are read at the committee meetings and suggest subjects for discussion in the light of the varying conditions that prevail on the different vessels.

Our Ship Safety committees now have such a good understanding of the duties involved that they function with little direction or aid from ashore.

DISCUSSION

MR. HAND: Are all the suggestions made by these ship safety committees carried out?

MR. MARR: They are not. We find thousands of suggestions coming in. Of the aggregate number of these committee reports, the vast majority are applicable to the local conditions on the ship where the suggestion originates. All these suggestions, all the minutes of their meetings are carefully read by a committee of captains and chief engineers engaged in practical operation in the summer, but during the winter, of course, have to lay off owing to closed navigation. These practical men carefully study those minutes. When they find a suggestion that is applicable to conditions generally on the lake fleet, they endorse that recommendation, and then it goes before a committee of our shore superintendents, who are practical navigators and who have graduated to the office management.

The proportion of recommendations concurred in by them are passed on to our Executive Committee of the Association. Their adoption of those recommendations. then, makes them. regulations.

MR. HAND: Do they have meetings once a month?

MR. MARR: Once a month aboard ship for the different men in the different operations of the vessel.

MR. HAND: The other members of the crew don't get the bonus, they?

MR. MARR: Only the members of the committee.

MR. SMITH: Are your lake crews practically all English speaking?

MR. MARR: Yes, our crews are all English speaking. Very rarely do we find a man that can't read and write English.

MR. FOUHY: Are any of your rules applicable to stevedores? Have you any control over them?

MR. MARR: No, we are entirely disconnected from the stevedore.

REDUCING ACCIDENT COSTS IN WATERFRONT WORK —THE CONFLICT BETWEEN COMPENSATION AND ADMIRALTY LAWS

James F. Fouhy, C.E., Manager, Smith Insurance Service, Inc., New York City

Workmen's compensation laws, fixing remedies for injuries incurred in industry, have been on our statute books for the past ten or twelve years. The have been found constitutional and may, therefore, be considered the fixed policy of the country. However, with respect to accidents along the waterfront there have been many conflicting decisions by the state courts which, fortunately, the United States Supreme Court has ruled on rather promptly.

Our common law is a development of the English common law which in turn, has grown up from numerous rights obtained in ancient times from the kings, from decision of the courts and acts of Parliament. As industry became more complicated in the last century, accidents multiplied with much resultant suffering, not alone from pain but from inability to pay medical bills, and to meet the usual household expenses. Accidents such as the amputation of a little finger, while possibly requiring the loss of may weeks from work, were frequently entirely uncompensated as the possible recovery was too small to warrant the employment of a lawyer, who usually takes such cases on a percentage of the amount recovered. Besides it was difficult to win a suit when the employer could set up either one or all of the following defenses: That the employee was injured through his own carelessness; or through negligence of fellow servant; or that employee assumed the risk on taking up the job.

The rule of law which excuses an employer from liability where his employee is injured on account of the negligence of another employee is judge-made law. There is no written law imposing such condition. But this is not an old rule; it made its first appearance in the United States about 1840 and afterward was adopted in practically all states.

Subsequently, there came a prouounced tendency of the courts to interpret the rule as favorably as possible for employees. This was accomplished largely through a narrowing of the class of fellow servants to include only those who worked along with the injured party and upon whom he might be capable of exercising an influence.

The first statute in the United States designed to abolish this defense was enacted in the state of Georgia in 1856. By that law, railroad employees were allowed to recover even though the injury was caused by a

fellow servant. Other states followed this example, largely confining th scope of the enactments to employees in the railroad service.

Reducing accident costs in waterfront operations, or marine risk: is similar to the proposition in any other kind of work in that th two main items to consider are the humanitarian side and the expens to the employer. Most men are interested in doing things which ar for the benefit of their fellow men; but they are surely interested t a greater extent when it touches their pocket book, through their busines It seems to the writer that the cost item is one to bring home the accide question to employers. This is well brought out by the attitude take by concerns who find it profitable to become self insurers. The intentic of this paper is to bring out the fact that accidents must be paid f by the employers, and that fact is brought out more forcibly when tl employer pays for each accident when it occurs, as he does under se insurance, than in any other way. It is a splendid thing to bring tl costs home in such a way that the employer must take the interest whi insures better results.

Self Insurance

Self insurance is only advisable where the payroll is large or whe the employment is considered so hazardous as to require a high rate. is well to recall here that the cost of accidents must be paid fro the premiums charged, and that if the premiums of small concerns a not sufficient to pay their costs, the premiums from other larger concer must make up the difference. A poor accident record reflects upon t employer whether he knows it or not. When he carries his own ri: or a part of it, he then looks upon the proposition in a new light; a when it can be brought home to him in this manner, a large start h been made along lines of accident prevention.

General statements do not always bring out the facts as well statements of specific cases. The writer belives that it may be interest to the Marine Division of the National Safety Council to he of facts in connection with a large concern which is making a savi in accident costs of between $20,000. and $30,000. per year. Such saving is decidedly worth while, no matter how large the busin might be. This result was accomplished after what had been term an unsatisfactory record.

The first step is to get the highest active officer of a company thoroug interested in accident prevention, and to provide a means of his keep in touch with it without too great effort on his part. It must be syste atized and made an important division of the work of the compa Most companies keep cost information, thus the accident costs not difficult to secure. In the particular company taken as an exam the previously "poor record" helped to furnish an incentive for entire official staff to "get busy." The surest way to get proper con eration by the section superintendents and foremen is to put them competition with other sections. In this company, it was possible

have considerable competition because of there being thirteen sections or divisions of the operation.

At the end of each month, the list of accidents is made up to show those that caused no loss of time, those that caused loss of but a few days, number of compensation cases, non-employee accidents not counted, non-employee accidents counted, the total, the rank of section and its rating.. The rank is the position in numerical order of efficiency, and the rating is "A" for a perfect record, "B" for a small number of accidents causing no lost time, "C" for a large number of such cases; "½" for an accident where a few days only are lost, "1" for a compensation or a non-employee "counted" accident. The figures are increased if there are more than one accident of the particular kind. In other words, when no time is lost, the section is not penalized except in the standing in the list. The theory here is that if the section were penalized, it might cause Superintendents and Formen to keep from reporting what they consider trivial accidents. Non-employee accidents not counted are those which the operation was not responsible for and which impose no liability upon the company.

The arrangement adopted by the company referred to could easily be changed to meet the needs of any other company. The important idea is to have a means of measuring accidents that will not have too much refinement. A bonus is paid for good work in accident prevention, which is in connection with similar payments for three other items in the operation of the company. One accident per month is allowed each section for a certain amount of the payroll, when the bonus will be paid. If accidents exceed the rate established, the bonus will be lost. Two accidents where a few days are lost count as one accident. In the ranking of the sections. the best section has total bonus earned increased by 25 per cent. and the next best section by 10 per cent. in order to make it more desirable to be the best section. The basis of the bonus is a fixed sum per man for perfect work. It is only for the superintendent and the men in each section who can influence the improvement in the operation. This feature is brought out to show one of many things that can be done to stir up interest in accident prevention.

Another thing that is done which helps is the posting of signs at each section, made up with adjustable letters, telling which section was first for the previous month and which one was second. The sign also shows total accidents in the section. The best section also has a framed banner gotten up in an attractive manner, with the U. S. flag and a statement signed by the president of the company, telling that the section in which the banner is located made the best record in the previous month, and expressing appreciation. Customers of the company see these signs and their comments help the competitive feature.

Circular Letters

During the month. circular letters are sent to superintendents and foremen telling of the accidents during the month, the causes, and the

lessons to be drawn; and at the end of the month, when the reco described above is sent out, a summary of all the accidents is give It has been found that this is apt to be dry reading, and an effort make the record along the lines of a human interest story is attempte The report generally is ended with some statement such as: "Aim for t bullseye: if you don't hit it in three shots, let the other fellow shoot It helps to make the report of greater interest. It is like the greeti a customer appreciates on going into a store, or the pleasant wo on leaving.

When the entire force is interested in accidents, it is easier to acco plish results. The investigation of the conditions, made at the pla of accident often brings out matters of much interest. However, the operation of the company is handling freight of various kinds, a as most of the accidents are due to lack of care on the part of t worker, the best efforts of the management have been in cautioning m to be careful. Each man in charge of a gang is cautioned by the sup intendent several times a day to look out for his men and to cauti them to be careful. The theory is that if a man is about to cross a b street and someone touches him on the shoulder and says: "Neighb that's a dangerous crossing, be careful," no accident will happen beca the man will have his mind on safety.

There is as much common sense to the safety problem as there to anything else. After all the known rules are applied, it is s necessary to be energetic on safety and to look at each case wit critical eye. When the company referred to finds that a man has b hurt a number of times, the manager talks over the matter with him see if he is alive to the seriousness of accidents. Several men have b dropped from the service because of too many accidents. This advertised among the other men.

Competent medical attention is of course necessary in order to the best results. In the case of the company which is taken as example, a dispensary is maintained at a central location, with a do and nurse in attendance. The accidents of the company does warrant the complete equipment and service furnished, but the us this facility by other concerns in the neighborhood, has been encoura thus it is a busy institution, working for the good of a consider number. The men in the medical service are experts in this line. any accident where a bone injury is suspected, the injured perso sent to one of the principal offices of the medical service where X-ray is taken. Orthopedists, eye specialists neuro-surgeons, etc. are affiliated with the service and ready for any case sent them. Rec of each case are kept in the must approved manner, so that case malingering are reduced to a minimum, and patients prevented attributing all their ills to their injury.

To sum up the accident cost problem, after every precaution has taken to safeguard machinery, buildings, equipment, etc., under the s

vision of an engineer specializing on such matters, after providing regular and expert medical service, the problem is one of proper method of insurance, and real interest on the part of the insured in instilling safety ideas in the minds of employees. The bulletins of the National Safety Council are helpful in this effort. The company referred to frames bulletins and types information on them to give local color which causes workmen to read and discuss them.

The company whose efforts at reducing its compensation costs has been discussed has had to meet the common difficulty of all waterfront operators, that is, the indefiniteness as to whether or not a case was settled after having been passed on by the Workmen's Compensation Board. Way back in the days of Queen Elizabeth and Edward I. Sir Edward Coke, the great English jurist, objected to the encroachment of the admiralty courts on the common law courts. Conflicts have contiued to the present day, though as far back as 1840, Judge Story enunciated the doctrine that admiralty jurisdiction did not hold with respect to maritime injuries except such as happened "on the high seas or on the waters within the ebb and flow of the tides." In other words the jurisdiction of the admiralty in torts (a wrong, an injury) depends entirely on locality. This doctrine has been upheld in many decisions with respect to torts. Concerning contracts there have been conflicting opinions.

Conflict of Laws

In a leading New York case, the New York Court of Appeals held that a man injured while on a dock supervising the loading of a ship for the charterer of ship, could not collect compensation, as he was engaged on a maritime contract. They held similarly when a coal yard employee, walking along the banks of a slip or a canal, and pulling a coal boat to dock with a rope, fell overboard and died of resultant pneumonia. In both cases, the United Sates Supreme Court held the Court of Appeals in error. It's decision in part reads: "When an employee working on board a vessel in navigable waters, sustains personal injuries there, and seeks damages from the employer, the applicable legal principles are very different from those which would control if he had been injured on land while unloading the vessel. In the former situation the liability of employer must be determined under the maritime law; in the latter, no general maritime rule prescribes the liability, and the local law has always been applied. The liability of the employer for damages on account of injuries received on shipboard by an employee under a maritime contract is matter within the admiralty jurisdiction but not so when the accident occurs on land."

The conflicting opinion of New York's highest court said. "The contract of employment by virtue of the statute contains an implied provision that the employer, if the employee be injured, will pay to him a certain sum to compensate for the injuries sustained, or if death results, a certain sum to dependents. These payments are made irre-

spective of whether or not the employer was guilty of wrong doing; it is a part of the compensation agreed to be paid for services rendered in the case of employment."

As the laws now stand we may state generally that where accidents occur in the navigable waters they are in admiralty, and on land or dock or bridges, workmen's compensation remedies are effective. The situation is very unpleasant both for the employer and the workmen. When a workman is injured he looks for his compensation, and even though he pays it, the employer is liable to be sued for large sums with a fine chance of losing due to the favorable attitude of the present day jury. If he doesn't pay compensation the morale of the workman is lowered, the injured man feels much aggrieved and there is dissatisfaction all around.

The following quotation from the opinion of Justice Brandeis in the Supreme Court cases recently decided Nos. 366 and 684, October term, 1923, which declared the latest amendment unconstitutional, sums the situation up pretty well:

> "A concern, doing a general upholstering business in New York directs one of its regular employees, resident there, to make repairs on a vessel lying along side a New York Dock. The ship, then temporarily out of commission is owned and enrolled in New York, and when used, is employed only within the State While on the vessel engaged in making the repairs, the employee is injured without the fault of anyone and is disabled for life. A statute of New York provides, that, in such a case, he and his dependents shall receive compensation out of funds which employers are obliged to provide. To such State legislation Congress, has, in express term, given its sanction. Under the rule announced by the Court, the Federal Constitution prohibits recovery. If, perchance, the accident had occurred while the employee so engaged was on the dock, the Constitution would permit recovery. Or, if happily he had been killed and the accident had been due to the employer's negligence, recovery (which is provided for by another State statute) would likewise be permitted under the Constitution, even though the accident had occurred on board the vessel."
>
> "The Constitution contains, of course, no provision which, in terms, deals in any way, with the subject of Workmen's Compensation" . . . .
>
> "The conclusion that the state law violates the Constitution and that the consent of Congress cannot save it, is reached solely by a process of deduction" . . . .
>
> "The requirement of the state is a regulation of the business of upholstering and stevedoring. It is not a regulation of ship-

> alty jurisdiction or procedure, or the substantive maritime law. It is but an exercise of the local police power. To impose upon the independent employer the obligation to provide compensation for accidents occurring on a vessel in port, while the vessel is made fast to the dock, in fact, cannot conceivably interfere with the proper harmony and uniformity of the general maritime law, in its international or interstate relations."

Perhaps we will find the remedy in one of the suggestions by two Supreme Court justices: viz: A. Federal Compensation Law or an amendment to the Constitution.

DISCUSSION

MR. D. M. HOLMAN (U. S. Mutual Liability Company): What is the status of a man who is a worker in the ship repairing yard. A ship is in a permanent dock and he is on the gang-plank leading from the ship.

MR. FOUHY: You have asked me a good one. I have been trying to find the answer to that myself. It seems to me offhand he is injured on shore.

MR. HOLMAN: That would be the natural supposition, but the Supreme Court has decided otherwise. Its decision was apparently based upon the theory that the ship floated into the driveway, she has to float out on the driveway. He was injured on the gang-plank. The Jenson vs. the Southern Pacific Company was the first case in which the Supreme Court made a decision.

Federal Compensation Act Advocated

(Mr. Hand took the chair at the request of Chairman Welch.)

CHAIRMAN HAND: I have a suggestion, if you will premit me to make it as chairman. Would it be well for this section to go on record as favoring the passage of a federal compensation law for marine employes? Our great difficulty, as brought out in this discussion and also the various decisions shows the need of a federal compensation act which will cover men on shipping work. I would very much like to entertain a motion to that effect.

I have made up my mind the federal compensation act, properly worded, is the solution of the difficulty. We are following out our plan in the settlement of injury on our fleet, but there is nothing to compel the individual to accept that plan, and if he gets hold of one of these lawyers who specialize in seamen cases he will not accept the plan.

MR. WELCH: I make the following motion, that it is the sense of the Marine Section of the National Safety Council that a practical federal law be made to properly care for accidents on board ships. That

may not be exactly as you would like to have it worded, but you can arrange that later or substitute other words as you think right.

MR. SMITH: Would Mr. Welch accept a rewording of his motion to apply to admiralty jurisdiction?

CHAIRMAN HAND: I believe a correct wording would be as follows:

WHEREAS, the National Safety Council, Marine Section, believes in the justice and humanity of workmen's compensation, and regards it as a sound business principle that all industry should, so far as possible under the competitive conditions of trade, assume the burdens arising from injuries to its workmen, as part of the costs of production now therefore be it

RESOLVED, that this association favors the enactment of a federal compensation act which shall accord to all marine workers injured in the course of their employment such fair and just compensation as the shipping business is able to carry without hindrance to its prosperity and development.

(The resolution was adopted.)

CHAIRMAN HAND: This Marine Section has a long road of missionary work to accomplish. If you can pound it into the individual ship owner that personal injury cases mean loss of efficiency and loss of money actually taking money out of their pockets even though they are compensated for the claim, that a man injured at sea who is obliged from the seriousness of the injury to knock off work, is paid wages to the voyage end and the ship owner loses the service of that man until the ship arrives in port you will do well. They have not gotten that through their heads yet in many cases. All of us who are members of the Marine Section will have to act as individual missionaries of the ship owners to convince them that safety supervision is the means of a profit-making plan to their individual companies.

MR. WELCH: Mr. Banash, of Chicago, is interested in marine work and suggests that we have local meetings, possibly one on the Atlantic Coast, one on the Eastern Coast, and one in the South, not necessarily have the chairman attend, but that the Marine Section get busy some way and try to hold meetings at those points during the coming year.

ADJOURNMENT.

Metals Section

September 30 and October 1 1924

T. H. McKENNEY, Chairman
Superintendent of Labor and Safety, Illinois Steel Company, South Chicago, Ill.

A. C. GIBSON, Vice-Chairman
Spang-Chalfant Company, Pittsburgh, Pa.

FRED BENNETT, Secretary
Director of Safety and Welfare, The Buckeye Steel Castings Company, Columbus, Ohio

TUESDAY MORNING SESSION

CHAIRMAN McKENNEY: During the year your chairman, in addition to attending several conferences at headquarters and handling considerable correspondence, attended the following meetings:

Two meetings of the executive committee of the Metals Section—one in Chicago at the National Safety Council Headquarters on November 13, 1923, at which Mr. H. A. Reninger, vice-president of the Council in charge of industrial safety, was present and several members of the National Safety Council.

A meeting in Pittsburgh, March 14, 1924, held in the office of the safety department of the Carnegie Steel Company. The courtesy of this meeting place was extended by Mr. John Oartel, chief of safety bureau of that company. Mr. Homer Weeks, supervisor of safety, American Steel & Wire Company, Pittsburgh, Pa., and Mr. Oartel lent us their presence at this meeting, and rendered valuable aid in our deliberations.

Also attended a conference of sectional chairmen in New York City, January 19 and 20, 1924 at the Commodore Hotel, Mr. H. A. Reninger presiding. The various industrial sections were well represented. There were also present at this meeting: the Hon. Ethelbert Stewart, U. S. Commissioner of Labor Statistics, Dr. L. W. Chaney, U. S. Bureau of Labor Statistics, R. B. Morley, Industrial Accident Prevention Association, Toronto, Canada; also Mr. L. A. De Blois, Mr. Homer E.

Niesz, Mr. W. H. Cameron and Mr. S. J. Williams of the National Safety Council. Annual Congress plans and matters pertaining to the general welfare of the various industrial sections as well as the general activities of the National Safety Council were discussed at length. I personally feel that a great deal of benefit was derived from this meeting in that it was the means of bringing about a better understanding between the chairmen of the various sections and accomplishing better co-operation in the preparation of their programs and the carrying out of the same at the Congress.

Also attended a meeting of the general executive committee, at their invitation, on January 21, in the same city, and a joint safety conference of the Engineering Section of the National Safety Council and the American Society of Safety Engineers in the Society rooms in New York City on January 22, 1924.

Attended a mid-year safety conference of the Engineering Section, National Safety Council, Chicago Safety Council and Western Association of Engineers at the Morrison Hotel, Chicago, on February 19th, 1924.

I wish also to report at this time on a resolution unanimously adopted at the last congress, to the effect that the Metals Section go on record as favoring the holding of the next congress at an earlier date than those previously held. In connection with this resolution, your chairman wrote a letter to the National Safety Council headquarters, under date of October 18, 1923, advising them of this resolution; also brought it before the meeting of the sectional chairman held in New York City on January 19 and 20. It was the consensus of opinion of those present, that in all probability the next congress would be held in Louisville, Ky., and that the climatic conditions of that city would perhaps make it more preferable to meet on or about October 1.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN MCKENNEY: Following the procedure of our program, it will be in order at this time to appoint the nominating committee for the selection of your officers for next year.

I have chosen Mr. John A. Oartel, chief, Bureau of Safety, Carnegie Steel Company, Pittsburgh; Mr. C. B. Smith, safety engineer, Chicago Bridge & Iron Works, Chicago and Mr. E. G. Quesnel, of the Commonwealth Steel Company, St. Louis, Missouri.

CONSTRUCTION, OPERATION AND MAINTENANCE OF OVERHEAD ELECTRIC TRAVELLING CRANES

W. S. Hall, Illinois Steel Company, South Chicago, Ill.

One of the first things to be considered in the design of a crane is the service in which it is to be used. This not only should be consid-

ered from the standpoint of hours of operation but also from a standpoint of probable loading, that is, the average load and the possible maximum load to which the crane may be subjected. With the experience and knowledge which crane builders have at the present time it is possible for the ideal crane to be obtained. This applies not only to the question of design but to the question of first cost as well. The reason that the ideal crane is not always installed on a particular job is due to the fact that in a good many cases the builder is not fully informed as to the class of service to which the crane will be subjected when installed. It may also be due to the fact that the customer is not in a position to judge accurately between first cost and future maintenance with the result that a crane entirely too light for the service is purchased.

The Association of Iron and Steel Electrical Engineers have from time to time drawn up crane specifications as a guide in purchasing cranes. The Association purposely has not adopted any standard set of specifications, it being felt that local conditions should be in each case the determining factor.

There is no question but what if these specifications were universally adopted the result would be that in all cases a crane would be purchased that would do the work satisfactorily with a minimum of maintenance and a maximum of safety. However, the expense involved would in some cases not be justified. For this reason the specifications stand on the records of the Association of Iron and Steel Electrical Engineers as recommended specifications and not as adopted specifications.

One of the first things to be settled in the design of a crane for a particular application is the question of factors of safety and it is upon this point that crane builders may vary considerably, thus materially affecting the weight and selling price of the crane. The following factors of safety have been recommended by the Association of Iron and Steel Electrical Engineers: crane girders, 5; shafting, 8; ropes and cables and hook, 10; gears and pinions, 6, and all other parts not less than 5.

These factors of safety are used on what are known as heavy duty cranes wherein the crane is called upon to lift up to its capacity several times during a 24-hour period. A lower factor of safety is used in the design of the girders and in all structural parts due to the fact that these parts are not subjected to wear by normal operation of the crane. The girder which will stand a 50-ton load when new should stand a 50-ton load 10 years later provided same has not been in any way distorted and the rivets kept tight, etc. For this same reason a higher factor of safety is specified on all wearing parts such as ropes, shafting, gears, pinions, etc. These factors allow for casting defects and wear and tear and from this it can be readily seen that comparing bids from different crane manufacturers, the proposals must be considered from the standpoint of factors of safety. A 10-ton crane with the factor of safety of 5 will have just half the capacity of a crane with the factor of safety of 1

This means that a crane with the factor of safety of 10 all the way through with the exception of the girders which may have 5 will be a very much heavier crane and, consequently, will cost very much more to build than a crane with a factor of safety of 5 all the way through. It may be pointed out that the weight of the girders is the big item in the total weight of the crane and two different builders may design for a factor of safety for 5 on the girders and one with 5 on the trolley and, another with 10 on the trolley. This does not imply that one builder's girders would be as strong as another because the trolley with a factor of safety of 10 will be a very much heavier trolley than the one with a factor of safety of 5. Consequently, the bridge will have to be designed much heavier to stand the increased load with the same factor of safety of 5. The question of factors of safety should therefore be definitely stated at the time the specifications are sent out to the manufacturers so that all bids when submitted will be on the same basis and can therefore be readily compared.

Factors of Safety

Having decided upon the various factors of safety which decision should probably be based somewhat upon the class of service required of the crane. the question of detailed design should be considered if the crane is to be purchased from one of the various crane builders. An important question in considering detailed drawings of any design is the question of what expenditure is warranted to make the crane safe. Faulty designs resulting in high maintenance cost can possibly be overlooked, but faulty designs resulting in actual damage and probable loss of life cannot be overlooked. Crane builders at the present time fully realize this and it is my opinion that if they are given full information as to the duty of the crane in question and also given an opportunity to build this crane at a reasonable profit the result will be satisfactory without exception. The trouble in years gone by has been that the purchaser has simply ordered a 10-ton crane just as he would order 10 pounds of sugar, assuming that a 10-ton crane was a 10-ton crane under any and all conditions.

In a good many instances new cranes are purchased to be installed in present buildings wherein the clearances are such that it is sometimes exceedingly difficult to design a crane which will fit the existing space and still give the amount of hook travel necessary to perform the same work now being done by cranes which were built several years ago. These conditions are of course entirely local and have to be met as best they can. If the crane is one that is not called upon to lift up to its capacity except upon rare occasions it might be desirable to ascribe somewhat on the question of accessibility, it being assumed that when repairs are to be made ample time will have to be allowed to make these repairs. This applies particularly to the trolley design where it is necessary to mount one piece of the shafting above another rather than in a horizontal plane as is considered the best practice.

Only in extreme cases should anything be sacrificed in the factors of safety. The writer calls to mind one particular case in which a 30-ton crane was installed on an open hearth runway. This 30-ton crane was of an obsolete design and probably would not rate above 15-ton capacity on the basis of factors of safety outlined above. The size of the open hearth furnaces had been increased from time to time making the old crane entirely inadequate to handle the work. The crane runway was exceedingly low, the distance between the center of the runway rails and the building's columns supporting the roof trusses was very small. The head room from roof trusses to the top of the runway was also very limited. These three conditions presented a difficult problem in crane design in that it was necessary to purchase a 35-ton crane to handle the work. Considerable more time was spent in designing this crane than in both the building and erection combined. The extreme clearances necessitated a complete new design, differing entirely from manufacturers' standard designs. The conditions were met however and the first crane has been in operation for 11 years and a duplicate crane has been in operation for about six years. The repairs on these two cranes during this period of time have been right down to the very minimum. This case was mentioned to impress the fact upon the crane purchaser that he should not be too hasty in accepting a lighter crane of a standard design just because a crane of capacity required cannot be adopted to the building clearances.

Capacity

A crane too light for the job at hand is a continual source of expense and delay to production, the total of which may, in many cases, equal the entire purchase price of the crane each year, when an expenditure of say 25 per cent more in the first cost would have eliminated all of the annoying and expensive delays. I am speaking now from the standpoint of the steel plant or foundry where delays incident to handling molten metal are very expensive. The same applies probably to a less degree in other classes of crane work. While carrying loads over workman's heads is positively prohibited in all shops today, the crane itself has to work over the workmen's heads, and broken gears and shafting, even a loose nut dropping off the bolt and striking a man below, can cause very serious accidents.

Standard specifications of the Association of Iron and Steel Electrical Engineers published by the National Safety Council in bulletin form calls attention to the necessary footwalks on the crane girders and when practicable, across the ends of the trolley. In addition to these specified platforms, provision readily can be made when the crane is designed for platforms from which bridge truck wheels may be lubricated conveniently and safely. Also, a platform upon which a repair man may stand while making repairs to trolley shoes is entirely feasible when these shoes are not located on top of the bridge girders. On the heavier duty four girder cranes, it is generally possible to provide

platform under the trolley for efficient sheave lubrication and inspection. These small platforms add very little to the total weight of the crane and when figured in on the original design probably add nothing to the purchase price of the crane provided the manufacturer is permitted to carry the design and the construction of these platforms through the shop in the regular way. Adding these features as an afterthought is an additional expense to the manufacturer for which the purchaser must expect to pay.

On runways where only two cranes are installed, platforms can generally be arranged under the building runway girders at each end of the building so that the cranes may be run to their respective ends of the runway, and all truck wheels made accessible from these platforms, thus eliminating the platforms on the cranes themselves. Where more than two cranes are installed on a runway the middle crane should be equipped with these platforms.

Another question which has to be settled in the design and construction of a crane is the question of braking. Dynamic braking, except in special cases has been almost universally adopted. The successfully operated dynamic brake as installed today has been, like every other successful apparatus, a development, and a crane operator should not compare the dynamic braking equipment of ten years ago with present day practices. There is no question in my mind but what dynamic braking, properly specified and properly installed and equipped with ample holding brakes for use when the load is at rest, is absolutely the safest and most satisfactory method of braking with possibly one application as an exception and this exception is from the standpoint of satisfactory operation only. This exception is applied to a crane which is called upon to do very accurate stopping and starting such as lifting a mold from the sand. The writer is still open for conviction on this point.

Slippery Rails

Another hazard in connection with crane operation which can be almost entirely eliminated when the crane is built is the hazard due to slippery rails. Adequate facilities for proper sanding of the rails should be insisted upon. These sanders can either be hand operated or electrically operated. In either case, the control of the sanding equipment should be in the operator's cab. In my opinion electric sanders are more readily installed and, if given ordinary care, are more positive in their operation. The practice of a man going onto the crane runway to sand the rails periodically is one of the most hazardous practices in connection with crane operation, particularly so if more than one crane operates on the runway. In many cases adequate protection for the man from falling are entirely lacking making the job particularly dangerous from this standpoint alone on account of accumulated grease and dirt making it almost impossible to obtain a sure footing while doing this work. Periodical sanding is very unsatisfactory at the best. If the sanding equipment

is mounted upon the crane and under the positive control of the operator the sand can be applied when needed and not after the crane has failed to stop or start as is the case with periodic sanding of the entire runway. There are many cases where no sanding is required. However, when new cranes are ordered for a new installation the sanding equipment should be included and if later on it proves itself unnecessary the equipment if electrically operated can be removed and installed on some other crane where it will no doubt prove of value. If the sander is mechanically operated, the interchange between cranes of two different designs may be not quite as readily made.

Another safety feature which should be embodied but not necessarily purchased from the crane builder is the safety light. Signal lights should be so installed that when a crane is down for repairs these lights should show red to the operators of other cranes operating on the same runway. If these lights are properly installed they require little maintenance expense for the high factor of safety which they introduce and they should be installed in weather proof and rust proof boxes. Complete lamps in small cast aluminum boxes can now be purchased for this purpose for much less than sheet iron box can be built and when once installed will last indefinitely.

The construction and size of the operator's cage is a question which should be given considerable thought when the crane is designed. The tendency within the last few years has been toward larger and more elaborate cabs. Part of this increase in size has been due to the more elaborate automatic control which is being employed. Something more than mere space occupied by this control is necessary. Space must be provided for the repairman to observe operation of this control while the crane is performing its regular duty. Serious flashes and burns are liable if this control equipment is crowded into a small space, therefore sufficient room must be provided to eliminate this hazard. On cranes where the operator must necessarily be near the floor as is the case with hot metal pouring cranes, sufficient room for the control equipment is generally available in the space immediately above the operator thus making crane cage proper a two or three-story structure. In cases where it is unnecessary and probably undesirable to have the operator so close to the ground it is much more desirable to mount the automatic control equipment on the bridge girders rather than to try to crowd them into too small a space in the crane cab. In either case control equipment should be totally enclosed in order to keep the dirt away. On cranes handling molten metal, ample provision must be made so that the operator can get out of the crane quickly in case of trouble. If this cannot be accomplished, a safety compartment should be provided into which the operator can go for protection. These compartments should be so designed that they are readily accessible and heat resisting for a period of at least ten minutes.

Operation

Under the question of operation of cranes, it appears that the subject is very well covered in pamphlet No. 4, published by the National Safety

Council in revised form in 1923. I believe that too much cannot be said in connection with the safe operation of cranes on the question of the importance of the crane man taking his signals from one man only. This is generally the case in the normal operation of the crane. However, in case of a serious breakdown where the delay involved runs into a considerable amount of money and where the breakdown has resulted in considerable excitement and confusion, the question of someone keeping cool is highly important. The crane operator, in most cases, being so located that he has a clear view of the entire situation, should by all means keep cool.

Another frequent cause of accidents is due to the common practice of the operator trying to handle more than one motion of the crane at a time. This is particularly true in crowded shops where floor clearances are not uniform for the entire distance of the crane travel. This is also particularly true in erecting shops where the location and height of the machines being erected varies from time to time. The picture of the crane moving along the runway at a high speed carrying a heavy load which has to be moved in and out for the necessary clearances as the crane moves on the runway is not a very pleasing one. Operators may become so expert that they can do this class of work with apparent safety. However, sooner or later the operator's best judgment will fail and the accident may occur. This practice also applies to the operation of cranes carrying molten metal. The load should be hoisted first to the proper height and, if possible, the trolley moved to the proper position on the bridge before the bridge is started, each one of these operations being distinctly separate. The actual time involved to do the work in this manner may be even a few seconds or a few minutes more than if all three operations are carried on at once, but in the case of a molten metal crane the actual time that the crane is in operation compared with the idle time of the crane is so small that the few seconds required to do the job safely is entirely justified as no curtailment of production would result. In the lighter class of cranes doing faster work the practice of operating more than one motion at a time may possibly involve a delay representing an apparent loss of production. However, the hazard in connection with this practice on these cranes is greater. On most of these lighter, fast cranes, where numbers of workmen are employed upon the floor which they serve, thus greatly increasing the hazard due to the possible mistake on the part of the operator, the practice is one which should be, if not entirely eliminated, reduced to the minimum.

Another important feature in connection with the operating of electrical overhead cranes is that of lubrication, and while this question might rightfully be considered under the heading of maintenance it is mentioned here because in most cases the lubrication of the crane is part of the operator's duty and has to be carried on during the every day operation of the crane. In a good many cases the importance of lubrication may be fully realized by the crane operator but not duly appreciated by those on the floor from whom the operator takes his orders.

Ample time should be provided to properly lubricate the entire crane for it is during this period of lubrication that the operator in climbing over the crane makes his possibly unconscious inspection of the vital parts.

Limit Number of Men to a Crane

As far as possible, the operation of any particular crane should be in the hands of no more men than is necessary to operate the crane throughout the 24-hour period. This practice permits the man to become fully familiar with *his* crane and naturally he takes an interest in making a good showing from the standpoint of repairs compared with other cranes of similar duty operated by other men. He will take pride in keeping his own crane clean and safe if he feels that he is to get his share of the credit. The two or three operators running a crane over a 24-hour period should get along well with each other and be willing to co-operate and glad to do just a little bit more than their share to help the other fellow out.

Not only is it desirable from the standpoint of repairs to have the crane operated by the same crew of men but also it is very desirous from the standpoint of safety alone. No two cranes handle exactly alike and for this reason if the work is at all hazardous the operator should by all means know his crane.

It has sometimes been found desirable to give the crane operators a certain amount of experience with the crane repair gangs. Not so much from the standpoint of the amount of repair work which they can actually learn to do but from the standpoint of letting the operator view the proposition from the repairman's standpoint.

Consideration should be given cranemen by the man directing the crane from the floor. The craneman is a human being just like anybody else notwithstanding the opinions of those on the floor directing him. When anything happens it is a very easy matter for those on the floor to blame the craneman for having done this or that at the wrong time. The craneman is in his cab most of the time and does not have the opportunity of getting in contact with the groups of men on the floor as closely as they get in contact with each other. This means that when there is a difference of opinion in trying to get the truth relative to some mishap the craneman has to fight his own battle while the floormen naturally lean toward each other. Attention is called to this not with a view of protecting the craneman when he is at fault but to make sure that he gets a fair deal at least, for it is always exceedingly difficult to get accurate information as to just how things sometimes happen particularly if one workman is trying to protect another and, by so doing shifts the blame where it does not rightfully belong.

This question naturally leads up to the subject of analyzing or investigating crane accidents. The success of such an investigation, in my opinion, depends a great deal upon the manner in which the investigation

is started. The men involved should be called together not with the understanding that the management is trying to place the blame on someone for the purpose of discipline but with the idea of trying to prevent a similar accident occuring again. This investigation should be made just as informal as possible, preferably by a committee of workmen with whom those involved are acquainted. Arguments between the men involved should in every case be carried no further than is necessary to bring out the facts. An entire investigation should be carried out with this one thought in mind. It is always well to have some one man in charge capable of making this point known and one who will be able to have the men leave the investigation feeling that it was carried on in a spirit of justice and fairness and not in a spirit of revenge. When this preliminary investigation has revealed the actual facts then the department management or plant management, as the case may be, should be called into the investigation with those actually responsible for the accident. If it is necessary to administer discipline care should be given that this discipline is taken in the proper spirit. This, of course, is not always an easy matter, depending entirely upon the ability of the superintendent and the disposition and personality of the one in fault. At any rate so much is dependent upon the manner in which the proposition is put to the workmen that it is well worthy of careful thought and consideration on the part of those upon whom this unpleasant duty falls occasionally. In most every case the amount of discipline in my opinion should depend as much upon the man's attitude toward the accident as upon the seriousness of the accident.

"Locking switches" is brought up under the subject of operation rather than construction because it is so simple a matter to make sure that it is locked every time that it should be in the normal operation of the crane. It is, therefore, not a question of construction but a question of training men to use these locks consistently. There is absolutely no question in the minds of those who have been in a position to follow up this feature of safety work on cranes but what the practice of locking switches approaches most nearly to 100 per cent safety of any device or scheme yet put into practice. Consistent effort on the part of those in charge followed up by reprimands and minor discipline for failure to use the locks will make this scheme highly effective.

Maintenance

A maintenance scheme which may work successfully in one plant may not work so successfully in some other place due to the fact that no matter what the scheme is the success depends almost entirely upon the human element involved, making the problem more a question of competent workmen rather than a question of a specific plan. I might add that as far as the works with which I am connected are concerned two or three different schemes of organizations in the various sub-divisions in the plant which make up the works as a whole, are in effect.

At South Works of the Illinois Steel Company there are in operation 222 cranes, charging cars, ore unloaders, etc. With this amount of apparatus divided in several different departments of the plant and with separate organizations maintaining this equipment it has been found desirable to devise some means of keeping in touch with the condition of the equipment in each department not only to make sure that the same is properly maintained but also to give all departments the advantage of any developments good or bad in another department. With this in mind a competent crane inspector is employed under the supervision of the electrical department. This man was chosen from among the best crane repairmen. He devotes his entire time to inspecting this apparatus, a complete round being made approximately once a month. These inspections are written up exactly as the inspector finds conditions and a copy sent to the department superintendent in which the inspection was made and a copy to the safety department. In these inspections proper stress is laid upon safety appliances and cleanliness. Before an inspection is made a review is made by the inspector of the report made the previous month. If recommendations have not been taken care of they are again reported. If recommendations have been taken care of mention is made of the fact that the condition is now O.K. This is done with the belief that the repairman takes a certain amount of pride in keeping up his equipment and the average repairman likes to feel that the superintendent knows that he is trying to handle the job to the best of his ability. It is thought that the effect of a long list of recommendations with no mention made of the work already done might have a detrimental effect on the repair foreman. As it is handled now he welcomes the report feeling that he may get a little sweet along with the bitter.

It is a customary practice for the inspector to make his inspection in co-operation with the mechanic directly responsible for the work. This plan has been in operation at our plant for about five years and, taking into consideration the amount of apparatus involved, we consider the record of accidents due to crane failure a very enviable one. In such plants as are not large enough to warrant the full time of a crane inspector it might be desirable to have the inspections made by someone outside of the department involved. At any rate, regular inspections by competent men should be made and regular reports of such inspection submitted so that the recommended items may be followed up from time to time until completed. The inspector must be a man in whom the repairmen have confidence. Plenty of 1st class "condemners" are always available and care should be taken to choose a man competent to weigh the cost of a recommendation against the risk involved.

DISCUSSION

MR. RICHARD (Ashland Gravity Company): To whom do you make the crane inspector responsible?

MR. HALL: He is responsible to the head of the electrical department. He is a member of the electrical department.

MR. QUISNEL (Commonwealth Steel Company): Do you inspect your cranes before each heat?

MR. HALL: No, it would be almost a physical impossibility at our plants. We have as many crane inspectors as we do cranemen.

MR. QUESNEL (Commonwealth Steel Company): We allow 20 minutes to inspect the heat cranes and we have a very small percentage of the loss of heat.

MR. J. A. NORTHWOOD (Bethlehem Steel Company, Johnstown, Pa.): Don't you pay a little more attention to hot metal cranes than you do to other cranes? Wouldn't the inspector make a more often inspection of a hot metal crane?

MR. HALL: Yes, I forgot to mention that. He gets around about twice a month. The local master mechanic makes his regular inspection and a written report is rendered once a month, at least, on every crane in the plant. We usually have three reports in two months on hot metal cranes.

MR. JOE EDWARDS (Illinois Steel Company): Here is a question that I want to ask you before we get away from the subject. Before we got to the boxes on our cranes we used to have a switch, on the bridge, too, and our boxes are practically 100 per cent in the plant. Do you leave the box on top of the bridge, as well as on the cab?

MR. HALL: The boxes that I referred to are the ones on top of the cranes. We open the switch, close the box and lock it.

CHAIRMAN MCKENNEY: The next speaker, Mr. A. V. de Forest was unable to be present, but he has sent Mr. L. W. Hopkins, of the research department, who will deliver his paper.

SAFE OPERATION AND USE OF CRANE CHAINS

A. V. de Forest, Research Engineer, American Chain Company, Inc., Bridgeport, Conn.

Speaking specifically of crane chain, hoisting slings and chain for similar service, where failure may lead to serious consequences, we might list the desirable qualities somewhat as follows: First, reliability. Then comes strength, elongation and cost.

Let "reliability" mean that there shall be no uncertainty in behavior. That it may not develop unexpected properties the result of any treatment should be studied in advance. Under static load conditions the properties of chain are well known. Workmanship and material have so long been subject to static test and so many thousands of these tests have been made that any reputable chain is as reliable under these con-

ditions as any other construction material. The trouble comes when we insist on using chain under conditions of dynamic loading, that is, where shock and fatigue resisting properties are brought into play.

The tests for determining fatigue and shock resisting qualities are as yet in the experimental stage. They have rarely been applied to chain material, much less to the complicated form of the finished chain. We would like to be sure that no surprising behavior is induced under these conditions, but unfortunately there is plenty of evidence that material which successfully withstands static loads is not necessarily best under conditions of fatigue or shock. No one would suppose that a link of heavy 2-¾ inch chain, weighing 63 lbs., may break like a piece of glass when dropped 16 ft. on end after overstrain. Yet this same link will stand 445,000 when pulled in the regular manner. C. G. Lutts, metallurgist of the Boston Navy Yard, has investigated the occurrence of this surprising brittleness in the best grade of wrought iron chain and finds, fortunately for us, that this type of trouble is prevalent only in large chain.

The conditions under which this result was obtained are peculiar in that the chain was overloaded by a high proof load, and the shock stress was applied as though the chain were in compression. A shock load in compression is not a usual condition as far as chain is concerned! It is to be expected that overload in any metal will make the material weaker under a reversal of load, but the extent of the embrittling effect is rather startling. In this connection a paper by Troendly and Pickwell in the August, 1924, transactions of the American Society for Steel Treating is interesting in showing the transfer of the elastic properties from tension to compression and vice versa by overload. Annealing, of course, will remove the embrittling effect of overload, as well as reduce the extra strength imparted by the overload in the direction of the load. Chain, however, is almost incapable of any but a tensile stress, and the detrimental effect of a single overload is therefore greatly reduced.

The Proof Load

The best practice in chain making has for a hundred years called for a proof load, usually about one-half the breaking load, applied to the finished chain for the purpose of showing up possible defects in workmanship or material. This load is nearly always enough to stretch the chain, and acts as an overload to increase the tensile elastic properties of the chain. While this practice can be carried too far it is certainly not a universal source of danger, as is shown by the abuse most chain is called upon to sustain. Repeated overload is, however, another thing. Here the familiar mechanism of fatigue comes in. At some point in the metal, usually near the surface, a detail fracture begins and gradually penetrates through the section, weakening it sufficiently to cause a break sometimes even below the customary load. This very seldom occurs, however, in practice. Chain is always used with slow moving machines and the number of applications of stress is small compared with the

sustained by parts of high speed machinery. A million stress cycles is a relatively small number in fatigue testing, but at the rate of a load a minute is would take five years of ten-hour working days to reach it. The load carried by chain is usually too variable to develop true fatigue conditions. The damage comes from a small number, perhaps only a few hundred peak loads, accidental shocks due to slightly careless handling, sudden lifting or the slipping and readjustment of a sling.

This is fortunate, for it provides an automatic self-recording check on the condition of the chain. If the chain has been overloaded it has been stretched. If it is measured carefully at frequent intervals, any elongation that is not the result of wear is a sure proof of overload. In that case it is to be presumed that the chain is too light for its present service and should be replaced. If the chain is amply strong for its regular use it is still possible for careless handling to cause a serious momentary overload. From the condition of peration it is easy to determine whether chain or workman should be corrected.

It is wise to carry a factor of safety or a reserve strength to care for some unavoidable condition of emergency. This is usually found to be a sudden shock load. Now the shock strength of a chain is a function both of its strength and its elongation. In all ordinary material, strength and elongation are somewhat antagonistic. Whatever treatment raises the strength, decreases the elongation. In chain, the working strength, and the load at which deformation begins, can be raised by taking out some of the elongation by means of a high proof stress, but this is at the expense of reserve shock strength. Conditions of service govern the selection of a factor of safety, but ordinarily it is wise to retain all the reserve shock strength which the manufacturing process allows.

The much discussed question of the effect of annealing might be here considered. It is well known that annealing restores its original properties to cold worked or distorted metal. At the same time it destroys the increased strength due to that cold work. As far as mitigating the effect of fatigue is concerned, it naturally can have no healing effect upon a failure already started, but it can and does lower the resistance to deformation, and thereby calls attention to the fact that the chain is being overloaded.

To illustrate: A 1 inch chain normally breaks at 60,000 lbs. with 15 per cent elongation. A proof stress of 30,000 lbs. causes 3 per cent elongation. Any load above 30,000 lbs. will cause additional elongation, but without careful measurement by inspectors the load could rise to 35,000 with perhaps 6 per cent elongation. Repeated loads just below this figure would start fatigue cracks and final rupture without appreciable further elongation. If, after the first application of the 35,000 lb. load the chain had been annealed, it would start stretching at about 28,000 lbs. and again would show nearly 15 per cent elongation, and if the 35,000 lbs. were once more applied, the elongation would be so great that overloading would be self-evident. Here the annealing would

act to protect the chain from further abuse. Suppose, however, that the loads repeatedly applied were 30,000 lbs. and the chain were not annealed after its one application of the 35,000 lb. load. It would carry these loads without danger, but would have lost the 6 per cent elongation taken out by the 35,000 lb. load and the resulting greater shock resisting power. Briefly, the annealed chain has greater resistance to breaking under a single shock load; the unannealed chain can stand a higher repeated load, has a higher working strength, but does not have as great a resistance to a single shock.

Annealing Increases Factor of Safety

The greatest benefit from annealing lies in the fact that it automatically increases the factor of safety. If improperly carried out, that is, if the chain is heated too hot, kept hot too long, or cooled too slowly, it weakens the chain. In general, it is only useful after the chain has been distorted by an overload and to lower the working load. It should not be done periodically as a "cure all," but, carried out in conjunction with careful inspection, it will add to the safety of lifting and hoisting operations.

To sum up the case of reliability: chain is perfectly safe only if it is not overloaded. Conditions of service make it very difficult to know the exact load or to prevent accidental overload. Inspection and measurement will determine whether a chain is heavy enough to stand up to its job and give notice of any abuse. Wear is sometimes a factor in causing elongation of chain, and it is necessary to distinguish between this effect and that of overload. Depending upon its use, chain should be replaced when the factor of safety has been reduced in this way by a definite amount. Annealing after distortion will tend to lower the working load and increase the factor of safety under shock.

Annealing, however, can only restore ductility in the metal and does not affect the loss in elongation due to permanent deformation of the links. No chain should be used on important work after it has been badly overloaded and has thereby lost a considerable proportion of its remaining elongation. Its tensile strength may be unimpaired but its reserve of shock strength is gone. If annealing is carried out, the chain should be heated to a uniform temperature of between 1500° F. to 1600° F., kept at heat only long enough to reach this temperature throughout and cooled freely in air.

The question of tensile strength and elongation is a minor one compared with that of reliability, and in fact most of the discussion on the subject is due to an attempt to interpret these easily measured factors in terms of shock and fatigue. In the absence of direct proof there are various arguments for and against the different materials and methods of chain making.

Up to seventy years ago, low carbon steel was almost unknown. Chain, like all other forgings, was made of wrought iron. When basic open-hearth steel, suitable for welding and forging, came into the market, its

low price and uniformity allowed it to drive wrought iron out of many of its previously held positions. On account of its low price it was looked upon with suspicion as a cheap and inferior substitute by many who wanted the best regardless of price. There seems to be a feeling of the same kind in regard to steel chain, in spite of its superior strength and equal elongation. In large sizes there are welding difficulites which make the iron chain easier to manufacture, and most chain above 1-½ in. is made of iron. Below ½ in. nearly all chain is steel, and much of it is electrically welded. Between ½ in. and 1-½ in., therefore, steel and iron are still in competition. Tradition favors iron, and price favors steel. So far tests are inconclusive.

Iron chain is ordinarily made from a mixture of pure soft puddled iron and reworked scrap, the resulting metal, after proper welding and rolling, is stronger and harder than the pure puddled iron and yet has the same elongation. Chain can be made out of puddled stock without scrap but the price is excessive and the chain weaker than necessary, without any clearly proven compensating advantages.

The question of price is usually a question of the proper factor of safety. Whether a certain job requires ¾ in. or 1 in. chain is a question for an engineer. That is, the number of pounds of chain is properly a matter for technical opinion, but all too often the quality, if it affects the price per pound, is in the hands of a non-technical Purchasing Department. It would seem logical to include both under the same category, and both subject to engineering judgment.

The law and the prophets can easily be summed up in two sentences. First, buy good chain. Second, don't overload it. The answer to the first requirement is to buy chain honestly and conscientiously, chain made of good material; and the answer to the second, constant and careful inspection.

DISCUSSION

MR. J. A. NORTHWOOD (Bethlehem Steel Company, Johnstown, Pa.): Mr. Chairman, in regard to that question of annealing, there are so many different ways of annealing that very often the annealing is not done properly, and I think there is a big question on that proposition. I would like to have that explained.

MR. HOPKINS: I would say that the method of annealing is far more important than the question whether you should anneal or not. The ordinary term means that it should be kept in a furnace for several hours, so that you can be sure that the material is thoroughly heated. Cooling furnaces—that treatment is all wrong. You want to refine. If annealing is carried out, the chain should be heated to a uniform temperature, kept at heat only long enough to reach this temperature throughout and cooled freely in air. Just heat your chain long enough to be sure that it is thoroughly heated and then pull it out on the floor and let it cool in the air. Heating it slowly is to be preferred,

and that is true of any heating operation. You bring on strength b heating it rapidly. I doubt very much the effect but heating slow is usually recognized as a better practice than heating rapidly.

MR. MURPHY (Pullman Company): Some give 500 degrees Cen grade, while others give 900 degrees Centigrade. Which would l right?

MR. HOPKINS: Fifteen hundred degrees Fahrenheit or sixte hundred degrees Fahrenheit has been our experience. Some of t authorities say a lower temperature, because your chain is not heat as rapidly at a lower temperature.

If you are careful to pull your chain out at 1500 degrees Fahre heit or 1600 degrees Fahrenheit and let it cool fairly rapidly, you wou get probably the same effect as heating it at 1300 degrees Fahrenh or 1400 degrees Fahrenheit.

I dont think that the average man in the steel industry knows wh 1200 degrees Fahrenheit is. If we standardize on 1600 degre Fahrenheit, we would be more liable to get it.

MR. MURPHY (Pullman Company): We made an experiment w six pieces of one chain. One piece which was annealed came c at 977 degrees, another at 900 degrees and another at 1300 degre The piece that came out at 977 degrees showed better results th the piece that came out at 1300 degrees. There was not so mu stretch to it.

MR. HOPKINS: There would not be as much stretch as elongati Your elongation, combination of the two, would give you your sh strength. Wear is sometimes a factor in causing elongation of cha and it becomes necessary to distinguish between this effect and t of overload.

MR. MURPHY (Pullman Company): The piece that was annealed 977 degrees broke at 23,000 pounds and the piece annealed at 1 degrees broke at 1100 pounds.

WEDNESDAY MORNING SESSION

CHAIRMAN MCKENNEY: I regret very much to say that the f speaker is unable to be present.

(Mr. Bennett read prepared paper of Mr. Watters)

PROTECTIVE DEVICES AND CLOTHING FOR FOUNDRY WORKMEN

W. E. Watters, National Malleable Castings Company, Melrose Park,

Employes should keep their persons and their clothing as clear possible. Careful attention to this point fosters selfrespect, and

proves the general tone of the mill or factory and it also has other material advantages. In case of injury, for example the danger of serious consequences from infection and blood poisoning is lessened in a marked degree.

Three distinct requirements are called for in the design of the most suitable working garment. These factors are safety, comfort and sanitation.

A working garment to meet the requirements of safety should not expose any loose parts, which could be caught in moving machinery or projections such as exist in many industries. Sleeves and trousers should be cut so as to permit free movement of the limbs, but no unnecessary looseness; many serious accidents have occurred due to this fault. The custom of wearing coats unbuttoned is a dangerous practice in the vicinity of moving machinery, for the garment is liable to be caught in the machine and draw the victim into the working parts. Careful attention should be given to the working clothing of female employees, for the ordinary clothing worn by the industrial female worker is anything but suitable for safety. Skirts are unsuitable for most industrial duties. They easily become caught in moving machinery and in addition do not permit the proper freedom of movement called for in many industrial duties. They are liable to be too long or too short, and of unsuitable material, and unless made of a washable, nonshrinkable material and regularly cleaned, the dust, dirt and other impurities which often cannot be avoided in manufacturing processes, lodge in the skirt and make it anything but a sanitary garment. Shirtwaists are also not intended for working clothing being invariably too loose, which is always a hazard, and the material is also unsuitable for factory service conditions.

Female employes should always wear caps wherever there is a liability of their hair becoming caught in machinery, belts, etc. Some distressing accidents have occurred from lack of this precaution. In addition to the cap being a safeguard against accidents it also affords protection to the head of the wearer against dirt, dust and other impurities. No matter how well clothing conforms to all other requirements, if it does not meet the requirements of sanitation it cannot be considered a suitable working garment. Our skin rebels against anything but fresh air and cleanliness. Without going into the anatomy and physiology of the skin, it can be stated that a working garment should be regularly and thoroughly cleaned, for it becomes unhealthful from dirt, dust, grease, perspiration, germs and other impurities. It is evident, therefore, that a working garment, to meet the requirements of hygiene and sanitation, should be made of non-shrinkable material that can be thoroughly washed.

A hazard which is directly responsible for a very large number of fatal and non-fatal accidents in this country, has been overlooked in accident prevention progress. I refer to slipping and tripping. The

advancement made in walkway surfaces has been notable from almost every angle but safety, and some of the latest walkway surfaces show a disregard for safety, which is hardly believable. Undoubtedly the highly polished surfaces which we now observe, will be a cause of a great number of slipping and tripping accidents unless some attention is given to the first necessity of walking surfaces, that is, a safe foothold.

The object for which many walking surfaces were apparently designed, seems to be to furnish to the walker as little friction as possible Friction constitutes walking safety and unless there is sufficient friction furnished between the walking surface and the foot of the walker, there is danger of a slipping accident. When these highly polished walkway surfaces become damp from humidity in the air, rain, snow or any other liquid or oily substance, the danger to those walking thereon becomes intensified. *Why* this disregard of the lives and limbs of those who must use such walkway surfaces? *Why* is the most important requirement of walkway surfaces, namely, safety, so ignored?

Walking Surfaces

The installation of unsafe walkway surfaces, and the policy of placing a warning sign, such as, "Watch Your Step," is entirely wrong. There is only one remedy to prevent slipping and tripping accidents and that is installing a safe surface, one that provides sufficient friction for the foot to remain under perfect control, and not slip off in any direction.

Slippery or defective flooring is particularly hazardous around wood working machinery, owing to the danger of falling against the rapidly revolving blades of some machine. Such accidents should be guarded against, as far as possible, by the provision of a floor of sufficient friction to hold the feet firm and also by keeping the blades or knives covered to as great an extent as the work will permit. Floors should be kept as free from sawdust and waste material as possible, and, this connection, an efficient exhaust system will be found to be of great value. Unsuitable clothing, hazardous as it is in other industries, particularly so in pattern, carpenter and woodworking shops. Ragged sleeve ends or loose fitting or unbuttoned coats or jumpers, often catch on moving parts of machinery and cause serious and sometimes fatal accidents. It is a wise precaution in many classes of work to roll the sleeves of all garments up above the elbows. Employes working machines should not be permitted to wear gloves, as they sometimes get

Among the hazards of foundries is sandblasting. It required a great deal of thought to thoroughly equip our sandblasting houses and properly clothe the men to make it absolutely safe for them to work We now have a sandblast equipment which is very good, as far the health of the operators is concerned. The sandblasting of metal castings has developed one of the most dangerous of dust hazards

vision, as well as to the general health. In foundries, the burnt sand and scale must be removed from castings. Formerly, this was ordinarily done by hand, hammer and chisel. Also by handscraping with steel brushes. That process was unsatisfactory, both as to result and because of the lack of protection against dust. But methods have gradually been developed, until now the operation of sandblasting at our plants may be accomplished practically without menace. Men engaged in this work must be afforded protection to the hands, eyes and face, for the sharp particles of sand are driven with such force against the surface operated upon, that they rebound many feet, and the surrounding air is constantly filled with dust produced both from the driven sand and that which is removed from the surface which is being cleaned. Our men are supplied with a steel mask in which they receive air from the outside. This mask is again protected by a canvas hood which covers the entire head. The first mask spoken of is equipped with glass for the men to look through. In order to protect this glass from the particles of sand, the hood, which is placed over the first mask, has a fine wire screen. The air supplied through the first mask is equipped with a main hose, which blows through the screen on the outer hood. By this method, it is impossible for any dust to enter the hood. The man's head, therefore, is kept absolutely clean. The above mentioned mask has met with such favor that I would like to describe it a little more in detail. It is made of strong, light material shaped after the general contours of the face of a man, with a large nose-piece which covers both the nose and mouth of the wearer, with laterally extended wings which cover the eyes, cheek bones and cheeks of the wearer, with glass lenses on both sides of the nose-piece for the eyes. It is held to the head by a flexible harness which fits over the top and around the sides of the head of the wearer. An annular cushion, which is inflated, is attached to all edges of the mask, and lies on the rear side of the mask and is of such size and shape that it will extend across the forehead, down the cheeks and across the chin of the wearer. This air cushion is inflated through a tube which is attached at the lower end of the cushion, and is equipped with a valve. A flexible air supply conduit connects with a rigid conduit at the upper point of the mask outside. This flexible conduit being so arranged as to pass over the wearer's head and down his back, where it is held in place by a belt, which passes around the wearer's waist. At the point of the flexible conduit where it is attached to the belt is a connection which is used to attach to a similar connection on a flexible conduit, leading to the main air supply. This second flexible conduit allows the wearer unhampered freedom of movement within the limits of the area covered by the flexible conduit.

The clothing worn by these men consist of a muleskin apron extending from the neck to the knees, heavy. Leather leggings so formed as to cover the top of the shoe, also leather gloves. With the above equipment they can work for hours without discomfort.

Injuries to Feet

Injuries to the feet constitute a good percent of our total number accidents. Our practice is to furnish a legging to each molder ar laborer when he is working about or pouring molten metal. This le ging is made of heavy duck, and is kept in repair from day to day— daily inspection being made. When leggings are found to be worn burned they are taken from the men and replaced with others in go repair, and necessary repairs made to those requiring same. In ad tion to leggings, we compel each molder or foundry laborer to we shoes of the congress type, and we have also in some cases oblig men with varicose veins to wear shin guards to protect their vei from being cut and bruised.

A scientific but practical inspection system is probably one of t greatest requirements for a proper solution to prevent accidents. thorough inspection system is a very important part of accident p vention. The size of the plant should determine the number of spectors required to carry on this inspection. Two are generally us and the work is divided as follows. The first inspector sees that wo ing conditions are in keeping with the law, also rules and regulatic layed down by the management regarding safe and unsafe practic to determine hazardous conditions and make suggestions to the saf engineer.

The duty of the second inspector is to inspect all machinery to that it is properly guarded, to see that all guards are replaced af repairs are made to machinery, to see that all guards are kept in g condition, to see that they are properly painted and make out a d report covering the conditions as found.

I would also recommend in connection with this above inspect that the head repair man in charge of inspection and repairs to chinery make out a report covering all working parts of the machi under his jurisidiction. By this daily inspection and the making of the reports it will be found that accidents caused by defective chinery will be reduced and the efficiency kept at a higher standar

The safeguarding of machines resolves itself into the use to wh they are to be placed. A guard is placed to prevent accidents. may also be used to prevent wear on gears, bearings and other p of the machine. Some safety engineers prefer guards made of s metal, some punched plate or expanded metal. Others again prefer iron or cast steel and I have seen a number made of wood. Al these materials have their advocates and have also been condem when used for certain specific purposes.

The solid or entirely closed in guard is opposed by a great n engineers on the theory that the working parts does not permi proper inspection without removing the guards. It also retards r inspection.

The expanded metal and punched plates also meet with various opinions. Some are of the belief that the parts wear out more frequently due to dust, scale, etc., that might be prevented by the use of the entirely closed in type. In designing guards for gears it is well to keep in mind whether they are to run in oil and the amount of oil used. In other words; in designing guards and selecting the material it is well to consider carefully the place they are to be used and the work they are to perform.

Punch presses, drop hammers, shears and this class of machinery are now so guarded that there is very little cause for injury to workmen on machinery of this class. The guards on some of the machines are so arranged that they can be tripped only when both hands are out of danger. Fingers and hands are brushed aside by a guard to prevent them from being caught. To remove material placed under punch presses a number of different ways have proven a success, where it cannot be done automatically by machinery; magnets, vacuum cups, sliding beds, brushes etc., have proven their value.

Guard railing made of angle iron or similar material is found to be the most substantial. Stairs should be used instead of ladders where possible especially such places as going to and from electric traveling cranes or those used a great deal.

Out of about 700,000 of the non-fatal accidents occurring annually in the United States about 60,000 are injuries to the eye, and, in the nation as a whole, it is estimated that 200,000 persons annually receive eye injuries.

Eye Hazards

Hazards to the eyesight of industrial workers are found chiefly in the following industries and occupations: the manufacture of iron and steel, machine operations, chipping, grinding and polishing, riveting, welding and cutting, mining and quarrying, sand blasting, woodworking, and where there is exposure to irritating and poisonous dust or fumes and gases, or to intense light and heat. These are not cited in the order of their importance as productive of eye accidents. In chipping operations there is always danger of the eyeball being penetrated by flying slivers of metal, which sometimes have such velocity that they penetrate very deeply and have been known to lodge in the optic nerve. The use of goggles is the most effective means of preventing accidents from this cause. Goggles for chippers usually have side screens for the deflection of chips coming from a lateral direction, but the tendency is to eliminate these side pieces and place screens between adjacent workers. The side pieces contribute to the steaming of the goggles and cause discomfort because of their weight and appearance; in some shops the soft metal chips are broken off with a hammer instead of being removed by the chisel. By this plan is avoided the hazard from the great velocity given the chips when they

are removed with the air-hammer chisel. Moreover, such remnants as must be removed by the latter process are much smaller than the original chips.

Cutting and trimming metal in machines produces flying chips, which cause many eye injuries. In the machining of rough castings there is also the hazard of flying sand that has adhered to the metal. As a result, the workmen often rig up protective screens of different kinds, but these in many cases are the cause of accidents. However, a guard properly designed, if made of good material and carefully fitted to the toolpost will give the required results.

Anyone who has handled core compound, which consists of pulverized pitch is familiar with the results of careless handling of this material. The hands become soiled with the fine dust and this is transferred to the face through the use of the handkerchief when perspiring freely. No ill effects are noticed as a rule until the next day; then the skin feels stiff and painful, very much the same as the result of sunburn or burn from the electric arc. The appearance of the skin is red and shiny and sometimes the eyes are blood shot.

This peculiar effect is not confined to pitch alone, but is caused to a lesser degree by all coals, and soot deposits in chimneys.

It has been found at our works that the above condition can be obviated if the persons handling this material wash immediately afterwards and then wash the exposed parts with a one to one mixture of 188 proof alcohol and saturated Boric acid solution. When these precautions are taken, no bad results are experienced.

The entering and leaving the works, by employes and the going from one department to another has given us considerable concern but it was finally worked out to what we now call our Human Conveyor.

The only entrance for foot travel is directly through the time clock lobby and tunnel entrance, located in the service building. The service building, which is adjacent to the main office, contains the wash rooms, locker rooms, shower baths, toilets, etc., for the employes, as well as the time office, time clocks, employment office, first aid and medical examination rooms. The service building and main office may, therefore, be termed the Head; the tunnel being connected with the Head and running to all parts of the plant; somewhat similar to the spinal column of the body. Therefore, the tunnel, being of such vast importance, must be large, well drained, lighted, and of ample capacity to perform its function.

New Men

The effect on new men coming from the employment office is to be considered. The first impressions are always lasting, and one immediately struck by the immensity of the proposition, as well as i

protective features. He immediately gets his bearings and can find his way to the various departments without any difficulty, all exits being plainly marked. He sees that the tunnel is used effectively in going from one department to another. As new men are most liable to accidents, this possibility is lessened, because it keeps them away from the dangerous places with which they are not familiar on the outset. The new employe finds the tunnel is convenient and leads as a direct air line route to all departments. Then, again as it takes less energy to tread on a smooth concrete floor than on a path containing obstructions such as are likely to be found in a manufacturing plant, he makes use of it from the start. The department heads, realizing this, are not compelled to keep other thoroughfares open and can utilize all valuable space for manufacturing purposes.

Where the two sexes are employed, the tunnel is very advantageous to the female. She is able to go to and from her work without running the gauntlet, viz., groups of the opposite sex that habitually gather, especially at the noon hour; their jests and remarks sometimes being objectionable to her. So, from a moral standpoint, the tunnel acts as a silent reformer.

In plants where men are on different shifts coming and going at various hours of the day, the tunnel does its work quietly and efficiently. The various shifts come and go without molesting or distracting the attention of gangs already at work. In plants that have no tunnel, men that come and go from their work, stop and chat or otherwise interfere with those who are working, the practice of which may sometimes be the cause of an accident, particularly where it is necessary to cross railroad tracks, electrical truck right-of-way, as well as the areas commanded by overhead traveling cranes carrying their loads.

In foundries and plants where men become wet with perpiration, the tunnel offers protection to them in their travel to the service house and shower baths. They do not have to pass the open spaces between buildings, thereby obviating the possibility of contracting chills, colds, lumbago, etc., common in the winter months; all of which add to the cost of production and effect the earning power of the individual.

Last but not least, this great underground concrete duct, which is 10 feet wide, 9 feet high and 300 feet in length, offers alike its protection to everybody using it as a thoroughfare. Workmen, office help, salesmen, visitors and outside contractors are all secure within its walls. This tunnel of modern times may be compared with the subway of a great, congested city, as an artery of speed and safety and protection that it offers to those not directly connected with the plant, which is a matter of utmost importance.

REPORT OF NOMINATING COMMITTEE

MR. JOHN A. OARTEL: Your nominating committee begs to report the following nominations for the ensuing year: chairman, T. H. McKenney,

South Works, Illinois Steel Company, Chicago; vice-chairman, A. C Gibson, Spang-Chalfant Company, Pittsburgh; secretary, Fred G. Bennet, director of safety and welfare, Buckeye Steel Castings Company, Columbus, Ohio.

(The report was accepted by [illegible])

PROPOSED CHANGE OF NAME OF SECTION

CHAIRMAN MCKENNEY: I wonder if it wouldn't be in order at this time to suggest the name of Iron, Steel and Other Metallic Trades would not be in favor of dropping a single institution that is engaged in a metal trade, anyway. We want to make it a united section all the way through.

I just wonder whether or not it wouldn't be well to consult the executive officers on this matter. There may be some reason why this name should not be changed. I just wonder if it wouldn't be in order to have a resolution passed to the effect that a committee be appointed; that it be the sense of the Metals Section that this name be changed to the Iron, Steel and Other Metals Section.

SAFE HANDLING AND USE OF CUTTING AND WELDING GASES

H. S. Smith, Union Carbide and Carbon Corporation, New York City and G. O. Carter, Linde Air Products Company, New York City

Gases for cutting and welding naturally fall into two classes: namely (1) fuel gases and (2) oxygen. Fuel gases such as acetylene may be generated at low pressure in the plant or bought in cylinders at high pressure in dissolved form, while other less commonly used gases may be purchased in liquid or gaseous forms in cylinders. Approved practices for generating and handling fuel gases have been set up by the regulations of the National Board of Fire Underwriters, so there is little or nothing to be said on their safe handling and use, which has not already been said and placed on record many times.

The same can hardly be said with regard to oxygen. Its widespread use for example about the furnaces in steel plants and foundries involves the assumption of certain definite risks not common to other industries. Therefore, the time available may be spent with profit if we note some of these hazards, and describe simple and feasible ways of avoiding most of them. First we will relate what is generally accepted as approved practice in handling oxygen cylinders.

Receiving and Storage of Oxygen Cylinders

Steel plants and foundries in general are what may be called "large consumers" of oxygen. Their requirements run from a few hundred

cylinders per month to as many per day. Therefore, the problem of receiving the supply and accounting for the cylinders is worth special consideration by the storekeeper.

On receipt of a shipment of cylinders, the careful warehouseman will examine them, and set aside any which show evidence of rough handling. Leaky valves can be detected by filming the outlet with soapy water and watching for bubbles. A cylinder with damaged threads on the outlet nipple should also be set aside, and the oxygen manufacturer notified.

It is a hard job to prevent truckmen and laborers from dropping cylinders out of the car or truck. Despite the fact that they are made of highest quality metal, they should not be mishandled since they contain gas at very high pressure, which seeks flaws unceasingly. Common sense alone signifies reasonable caution. One good way to avoid carelessness is to build storage platforms car-body high. Since oxygen is not combustible, explosive or lethal most of the precautions thrown about the handling of oxygen cylinders (such as keeping lights and fires away) are primarily established because all cylinders look alike to some men. If they are careful with oxygen when it isn't strictly necessary, they will probably be careful with acetylene or other fuel gases where it is absolutely necessary.

Call Oxygen by its Right Name

Right in this connection a thought may be interjected with all the emphasis we can command, and that is this: Call Oxygen by Its Right Name. When you mean oxygen, say "Oxygen." For this reason:

During the last twelve months there have occurred three or four accidents caused by foolishly using a cylinder of oxygen to impose head pressure on an oil tank feeding burner or preheating torch. This would be a hazardous proceeding even on a clean, empty tank, for the pressure in a fresh cylinder of oxygen (2000 lb. per sq. in.) is sufficient to overstrain and probably rupture the average storage tank. When the interior of the tank is greasy or oily the practice usually causes immediate disaster, for the oily substances take fire spontaneously in contact with the oxygen developing so much heat and pressure that an explosion and fire result.

Such accidents may be in part due to the fact that many welding operators, foremen, and even purchasing agents, refer colloquially to a cylinder of oxygen as a "cylinder of air" or a "tank of air." Perhaps some of them really think that it contains compressed air, and that it can be used interchangeably with the air supply from a compressor for pneumatic hammers, drills, and other tools. Nothing is farther from the truth!

This confusion of ideas is probably due in part to the corporate names of the leading manufacturers of oxygen: The Linde Air Products Company, and the Air Reduction Company. However, these

organizations never refer to their product as anything but "Oxygen." Each is shipped with a tag or label showing the word "OXYGEN" in large type. Rough handling in dirty places may obliterate and mutilate this lettering; nevertheless, users of compressed gases cannot be too careful to use the correct name at all times, and insist upon their workmen and supervisors doing the same

Oxygen is not air, it is oxygen. Acetylene is not "gas," it is acetylene. The assumption that oxygen and air are synonymous terms is particularly dangerous. Like steam, water or electricity, oxygen is a docile servant when properly used.

Store in a Safe Place

Once the properties of oxygen are understood, it will be known that although it will not burn, it will aid mightily in burning anything else which will. For that reason, cylinders should not be placed near stores of rope, tar, building paper, or paint. Oil and grease, of course, should be kept religiously away—a most important point that does not need to be stressed in detail before the present audience

Moderate changes in temperature involve no hazards for oxygen cylinders. Therefore, it is quite all right to store cylinders on an outside platform provided they are sun shaded and protected from tampering by curious individuals. This is the chief consideration for isolated stores—say on an ore dock or in a scrap yard, or in a mill building A small shed likewise will suffice. Make a skeleton of second-hand structural shapes or pipe, a roof of corrugated iron, sides of heavy fencing welded on, and a locked door. Locate this where it is accessible for cars or trucks, yet where there is no danger that it will be pierced by a flying chunk of steel or the cylinders endangered by spashes of hot metal or slag.

Transportation of Cylinders

Oxygen and fuel gases are used in such quantities about a steel plant that a definite delivery service should be established. This is not only cheaper, but better, than sending a laborer and a wheelbarrow. He will loaf on the job and the load will be spilled frequently. Furthermore, a regular truckman can be instructed and depended upon to handle the cylinders in a careful manner and with oil free hands.

Deliveries about a mill building are often made by crane. Should a cylinder of oxygen be dropped hard enough to rupture or puncture it some damage might be done while threshing about before the gas escapes. Therefore, handling with a magnet or by chain slings should be prohibited. Load the cylinders into a "boat" or a box with sides, or provided a special carrier such as illustrated in *National Safety News* for January 1923.

For ordinary jobs of cutting and welding, located here and there throughout a mill, a two-wheel truck with cylinders chained in, shou

be bought from an apparatus manufacturer. Beyond the obvious fact that delicate regulators and valves will be better protected, this truck elevates the cylinder from a nuisance to be kicked out of the way to a real tool to be treated with due consideration. Much hazardous mistreatment of cylinders by workmen undoubtedly is due to the fact that their foremen seem to think that a cylinder is of no account, and a welding outfit deserves no more care than a sledge.

Oxygen for Tap Holes

A great amount of oxygen is now used close alongside blast furnaces, steel furnaces, and ladles of molten metal,—for opening tap holes through which rush streams of white hot metal. This use of oxygen involves certain additional risks.

An oxygen lance is a simple form of cutting blowpipe. It is best adapted to piercing holes in large masses of iron or steel and cutting large sections. This metal may be clean or very dirty, hot or cold.

It is absurdly simple. Too often it is found in operation stripped to its bare essentials that is consisting of nothing more than a length of ⅛ or ¼ inch steel pipe, connected to a cylinder of oxygen with a piece of common hose. In such form it requires two men to operate it—one handling the lance with the other opening the cylinder valve. This scheme has nothing but parsimony to recommend it, because operation without proper attachments has caused several bad accidents, and is very wasteful of oxgyen as well.

Therefore, safety, convenience and economy demand certain attachments as sketched. A heavy duty regulator should be used to control the pressures in the hose. Such regulators are designed to pass a heavy flow of oxygen without so called freezing. In order that the supply may not fail it at a critical moment, it is desirable to hook up at least five cylinders to a manifold.

It should be repeated that several accidents have resulted from a failure to provide oxygen pressure regulators for this work, even in plants where ordinary cutting and welding practices are quite good It is easy to see how these accidents occur. If, for any reason, the lance pipe becomes plugged, pressure in the hose and pipe mounts to rupturing proportions. The way to avoid this is simple; insist on the use of a regulator and then insist on careful attention and frequent inspection.

Despite what many furnace men say, oxygen pressure on the line should not be high; usually 60 lb. will be ample. In fact volume is more important than pressure. Pneumatic hose may be used. Be sure it has not previously been connected to air tools and is never loaned to a riveting crew to become oily or greasy. Large area, especially at couplings, is very desirable. Do not use wire-wound hose, because if it bursts, it flies into fragments.

The bent piece of 1 in. pipe serves as a handle, allowing the operat to stand to one side of the stream of sparks, blown back out of t hole. (Goggles and asbestos gauntlets are obvious essentials.)

The lance pipe must also be free of oil or grease, and have en with easy running threads. Each length should be equipped wi the usual sleeve connection. Freedom from oil or grease can easi be insured by placing the pipe in a reheating furnace, and keepi them at a red heat for a few minutes.

Hazards of Furnace Work

It is obvious that close proximity to molten iron and steel is n the safest place in the world to keep oxygen cylinders. In the fi place, most cast houses and tapping platforms are somewhat inacc sible, and many handlings are required before the cylinders fina arrive at the scene of operations. In the second place, there is no too much room available at the point where the oxygen is needed in other words, cylinders are liable to be very much in the way. Last the surroundings are hot, and there is danger that a splash of me or slag may strike a cylinder, causing the oxygen to burn throu the cylinder wall and escape with a violent "kick-back." (Iron "kindl in pure oxygen at approximately 925 deg. C., a cherry red heat.)

For these reasons it is advisable to bring the oxygen to the furn in some other way than by cylinders. We shall describe this mod method at length later in this paper. However, the large majority steel plants still use cylinders close to the furnace. For such conditi the following remarks apply.

It should be apparent that the cylinders serving each furnace sho be enclosed in a sheet metal cupboard, affixed to the wall in the shel of some building column. Regular delivery service by careful, perienced men should be instituted. Rigid inspection should be gi all equipment at frequent intervals—hose should be cut back a cou of inches at each end; examined for deterioration, and couplings curely replaced; manifold and regulator tested for leaks and gau for accuracy; lance pipe watched for grease and oil. Above all, men should be observed in action, and cautioned against any carel ness or reckless disregard of common rules of safety.

However, it is many times impossible to find safe storage for c gen cylinders near the tap-hole of open-hearth furnaces. For s a condition a large rolling mill has devised the traveling oxygen su shown on the attached print (10,911). Cylinders are loaded into t buggy from the bottom, rest on cradles and are held in place by end gate. A little shelf attached to the handles supports the m fold, and pressure regulator, all of which is guarded from a pas blow by sheet metal and wire screening. This equipment can rea be wheeled up to the furnace breast when tapping is necessary, removed promptly to a safe haven when it has served its purp

Pipe Lines for Oxygen Supply

Unquestionably a safety engineer can do much to reduce the risks attending the proximity of oxygen cylinders and large quantities of molten metal. Nevertheless, the ideal would be to keep them as far apart as possible. Fortunately this ideal can be approached by installing an adequate pipe-line system, leading from manifolded cylinders at a central point to the various consuming stations. This scheme has given great satisfaction at railway shops and large manufacturing plants for some years, and therefore a system can be installed with assurance of permanent satisfaction.

Nor is the cost so very high. A recent study of a typical small plant, possessing two blast furnaces, 10 open hearth furnaces, and the necesary rolling mills, showed that 3500 feet of pipe line (the longest branch of which was 1200 ft.,) would satisfactorily cover the plant, so outlets could be placed within 50 feet or more than 90 per cent of the oxygen consumption points. This expense was estimated as follows:

Housing and platform	$1000.00
Manifolds and regulators	1000.00
Pipe: 3500 feet at 50c	1750.00
Valves	400.00
Total first cost	$4150.00

The operating costs would be:

Interest and depreciation 25 per cent (per year)	$1000.00
Extra labor for attendance	1000.00
Total	$2000.00

The cost of handling individual cylinders in that mill was estimated as 25c each; so that the above yearly expense would pay for handling 8000 cylinders per year by hand. This amounts to 650 cylinders per month—the approximate consumption of their open-hearth department alone.

On this basis only it was good business to pipe the plant for oxygen. As a matter of fact, experience shows very large economies in oxygen consumption when furnace tapping is done with proper manifolding system. Add to this the real value of the safety insurance, and the brief for the oxygen pipe line as economical method of handling fairly large quantities of oxygen is complete.

Oxygen Manifolds

Each plant is a study in itself, nevertheless some of the details of a typical installation may be given.

The central welding shop will probably be favored for the location of the manifold. It will ordinarily be at or near the boiler shop. and conveniently situated for the furnace departments and mills. The

plant may be served, therefore, with not too great length of piping. The shop is also convenient to railroad track or trucking roadway, sc cylinder handling is reduced to a minimum. Furthermore, the repair man who cares for welding equipment is an ideal person for handling the cylinders to and from the manifold, and he ordinarily will have plenty of time to do the work.

The manifold room should have storage space for a minimum car load of oxygen cylinders (say 200 at least). Its floor should be car body high. An ample loading platform should be provided. Of course it is separated from any acetylene generator or fuel gas stores by a firewall. It should be steam heated to prevent regulator trouble in severe winter weather.

No attention need be given the oxygen supply at night if a sufficien number of full cylinders be hooked on the line after the day shift quits If a full 12-hours' supply is available during the night-time—whe consumption normally would be at a low rate—an ample margin wil be available. In the typical small steel plant under discussion, tw 20-cylinder manifolds each with its own regulators, would be suff cient. These should be joined to headers and have necessary valve and by-passes so any bank of ten could be cut off the main line a will, or, as they become exhausted, turned into the low-pressure lin leading to the welding shop.

A word of caution may not be amiss. It is better to buy the man folds from a reputable manufacturer of welding apparatus than to mak them yourself. It will probably cost less in the end. Furthermor 2000 lb. per sq. in. is rather too high a pressure to trust to the ordinar pipe fitter or pipe fitting.

Certain accessories are desirable. For instance, a gauge should b located in the tool room showing the line pressures, so the attendan could have his "eye on the line" constantly. Another useful devic is an accurate master gauge, so the pressure on the line can be observe during the noon hour or at least every week-end, to test for pressur correctness and for system leakage. A main line valve should b placed outside the building where the fire department can arrange have it closed in event of an alarm.

Oxygen Piping

Oxygen piping should be designed for 100 per cent overload at an station. This will take care of unusual demands or plant expansio It should also be capable of delivering 2000 cubic feet oxygen per ho at 100 lbs. per sq. in. at the furtherest point from the manifold. Ev dently such a layout should be made by competent engineers.

In an open hearth a pipe line should be carried along both sid of the craneway spanning the bay in which the steel ladles are handle These lines are carried along the crane columns, high up under t

moves them from the possibility of damage from furnace breakouts, or bad spills of metal, and brings them above the grease dripping from crane girders. At appropriate places—between each pair of furnaces, and at each pouring platform—a ¾ inch pipe leads down the building column, stopped by a ¾ inch high pressure globe valve at about five feet from the floor, and ends in a special coupling for the oxygen hose. These outlet valves should be locked, and keys kept in possesion of responsible workmen only. This guards against waste as well as dangerous uses. Furthermore, oxygen lines should be painted a distinctive color for example green to inform pipe fitters and other workmen of the contents. A metal tag should be chained to each outlet, plainly indicating that the line carries compressed oxygen.

Since oxygen is a valuable commodity, the piping should have welded joints throughout. The need for a permanently leak-proof construction is more than ever necssary when the line is supported on mill buildings, which vibrate violently at times, or when crossing made ground, subject even to slight settlement. Some screwed or flanged fittings will be necessary at valves. It would be well to make up these joints in a pipe shop, the threads being thoroughly washed in a solution of one pound caustic soda to a gallon of hot water. Regular pipe compounds should be prohibited on oxygen lines on account of the oils they contain. Instead of red or white lead a mixture of litharge and glycerine may be used on the male connection only. Valves should also be completely dismantled, washed in hot caustic solution, and on reassembly the original packing replaced with asbestos yarn. Needless to say, all line piping should be washed inside and out with caustic soda before welding the joints, and handled with clean hands and tools and with great care to keep the work clean. After erection the whole system should be flushed out with caustic solution, then put under oxygen pressure twice the working value, and every joint and valve examined for leakage with ivory soap water.

All piping and valves should be new, extra strong, for high pressure, and free from scale or rust. Minimum size should be ¾ inch. At suitable points a safety device should be installed to relieve excessive pressures. The pipe should be carefully graded and drip pots welded into the line at the low spots. These should be drained periodically.

With such a piping system, the safest way to handle oxygen about steel plants and foundries will be attained. Oxygen will be delivered where it is needed in a convenient way, like electricity, water, steam, or any other liquid or gaseous commodity. It will be protected against misuse by the ignorant and careless. The plant cylinder handling problem will disappear. All risk of cylinder accidents due to furnace breakouts or splashes of hot metal will vanish. The temptation to use oxygen cylinders for rollers, to pitch them off platforms, or kick them around indiscriminately will be practically removed. All these factors have real value to the safety engineer. A clinching

argument to the manager rests in the fact that at the same time real economies in oxygen consumption will surely follow.

DISCUSSION

MR. E. C. RAMAG (Carnegie Steel Company): What size mains do you recommend?

MR. CARTER: It depends a good deal upon the consumption at the particular point. We believe in figuring at least 100 per cent over the needs as laid out at any given time, because it has been our history that the process is growing very rapidly and they keep demanding more and more, so we give it a good oversize; but, frankly, I think an inch line will carry ample oxygen any distance required within any one mile. If you are going to have an installation to take care of several miles, it would probably be a good idea to start at two inches and reduce down.

MR. J. A. NORTHWOOD (Bethlehem Steel Company, Johnstown, Pa.): How do you transport to your manifold?

MR. CARTER: We believe in proper methods, so locate your manifold that you are to use as near your roadway as possible. An extra hundred or two hundred feet of pipe amounts to very little if you are so jammed up that you can't get to your manifold location without running a little pipe. I know of places where they carry cylinders by hand three hundred of four hundred feet. It would be far cheaper to put in that amount of pipe, so we believe in locating manifolds at convenient locations for trucks to get to.

MR. LANE: I would like to ask Mr. Carter if he uses hydrogen in conjunction with oxygen; and, if so, does he use some manual houses with both gases.

MR. CARTER: In many places, they have the gases right close together. We believe in always keeping a fire wall between compustible and non-comustible gases, but there is no reason in the world why the pipe lines should not run along side by side wherever it warrants.

MR. WEEKS (American Steel & Wire Company): I would like to ask Mr. Carter if he thinks it is a good plan to put in these extensive pipes around the plants without welding all joints.

MR. CARTER: I was asked about February of this year by the President of the Magnolia Gas Company, which is a new subsidiary of the Magnolia Petroleum Company, in Texas, this question: If you were in my position, putting in 205 miles sixteen inch pipe line would you weld it? I told him that I would and that job is going through. It has grown to 230 miles. We welding it because we believe that it will be better able to stand up when it is properly done, and it will be absolutely tight. I don't know of any properly installed pipe lines that aren't giving satisfaction.

MR. F. C. KING: I would like to ask Mr. Carter if he receives any report of trouble in cold weather; that is, if cold weather effects the general combination of acetylene and oxygen. I would like, also, to ask him if there is any method of taking a precaution to overcome that trouble. I believe there is.

MR. CARTER: Well, I haven't noted it in my paper, but where a manifold installation is put in it is advantageous to have a steam coil near the regulator, particularly to keep it warm during cold weather. If there is considerable trouble, it is usually not below the freezing temperature, but it is at a temperature around about 40 degrees, when the expansion of the gases coming through fizzes in the regulators and cause a condensation and freezing, and that sometimes gives a little trouble along that line. Therefore, it is highly advantageous to have a little heater of some kind, preferably a steam pipe rather than an open heater of any kind. Some people seem to have a little trouble and some people seem to have less trouble. Several of the companies are making larger regulators to take care of that condition.

From an operating standpoint, I would put in a little steam coil, or have a little heater of some kind and I believe you will get away from that trouble.

ADJOURNMENT

Mining Section

R. DAWSON HALL, Chairman
Engineering Editor, Coal Age, New York City

J. L. BOARDMAN, Vice-Chairman
Safety Engineer, Anaconda Copper Mining Company, Butte, Mont.

J. B. WARRINER, Vice-Chairman
Lehigh Coal & Navigation Company, Lansford, Pa.

GEORGE MARTINSON, Vice-Chairman
Pickands, Mather & Company, Hibbing, Minn.

C. L. COLBURN, Secretary
U. S. Bureau of Mines, Pittsburgh, Pa.

TUESDAY MORNING SESSION

CHAIRMAN HALL: I will ask the Secretary to make a report his work during the year. He has, I think, been more active th any of us. I wish to express my appreciation of the work he has do and the careful consideration he has given to his duties. We no long assist in paying his expenses when he travels around the country. He helping us because he has our welfare at heart. We have to thank h for having given us his entire co-operation ever since support was wi drawn.

Secretary Colburn then recounted the proceedings of the precedi annual meeting.

On the request of Mr. Hall, J. W. Reed, chairman of the Bulle Committee reported on the work of that committee greatly complime ing Mr. C. Lorimer Colburn; Mr. John L. Boardman of the Bureau Safety, Anaconda Copper Mining Co., Butte, Mont.; Mr. C. A. Si Stonega Coal & Coke Co., Stone Gap, Va.; and Mr. G. C. Cossack St. Louis, Mo., who had assisted him in preparing bulletins. Reed said that more material was needed.

REPORT OF CHAIRMAN

CHAIRMAN HALL: This year has been severe on the mining indus and I was afraid that the fact might have a bad effect on the attendar I am therefore greatly gratified to see that there are so many out at

meeting. It shows that we have retained our interest in safety in mining, and it is highly important that we should retain it.

Some companies seem to believe that the first economy to be effected is to cut down the force by which safety is promoted. The profits of safety work are too often intangible. It is difficult to see whether the precautions that are being taken for the protection of the personnel of the company are really doing good work. Some people hope that they may manage to get by without either safety work or accidents. And for a while of course, no great disaster may happen, but in the end the absence of precaution means a large increase in accidents and possibly a disaster in which many may be involved.

The year has been by no means free from terrible happenings. We are faced with the fact, that sprinkling has been found a failure in bituminous coal mines, and that a new remedy must be found for coal dust explosions. For the present at least that remedy is doubtless rock dust.

We are faced with problems which we never had before, and as is always the case when confronted with a new difficulty we tend to go along, as the speaker said the other day, by instinct rather than intellect, doing the things which we did before until it is proved clearly to us that they are extremely dangerous. That proof is a costly one. It is far better for us to take such steps as knowledge and intellect would point out, than to wait until a terrible disaster has created an instinct which will cause us to avoid such dangers.

There has been quite a loss in memberhsip this year as one of the features of the dropping off of safety work, and therefore, this coming year will have to be one of extreme effort in increasing the membership.

Education in Safety

A committee was appointed this year to study education in safety. It has done but little. though here lies, I believe, a large opportunity. In the coal mines it is true we have examinations for mine foremen and firebosses, and those examinations are praiseworthy because they require, on the part of those who want to occupy the official position of either mine foremen or fireboss, a certain knowledge of mining. But, unfortunately, I am afraid that the principle has been rather algebra first and that the real principle, safety first, has been relegated to a second place. We have taught the candidates mensuration, ventilation formulae, pumping calculations and algebra rather than the simpler and more fundamental principles of safety. Some of the larger principles of safety are not being taught at all. If you talk to any of the educators who are trying to instruct men who are entering examinations to obtain mine foremen's certificates, they will say, "Nobody is interested in such subjects because they don't help a man to pass his examination. He is not liable to be asked questions of that kind." The instructors can teach the students only the subjects on which they will be examined. The examinations are largely to blame. because they do not touch on the fundamentals of

safety as they do on the fundamentals of algebra, mathematics and mensuration. In the metal mines, there are no such examinations. Fortunately, they meet the problem in another way. Many of the foremen are today mining graduates and don't need the examination so badly.

Unfortunately, there is a general tendency among all of us to be scholastic and booky rather than practical and to the point. I hope that this Committee on Education in Safety may be continued and that this year it may be able to take effective action that their opportunities will suggest to them.

We will proceed to the article by Mr. Jones.

STRAY ELECTRICAL CURRENTS

E. E. Jones, Electrical Engineer, E. E. White Coal Company
Glen White, W. Va.

In the latter part of 1922 a shaft was sunk on the property of th E. E. White Coal Company, at Stotesbury, West Virginia, to the Poc hontas Coal Seams Nos. 3 and 4. I might mention here, that this was th first shaft ever sunk in this country through water-bearing strat making 1,000 gallons a minute, where electricity was used exclusively.

When the shaft was at a depth of about 65 feet, a premature explosic occurred in the following manner: A sumping shot of 80 sticks of dyn mite had been prepared and connections made for electric blasting, a 250 volt direct current circuit located on the surface. Due to an ope circuit in the cable leading from the surface to the bottom of the sha this charge could not be made to detonate, and as two men started descend the shaft in order to locate the open circuit and repair the sam so that the work could proceed, the charge of dynamite let go. Fo tunately no one was injured, as the shot had been well placed and load properly, so that no rock was thrown to the surface.

It was now evident that the method of sinking was extremely dang ous, and that the cause of this premature explosion must be found a eliminated. Also, the confidence of the workmen had been destroye and some of them refused to proceed with the work unless steam w used for hoisting and pumping, instead of electricity.

Due to the fact that the entire plant was electric, and that the m chinery for sinking had all been installed, it was practically out of t question to use steam. It was, therefore, evident that the cause of th explosion must be found and the remedy applied.

It was known positively that the circuit leading to this charge dynamite was open, and that the switch had been disconnected so time previous to the detonation of the shot in the shaft. It was a known that this shot had in some way been detonated by what is co monly known as stray currents of electricity.

A number of tests were now made in order to determine the exact cause of this danger, so that these causes could be eliminated and the work proceed safely. In making these tests, first, all the switches were opened, those that went to the hoists, the compressors and the pumps in the shaft, and an ordinary electric blasting cap was connected between the compressed air line and the discharge line from the pumps located at the bottom of the shaft. The instant a connection was made between the air line and the discharge line from the pump, with an electric blasting cap, the cap detonated; thus showing that a sufficient difference of potential existed between these points to detonate an electric blasting cap. Second, a connection was made between the air line going down the shaft and the ground adjacent thereto. The cap detonated, but not instantly, showing that there was not at all times sufficient voltage between these points to detonate the cap. Third, a connection was made between the electric hoist frame and the ground; the cap fired instantly. Fourth, a connection was made between the shaft bottom and a wet place near the surface; the cap fired in a few seconds.

From these results it was evident that sufficient difference in potential existed in various places selected to fire blasting caps connected in an ordinary circuit in the shaft. To equalize the difference in potential existing at these various places, connections were made with heavy copper wire as follows: The frames of all the machines on the surface, and the pipe lines going down the shaft were electrically connected. Holes were dug near the hoist and compressors, and ground connections made by burying a coil of wire, and bolting the connections to the frames of these machines. Salt water was poured on these coils of wire in order to increase the conductivity, and earth placed over the coils of wire; thus filling up the holes and insuring that the coils would remain wet. Tests were now made with a millivolt meter, with which no difference in potential greater than 100 millivolts could be detected between any two pipes, from the pipe to the ground, or from the top of the shaft to the bottom of the shaft.

After the foregoing work had been completed and the tests with the millivolt meter made, several blasting caps were given to the most intelligent workmen, and a prize of $25.00 in cash offered in case the cap could be denotated at any place or in any way except by the use of the blasting circuit. It was amusing to watch the efforts of the men to detonate the caps, and the precautions used in case they should explode. The air of confidence soon vanished, and was replaced in some cases by suspicion. It was evident that some of the workmen thought that the caps being tested would not explode at all; in other words, they thought these caps to be "phony." In order to allay this suspicion each cap was connected separately to the blasting machine, and detonated, thus restoring the workmen's confidence, so that the work could proceed without fear on their part.

Blasting Rules

The following rules were then posted regarding the blasting, and rigidly adhered to from then on. (The author is proud to say that this shaft and

slope was then sunk through a water-bearing strata of 1,000 gallons of water per minute, under a pressure of 20 pounds to the square inch, without the injury of a single man):

Rule 1. Explosives must be in an insulated container when lowered down the shaft.

Rule 2. Not more than two men must be in the shaft when shots are being prepared.

Rule 3. The muck bucket must not touch the bottom of the shaft during the preparations for a blast.

Rule 4. The blasting machine must remain in the possession of the top man, and can be used only by the men who prepare the shots, and then only in the presence of the top man.

Rule 5. The shooting cable must be inspected daily, from top to bottom of shaft. If a bare place is found, the cable must be thrown away and a new one secured.

A little thought leads to the reasons for each of these rules. First, if the explosives are in an insulated container while being lowered down the shaft, there is no danger of an electrical contact being made. Second, if only two men are in the shaft during the preparation of the shot it is certain that not more than two men could be hurt in this manner. Third, if the muck bucket does ont touch the bottom, there is no danger of stray currents from this source. Fourth, if the blasting machine is in charge of one man, not more than one is responsible for its safe keeping and if the men who prepare the shots are the only men who are allowed to use the machine, it is evident that no one will connect it until everyone is out of the shaft. Fifth, if a well insulated blasting cable is used, in case it comes in contact with any of the machines or pipe lines, the insulation will prevent a flow of current to the cable in case a potential existed. In case a repair to the cable is made, it might be made carelessly; therefore, throw the cable away and use a new one.

Since this experience some thought has been given the subject, and some advance has been made in the way of handling electric detonators especially around the coal mines. In the case of the E. E. White Co. Company the miners are taught to twist the bare ends of the wires of the blasting caps together, and to keep them in this condition until finally connected to the blasting circuit. This means simply that in case the wires of the cap come in contact with a source of current, that the ends being short circuited, there is no danger from this source. Caps are always given the men in paper sacks at the magazine, the sack being closed, thus insuring that the ends of the wires will not come in contact with any source of current. The men are taught to suspend the cables on the wooden posts, and never allow them to come in contact with the room tracks which run into all the workings. The blasting batteries used are made in such a way that a connection to them cannot be made with the cable except by holding the cable in one hand and the battery in the other; thus there is no danger of a workman leaving

his battery connected and going to the face and connecting to another shot. However, this has happened at other mines, where the miner in some way secured a telephone battery and screwed down on the ends of his cable and forgot to remove the connections.

To put this in other words, some batteries can be bought so constructed that the ends of the lead wires can be screwed to the blasting circuit. Suppose a miner makes the connection and then forgets that he has made it and after a while prepares to shoot another shot. As soon as he makes the connection to the electric detonator his shot goes off. This has actually happened. It is, therefore, important that only batteries having a hole on each side shall be used. The ends of the blasting cable are pushed into the holes in order to complete the circuit. The man cannot go away and forget that the connection is made, for as soon as he leaves the battery the ends of the lead wires escape from the holes and the circuit is broken.

To those who have studied electrolysis the subject of stray currents is a familiar one. Much study has been given this subject, and some electric railway companies have gone so far as not to use the rails or ground for return circuit at all; in fact, this is the case in Cincinnati. The danger in this case is not so much in premature detonation of shots, but in the damage to steel structures.

Electrolysis

If electric current is passed through a liquid from one metal to another, electrolysis will take place; that is, metal will be deposited on the negative pole, and the positive pole, or electrode, will be dissolved by becoming oxidized from the action of the oxygen collecting at that place. In an electric railway return system there is necessarily a difference in potential between the outlying parts of the system and the rails and other buried metals, such as pipe lines, steel structure, foundations and buildings. The value of these differences in potential depends upon the loss in the return circuit, and varies with the amount of current flowing, and the resistance of the return circuit. It is, therefore, evident that in case these pipe lines and buried pieces of metal are all connected togther with low resistance cables, these differences in potential would be equalized. However, it is not so evident but nevertheless true that different strata in the earth are of different resistances and are sometimes separated by strata of comparatively high resistance. Thus we can see why we will have differences in potential between different strata. It is also evident that where current is flowing through the earth, there would be differences in potential between points on the surface, or between the surface and underground, depending upon the difference in their distances from the source of current and the amount of current flowing. The first experiments in wireless were made upon these principles; that is, by connecting to the ground in places separated from one another, with sensitive apparatus, and thus signalling through the ground.

When we consider the small amount of current necessary to explode an electric detonator, and the small amount of voltage required, it is evident that in electric blasting, care must be taken not to allow the bare ends of the exploders or bare places in the shooting cable to come in contact with metal, especially pipe lines, steel rails, ponds of water, or wet places inclined to be of high conductivity, due to mineral salts and acids.

It is strongly recommended that all electric blasting caps have their ends twisted together during the process of manufacture, thus eliminating one danger; namely, these ends coming in contact with two metal surfaces having a difference in potential. The twisting of these bare ends together adds slightly to the cost of manufacture, but if universally practiced, would not work a hardship upon anyone.

The cables used for the purpose of electric blasting are poorly insulated and cheaply constructed; the insulation consisting chiefly of cotton treated with paraffine. A great improvement could be made in this direction which would add to the safety of electric blasting. Manufacturers of electric batteries used for firing electric blasting caps can improve their construction by so arranging these batteries that no permanent connection can be made to them. This refers, of course, to the batteries used by coal miners, where only one cap is detonated at a time. In order to fully understand the small amonut of current necessary to explode a cap, the fact that the current flowing through an ordinary 40 watt lamp will fire approximately 80 caps if connected in series, is sufficient to remind us that we must be careful.

For the benefit of those who wish to calculate the resistance of blasting circuits, I quote literally from Mr. J. H. Horlick, Jr., of the Hercules Powder Company, who very kindly furnished this information.

"The actual amount of current required to heat the bridge of our Electric Blasting Cap sufficiently to set off the charge in the cap is approximately 0.4 ampere. However, in actual blasting, and with more than one cap connected in the circuit, a greater current is recommended in order to take care of any slight variations in the bridges of the caps or of any leakage which may occur in the circuit, especially under damp conditions or in conductive material, such as iron ore. For various types of connections we, therefore, recommend the following currents:

1. For straight series connection, not less than 1.5 amperes.

2. For straight parallel connections, not less than 0.6 amperes per cap in parallel.

3. For parallel series, where the caps are in series in groups, and the groups in parallel, not less than 2.0 amperes per series.

4. For series parallel, where the caps are in parallel in groups, and the groups in series, not less than 1.0 ampere per cap in the largest parallel group.

Of course, it is quite possible to get satisfactory results with less currents than above recommended, and even probable with small numbe

of caps in circuit, but the above minimum currents are recommended in order to have some margin of power to take care of any irregularities in the circuit and provide greater assurance of all caps firing.

With the necessary current determined, the required voltage then depends upon the resistance of the circuit, as per Ohm's law, whereby in calculating the required voltage, it is important that the resistance of the entire circuit, and not of the E. B. Caps alone, be taken into consideration. For instance, suppose we had a circuit consisting of ten 10' No. 6 copper Wire E. B. Caps in series with 500 feet of No. 14 copper leading wire to the source of power. The resistance of E. B. Caps, of course, varies with the length and kind of leg wires, that of Hercules 10' No. 6 Copper Wire E. B. Cap being 1.50 ohms. Ten in series would therefore have resistance of 15.0 ohms, while 500 ft. of lead wire would have resistance of 1.26 ohms, or total resistance of 16.26 ohms. Then with minimum recommended current of 1.5 amperes for this series circuit, the required voltage by Ohm's Law would be

$$E=1.5\times16.26=24.39 \text{ volts, or say } 25 \text{ volts}$$

Of course, for firing only a single cap, a current of only about 0.5 ampere would be sufficient to use in calculating the required voltage along the above lines, in which case about 1.5 volts would probably fire the 10' copper wire cap.

Furthermore, if a stray current should get through the cap wire insulation near the cap itself, thereby eliminating the leg wire resistance, a voltage as low as about 0.6 volt might fire the cap. However, for more than one cap in regular blasting circuits, we recommend calculations for required power based on more than merely theoretical required current, in order to more greatly insure the firing of all caps in the circuit.

DISCUSSION

CHAIRMAN HALL: Mr. Jones' interesting paper describes only what might have been an accident rather than what was one. There are some companies, unfortunately, which could furnish more exciting material because their accidents actually killed and injured their employees. Mr. Jones' company was fortunate that no man happened to be at the bottom of the shaft when the explosion occurred. It is due to Mr. Jones' efforts and those of the E. E. White Coal Company that no accident did occur at a later time. There was a dangerous condition and they met it in an excellent way. I think we can learn much from it. I fear there are more accidents from stray currents than we think.

Mr. Elwood sometime ago presented a paper in which he showed the difference in potential between various parts in a coal seam where there were stray currents. A number of other suggestions have come at different times which have tended to show there are such currents in

existence, and we need to look out for them. Enough information has not been published. Sometime ago some of the inspectors for the State of Pennsylvania investigated this subject. They had a severe explosion in which men were actually killed.

MR. BOARDMAN (Anaconda Copper Mining Co., Butte, Mont.): I would like to ask Mr. Jones if there is any possibility of a stray electric current detonating a cap other than an electric cap?

MR. JONES: I don't think there would be.

MR. BOARDMAN: We have had two similar accidents, though we don't use electric blasting caps. In these cases, the man was loading his hole with ordinary fuse caps, in a safe manner, and the caps detonated. We can't account for it. Both caused serious accidents.

MR. GEORGE MARTINSON (Pickands, Mather & Co., Hibbing, Minn.): We had an accident just a few weeks ago, as fortunate as that of Mr. Jones. In our open-cut mine, we had about 40 holes loaded when an electrical storm occurred, and two of these 40 holes exploded. Each hole was loaded with about 800 pounds of explosives. No one was injured. It was suggested that in future whenever a hole was loaded, the ends of the cap wires be twisted together as Mr. Jones has suggested.

It was also suggested that when an electrical storm started, all the holes that were loaded should be shot immediately. That isn't always practicable from an operating standpoint. The holes may be loaded in the center of the area and spoil the others. We have taken this matter under consideration with the manufacturers of the caps, and they haven't offered any real suggestions as to how this danger might be avoided. I wonder if Mr. Jones is convinced that twisting the ends of the caps together would prevent them from being discharged by an electrical storm?

MR. JONES: It certainly would, up until the time the wires were opened to make the connection; of course, the time between opening the connection and firing the shot would not be long, a few minutes at most.

MR. GEORGE MARTINSON (Pickands, Mather & Co., Hibbing, Minn.) If we left the ends of the wires twisted together until the storm was over, you feel we would be safe?

MR. JONES: I believe so.

MR. MARTINSON: The insulation on the wires would be thin and the wires lie on iron ore. I have feared that possibly some current might get through the insulation.

MR. JONES: I think twisting the ends of the wires together is the first step, because the cap then is in a safe condition from the time it is given to the miner until it is actually used.

MR. J. W. REED (Consolidation Coal Co., Fairmont, W. Va.): I wonder if Mr. Jones or any person present could tell us whether th

mercury in the detonators is a conductor or non-conductor. I believe that fact would enter into the question as to whether twisting the wires would give a complete protection; and whether we could get a current directly through the wires?

MR. J. T. RYAN (Mine Safety Appliance Co., Pittsburgh): An interesting test is now being conducted in Pittsburgh. A company had an explosion recently that was due to stray current.

They have almost compelled one of the powder companies to make them up a detonator that would require 8 to 10 volts to detonate. They made an investigation of their mine after the explosion and they found they had up to 6 volts of stray current.

CHAIRMAN HALL: Lightning sometimes enters the mines and explodes shots underground in much the same way as in the open pit at Hibbing.

MR. FRANK A. POLLOCK (Oliver Iron Mining Co., Eveleth, Minn.): I would like to ask Mr. Jones about the blasting switch. Does the blaster carry a lock? Is it locked so that nobody can handle it but himself?

MR. JONES: Each miner has his own individual battery. Some mines have a shotfirer, and only the shotfirer has the battery.

MR. POLLOCK: (Oliver Iron Mining Co., Eveleth, Minn.): Is that connected with the electric current?

MR. JONES: It is a small battery similar to the one in the flashlight the miner uses. It generates a 3-volt current when the ends of the blasting cable are inserted through the holes in the battery. You can shoot only about two caps with that battery.

MR. POLLOCK: We use Hercules batteries. In order to make them so only one man can use them a Yale lock is provided on the top of the battery and the handle is slotted. Nobody can pull the battery handle until the blaster opens the Yale lock.

MR. JONES: A splendid precaution, I think.

MR. POLLOCK: We have had trouble with men picking up the batteries and pulling up the handle to see if the battery will work, especially after the wires are connected. We connect the wires and then the blaster has to unlock the battery handle and pull it himself.

SAFETY KINKS

By C. Lorimer Colburn, U. S. Bureau of Mines, Pittsburgh, Pa.

The right time to initiate a workman into the safety game is when he is first employed. Much can be accomplished by giving a new man the right start in safety.

Safety Kink No. 1.—The prime move for this safety kink is the employment agent. While engaging a new man, the employment agent should tell him that the company is doing everything within its power to protect the men from accidents, and for that reason will not employ careless

men. The new employee should promise the agent that he will abide by the safety rules and regulations of the company and that he will study the rule book, a copy of which should be given him. This kink gives the employment agent a chance to exert his influence for safety and is of particular value if followed with Safety Kink No. 2.

Safety at a mine rarely amounts to anything unless it has the unstinted support of the management. The stand of the manager on safety should be made known to the new man immediately after he starts to work. This can be done as follows:

Safety Kink No. 2.—The mine manager sends a letter to the new employee reminding him of the fact that the company is working for safety and expects him to be a safe worker. The manager's letter further states that a safety meeting will be held at a certain time and place for new employees, and he tells the new man to study his rule book and be present at that meeting. The new man has no option in the matter. He must report at that meeting or be liable to a reprimand.

At the meeting the safety engineer or one of his associates explains the safety policy of the company, and answers all the questions that may be asked regarding the rule book. For a fair size mine, safety meetings for new employees can be held weekly.

Another advantage of the safety kink is that it brings the new men in touch with the safety department at the start. He has no option in regard to attending this first safety meeting. It is made one of the requirements of the job by the manager.

Publicity

In order for safety to succeed, it must be kept before the men at all times. There are two methods of advertising safety; one is the bulletin board, and the second is the plant magazine. Only the larger companies can afford a magazine, but bulletin boards can be placed at vantage places at all mining operations.

So that the bulletin board may put over its daily message of safety it must be interesting, and it must contain live snappy bulletins. Safety bulletins can be supplemented with news items of interest to the men. The bulletin board is the mouthpiece of the company, and it should be used by the company for conveying instructions to the men. Bulletins should be posted regularly and changed frequently.

Occasionally it will pay to conduct contests in bulletin board reading.

Safety Kink No. 3.—Take 10 photographs around the mine showing men doing their work incorrectly. Give a prize to the man who sends in the best set of methods for doing the work right.

The value of this plan depends upon the ability of the safety engineer in selecting and securing the pictures, in the way the pictures are shown, and in the manner in which the contest is conducted. The right and wrong method of doing the work should be pictured so that the men will recognize the advantage of the right method.

This safety kink can be modified by posting a picture of a wrong method and asking what is wrong with the method, and offer a prize of $1 for the first correct answer. Then post photographs showing the right way as well as the wrong way.

Very often the bulletin boards become dirty and ill-kept. Dirty bulletin boards are an eyesore, and do not reflect well on the management. I have noticed bulletin boards at mines that have degraded into being a junk pile of bulletins. In order to overcome such conditions one man should be responsible for keeping the bulletin board in good condition and for the posting of bulletins.

Safety Kink No. 4.—If a safety society such as a chapter of the Joseph A. Holmes Safety Association is organized at the mine, a bulletin board committee can be organized.

Let one man of the committee be responsible for keeping the bulletin board in proper condition. Give a second man the job of securing six exhibits of useful tools. Give a third man the job of securing six of the best kept tools on the job and post them on the board. The committee should use the National Safety Council bulletins. If there is anyone on the job who can make cartoons, get him to prepare a few bulletins. Home bulletins are particularly desirable. By getting several men interested in furnishing material for the bulletin board and by holding one man responsible for its up-keep and care, the bulletin board can be made attractive and a power for building safety into the mine.

Pictures are of particular value in putting over safety. If good photographs are available they should be shown in such a way that the men will get their safety lessons from the picture.

Safety Kink No. 5.—At one mine a room in the change house was made into a small auditorium. A lantern and screen were installed. At stated times, each shift of men was held five minutes to view a few slides showing a lesson in safety taken at the mine. These meetings became very popular, and the management was so well pleased with the idea that a motion-picture operator was employed and a short 5-minute safety film was shown once a week. The company lost five minutes of each man's time each week, but thought that the plan saved them more than that in safety and efficiency.

Popularizing Safety

One of the best ways in which to enlist a man's support of anything is to give him work to do that concerns that thing. It is only necessary to get a man working for safety to get him interested in it; therefore, it is well worth while to organize safety clubs and societies among the men. The safety society has a beneficial influence in proportion to its activity and the number of men that it reaches. Many companies, recognizing the truth of this statement, organized safety societies in their mining operations. Some of these have been successful, but many have died out. Work of this kind failed to get a foothold with the men

until the organization of the Joseph A. Holmes Safety Chapters. This organization promises to do much good for safety.

Safety Kink No. 6.—Organize a chapter of the Joseph A. Holmes Safety Association—work with that chapter and help it grow and develop its members in safety. Through this chapter, put on safety rallies, no-accident week campaigns, first-aid meets, field days, socials, playlets and motion-picture shows. Organize the committees so that the maximum number of men will take part in these activities.

Methods of Financing a Safety Society

Men are interested in those things in which they work, especially those things in which they work without receiving money compensation or those things to which they are called to subscribe money. It is well, therefore, for the safety society to have regular dues and to insist upon the members paying their dues promptly, but quite often the dues are not enough to provide the society with sufficient money to carry on its work.

Safety Kink No. 7.—Place the safety society on the payroll of the company so that it will receive a regular monthly allowance which will represent the financial support of the company.

Safety Kink No. 8.—Make arrangements with a local motion-picture proprietor to go fifty-fifty on a motion-picture show. The society could sell tickets to the show for a day which should be made a safety motion-picture day. To help in this plan, the society can obtain appropriate films free from the U. S. Bureau of Mines. This film can be combined with a comic or perhaps a feature film which will make an extra good performance.

This method of raising money is good for the society because there is very litte expense to it, and the amount of money received is nearly all clear profit. It is good for the motion-picture proprietor because it enables him to obtain the good will of the people of the community. The safety chapter conducts his advertising campaign for that day.

Study of Safety Problems

Very few of our mining companies give their bosses an opportunity to study safety fully and plan to overcome accidents.

Safety Kink No. 9.—A mining company with several operating mines established a monthly visiting day for the superintendents of the different mines. On this visiting day the superintendents were relieved of their regular duties and congregated at one of the mines and spent the entire day together at the mine. They were free to talk about anything or to visit any part of the mine they desired. They were not required to make a report regarding their day's deliberations. The only requirement was that they spend the day together at one mine. It was found that these men would discuss the problems that were foremost in their minds

and they would visit the section of the mine that fully pictured the problem, and right there on the job they would devise means for improving the condition or overcoming the hazard that existed. The superintendents' visiting day proved to be a great success. Although the superintendents were not required to make a report or to discuss with anyone what happened on their visiting day, yet it was found that many ideas brought up at the general safety meeting originated on these visiting days.

Keeping Out of a Rut

It is very easy for a mine official to get in a rut, and as soon as he does he is liable to over look some of the new safety developments.

Safety Kink No. 10.—Establish a method of sub-standard reporting on one day in each month. Have the sub-foremen or shift-bosses changed to another section of the mine so that each of these bosses for that day are in charge of their neighbor's territory. At the end of the day have each of these bosses make a report of the sub-standard conditions that he found during the day. These reports should not be held against the man on whose territory the report is made, but credit or discredit should be given to the boss making the report. In this way the foreman will become acquainted with other foremen's methods, and in time become familiar with the entire mine, so that in case of emergency he can serve in any position.

DISCUSSION

CHAIRMAN HALL: Gentlemen, you have heard this excellent paper I am sure it brings to our minds the fact that after all, only a part of safety engineering is of a mechanical nature. Much of it deals with the human element, and we have to keep always in mind the fact that unless we make the man behind the tool handle it right, we shall have little success in making the tool safe, because anybody can make a safe tool unsafe by unsafe handling.

MR. J. T. RYAN (Safety Appliances Company, Pittsburgh): I must first congratulate Mr. Colburn on his unusual and splendid way of presenting this subject. I have been wondering, however, where he is going to get the safety film to show once a week.

SECRETARY COLBURN: In answer to Mr. Ryan's question: The "Safety Kink" I mentioned was tried at the North Butte mining operations in Butte, and in taking motion pictures underground, they were not troubled, of course, by the presence of gas. The Bureau of Mines has taken a number of excellent motion pictures underground by using electric lights.

To get this film once a week, the North Butte Mining Company employed a motion-picture operator and if there was any particular phase of the work around that mine that they wanted to show to the

men, they photographed it with the motion-picture camera. They presented such pictures as these, once every week.

The pictures were shown in a room adjacent to the change house. Before the men went on shift, they were required to go into this little auditorium. The moment they assembled, the picture was thrown on the screen. Immediately after, they went to their work in the regular manner.

MR. J. L. BOARDMAN: (Anaconda Copper Mining Co., Butte, Mont.): I have a mechanical "Safety Kink" that I brought down to present at this meeting.

In looking over our accident reports one day, I noted a peculiar case. The report said that a man had been pulling some empty cars with a locomotive. One of the cars left the track, and the motorman, having no helper, went back to rerail the car and found he couldn't do so without taking the slack out of the train. So, he went back up to the locomotive and instead of getting in the locomotive and sitting down in the seat provided, he reached over the side and turned the controller handle while he was standing on the ground. The locomotive jumped ahead and rolled him between the timbers and the locomotive and cars. The locomotive didn't stop, but proceeded toward the shaft, leaving the injured man along the side of the road. The shaft boss coming down the shaft at that time, found the locomotive off the track, with the

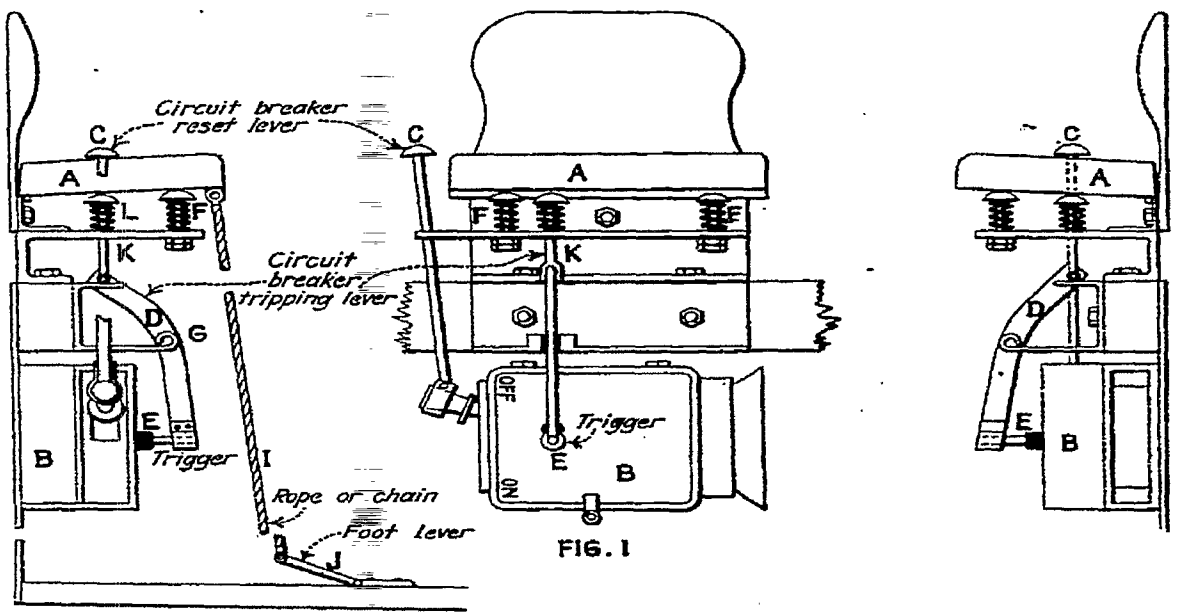


FIG. 1

The motorman does not sit on the circuit breaker and hold it closed against an overload. When he sits on the seat or holds his foot on the lever the trigger is reset and the breaker can be closed. Just as soon as the motorman releases the trigger by getting off his seat and at the same time freeing the foot lever the circuit breaker opens and power cannot be applied to the motors. This little safety feature was put on a locomotive so that the motors cannot be operated unless the motorman is in his cab and in proper position.

power still on and the controller burning. He pulled the trolley pole off the wire and went inside because he knew something was wrong, and found the man with both legs, collarbone and one arm fractured. Fortunately, he recovered.

In all my accident experience, I had never heard of an accident exactly like this. Three days later, however, an identical accident happened in another mine. So, I got busy. I placarded all the mines, explaining the accident, and asking each of the safety inspectors to warn their motormen.

Ten days later, the same kind of accident happened in another mine, and three months afterwards, another such accident occurred in another mine and caused a fatality, and again ten days or so after that, a similar accident happened in yet another mine. We were confronted by what might be termed an epidemic of accidents.

One of my psychologist friends says it was due to the propaganda that we had spread. I am sure I don't know if that was the cause.

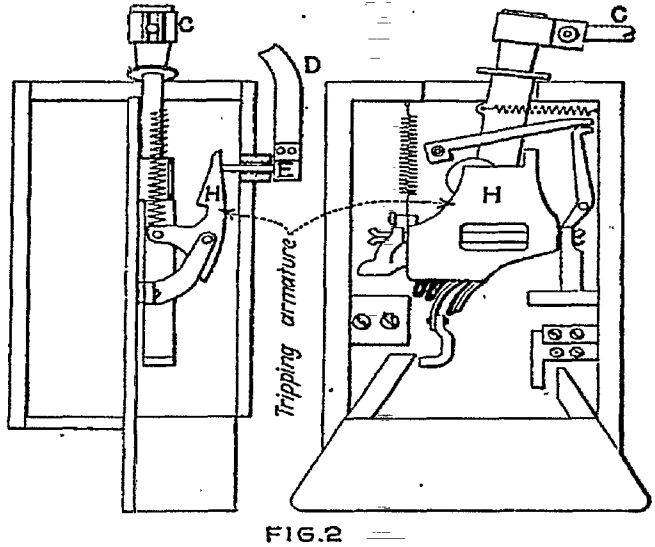


FIG.2

The pin E is forced against the tripping armature H and the circuit opened when the motorman steps out of the locomotive and releases the pressure on the seat or foot lever. The device does not prevent the circuit breaker from functioning when an overload is placed upon the locomotive.

We decided that if these men wouldn't think for themselves, we would have to think for them, so we asked the electrical department to devise a means whereby a locomotive motor could be so controlled that a man could not operate it unless he was sitting in the seat of the locomotive pit. It was quite a clever contrivance and cheap. I think it costs $25 to equip either a battery locomotive or a trolley locomotive with this device. [See Fig. 1 and Fig. 2.]

CHAIRMAN HALL: This material Mr. Boardman has presented is of immense interest and value and we have to thank him for having brought it with him. If any of our members at any time find that the program committee has not developed something which should be presented, they would do well to volunteer that information as Mr. Boardman has so kindly done. It is difficult for us to know what you

have done, but you know and we hope that you will always take care to bring it with you so we may have the benefit of it. I think it would be well to put a note in the program inviting members to bring with them any such safety kinks they have devised or developed.

APPOINTMENT OF NOMINATING COMMITTEE

I appoint the nominating committee, as follows: Mr. John L. Boardman, of the Anaconda Copper Mining Company, Butte, Montana; George Martinson of the Pickands, Mather & Company, Hibbing, Minn., and J. T. Ryan, of the Mine Safety Appliances Company, Pittsburgh, Penn.

You will observe that on the committee I have named a copper man, an iron man and a coal man, if Mr. Ryan still considers himself a coal man. He has now a broad interest in mining of all kinds.

I have written a telegram to Mr. B. F. Tillson, which I wish to submit to you for your approval. "Mining Section, National Safety Council, meeting at Louisville, expresses its great regret that its former chairman can not be present to furnish us with counsel, information and co-operation."

Mr. Tillson, as you know, has been Chairman of the mining section almost from its formation. Mr. H. M. Wilson was the first to occupy the chair. He was followed by Mr. Tillson and he was chairman till our last meeting, and admirably did he perform his duties.

Mr. Tillson is unable to come here, because the General Manager, of the New Jersey Zinc Co., Mr. Catlin, is now in Europe, and Mr. Tillson has been obliged to stay on the job.

(It was moved, seconded and carried that the telegram be sent to Mr. Tillson.)

MINE ACCIDENT STATISTICS

W. W. Adams, U. S. Bureau of Mines, Washington, D. C.

The main purpose in the compilation of accident statistics is to reveal conditions that may result in injury to persons or property so that remedial measures may be applied. For practical reasons it is usually found necessary to restrict inquiry to conditions which actually have caused personal injury, and to omit those which may, but have not yet, resulted in damage. Fortunately or unfortunately, there is a sufficient number of the former to indicate the existence of hazards so numerous as to require all of the attention which the industry can devote to the subject.

Two years ago, the Bureau of Mines, in co-operation with the National Safety Council, undertook an intensive campaign to obtain more complete and satisfactory information regarding mine accidents than had theretofore been available. Since 1911 the bureau had been receiving annual summaries from all companies operating metal mines, showing, in a general way, the number and causes of accidents that

occurred during the preceding year and the number of men employed at the mines. Monthly summaries of fatal accidents at coal mines were received from the State inspectors, showing the number of deaths attributed to each of 22 main causes of accidents. Information for individual coal mines was not furnished.

While this information, nation-wide in scope, is indispensable because it epitomizes the progress or retrogression in the industry as a whole, and serves as a background of specialized studies, yet certain classes of accidents, for example, those that are more or less peculiar to specific districts or mines, require an analysis in greater detail than is possible on the sole basis afforded by the annual summaries.

The need for more specific information was realized some years ago in the State of Pennsylvania in connection with the administration of the workmen's compensation law. The mining industry is well acquainted with the valuable studies of accidents, particularly non-fatal accidents, in the mines of that State being conducted by Mr. Rush N. Hosler.

Within the past few months, the Tri-State Mine Operators' Association, Miami, Oklahoma, composed of companies operating lead and zinc mines in Missouri, Kansas, and Oklahoma, has inaugurated a plan for an intensive study of accidents in that district. The work will be conducted by Mr. R. V. Ageton, formerly with the Bureau of Mines. The Ohio Department of Mines has recently inaugurated a special study of accidents in the mines of that State, and intends to give special attention to the so-called minor injuries, those that disable the men for only a short time.

The Portland Cement Association has for several years been publishing statistics of accidents in the cement industry, including a record of lost time due to minor injuries. Similar records are being maintained by several sections of the National Safety Council, for various other industries. As the mining industry was a pioneer in the statistical study of industrial hazards, so far as frequency of accidents is concerned, it is fitting and proper that it should now prosecute more intensive studies to learn not only the number of persons killed or injured but also the nature of the injuries and the loss of time which they entail. In no other way may the economic loss due to mine accidents be revealed.

Scope of Present Analysis. The present paper deals mainly with so-called lost-time accidents to underground workers. This class of accidents includes all injuries causing disability of a temporary nature lasting longer than the remainder of the day or shift. Accidents of this type comprise about 95 out of every hundred accidents in the mining industry. In aggregate economic loss they are possibly of less consequence than accidents of a fatal nature; but as signposts of danger they are highly instructive. Many of them are potentially fatal in their results, and they form a mass of evidence of existing hazards that might very tardily be discovered from a record of fatalities alone.

Several tables were prepared which include fatal as well as non-fatal accidents. In calculating loss of time from fatalities, use has been made of the stanadrd of weights adopted by the International Association of Industrial Accident Boards and Commissions. According to this standard, a weight of 6,000 lost days has been assigned to injuries causing death or permanent total disability.

Causes of Lost-Time Accidents. Of all causes of lost time from accidents underground falls of roof or face result in the greatest aggregate loss, both at coal mines and metal mines. This cause of accidents, while proportionately more important as regards fatalities than non-fatal injuries, nevertheless were responsible for 33 per cent of the lost time at coal mines and 26 per cent at metal mines. In coal mines most of the falls occurred while the men were loading coal on the cars or while engaged in cutting or barring down the coal; in metal mines the largest number occurred when the men were drilling although quite a number occurred when the men were loading ore or engaged in taking down loose rock or preparing to set props. Haulage accidents which rank next to falls as a cause of fatalities also rank second as a cause of lost time from non-fatal injuries. About 18 per cent of deaths in the coal mines are due to haulage accidents, but 30 per cent of the lost time at coal mines and 16 per cent at metal mines were due to accidents in this group. Being struck or run over by the cars formed the largest single class of haulage accidents, and of these the largest number occurred while coupling cars. Next in point of lost time were injuries resulting from the men getting squeezed between the care and side. Handling materials, including the loading of coal or ore, caused the third largest loss of time at both coal and metal mines. Not many fatalities are included in this group but 11 per cent of the lost time at coal mines and 16 per cent at metal mines resulted in handling materials, principally coal or ore, although quite a large time-loss resulted from injuries while handling props. At this point the parallel of the causes of lost time at coal and metal mines ceases, and the various classes of accidents assume different degrees of importance in the two branches of the mining industry. Hand tools ranked fourth as a cause of lost-time accidents at coal mines and were responsible for 9 per cent of the aggregate loss of time while at metal mines they ranked fifth and caused nearly 9 per cent of the loss. Picks were, of course, the principal tools involved in this class of accidents at coal mines. The sixth most numerous class of accidents at both coal and metal mines was falls of persons, to which was attributed over 3 per cent of the lost time at coal mines and more than 8 per cent at metal mines. This class of accidents is also an important one because of the number of persons killed by falling, although it is not a major cause of fatalities. Machinery ranked fifth among the causes of accidents at coal mines and seventh at metal mines; in each case about 6 per cent of the time lost was included in this group. Undercutting machines at coal mines and drills at metal mines are the principal types of machinery referred to. Accidents connected with shafts or cages caused

a little over two per cent of the time-loss at metal mines and about one-half per cent at coal mines. Lost time from falling objects amounted to nearly 11 per cent of the aggregate loss of time at metal mines but only 1.2 per cent at coal mines, the difference being due mainly to injuries from objects falling down chutes, winzes and raises in metal mines and the non-existence of this type of hazard in most coal mines due to level coal-beds.

Explosives are the direct cause of relatively few accidents either in coal mines or metal mines. Indirectly they may be charged with some of the accidents usually attributed to falls of roof, but to what extent they are thus chargeable is not known; and, in coal mines, they are the initial cause of perhaps 4 out of 10 of the larger mine explosions of gas or dust, but in the latter class of accidents most of the destruction of life and property has been due to the presence of the dust or gas rather than to the initial blast. As a direct cause of fatal accidents, explosives are generally responsible for about 6 per cent of all deaths in the mines; as a cause of lost time from injuries, they account for less than one per cent either at coal mines or metal mines. Electricity is likewise the cause of relatively few deaths—about 4 per cent is the usual proportion—and a still smaller percentage of non-fatal injuries. The records under consideration show 1.2 per cent of the time loss at coal mines and only one-tenth of one per cent at metal mines. The chief characteristic of accidents from electricity is the high proportion of them that result fatally, rather than the actual number of such accidents as compared with the number resulting from other causes. Explosives and electricity in mining operations are of extreme importance because they make for efficiency and increased production, but as causes of accidents they both—particularly electricity—occupy relatively minor positions. Without lessening one itoa the attention which the prevention of such accidents deserves, it should be remembered that even more thought should be given to the prevention of haulage accidents and falls of roof. The belief is widespread that the prevention of falls rests entirely with the workers at the face, after the men have been provided with the necessary timber and props. I do not share this belief. I believe that a full and complete record of such accidents and a thorough analysis of them would reveal why they contribute so largely to the death rate in the mines of this country. The analysis must cover the personal qualities of the miner and his employer as well as the physical factors involved. In this respect the study of falls of roof must differ materially from the study of other classes of accidents where the factors involved are more largely confined to things physical and material. This matter is urged upon the attention of safety engineers in the hope that "carelessness" may no longer be considered an adequate explanation of an accident of this type.

Occupation of Injured Men. A tabulation of the accidents according to the occupations of the injured men showed that 68 per cent of the

employees injured in coal mines were miners and loaders and other at the working face; the percentage for metal mines was almost th same, the actual figure being 70 per cent. Twenty-one per cent of th injuries in coal mines and 22 per cent in the metal mines were re ceived by haulage employees. The duration of disability of these tw groups of employees did not differ materially; in coal mines the in juries to face workers lasted 15.4 days each, those to haulage em ployees 15.7 days; in metal mines the men employed at the face lo 12.7 days per injury, those connected with haulage operations average 11.2 days per injury. The general average of time lost for all classe of underground employees was 15.3 days per injury for coal mines an 12.2 days for metal mines.

Considering the miners and others working at the face as a sing group, the report for coal mines showed that 36 per cent of their i juries were due to falls of roof and coal, and 30 per cent to hand too and handling material, including the loading of the coal; sixteen p cent of the injuries to the face workers were due to mine cars. metal mines 27 per cent of the injuries to the men employed at th face were caused by falls of roof, 29 per cent to hand tools and loadi ore, and 10 per cent to haulage.

Considering haulage workers as a separate group, haulage acciden accounted for 67 per cent of their injuries at coal mines and 42 p cent at metal mines. This group of employees in metal mines was al frequently injured by falling objects, particularly by rock falling dow the stope, winzes, etc.; the actual percentage of this type of accider was 18.

Average Duration of Temporary Disabilities. The compensation laws many of the States do not provide for the payment of compensati to injured employees when disability terminates in less than eig days. In some cases compensation begins after the 10th day and still others it starts after two weeks. When the injury termina within the legal waiting period, the loss usually borne by the compa is that incurred in providing medical and hospital service to the jured employee. On the other hand, the injured employee genera loses his wages, although at least one company retains its injured m on the payroll for the first two days of disability. In the normal c the injured employee bears the entire loss of his wages during t waiting period established by the State law.

These facts lend interest to an analysis of the accidents to determ the proportion of the total number of injuries terminating before right to compensation begins. Forty-one accidents out of every h dred in the coal mines and 60 out of every hundred in the me mines caused disability that terminated before the eighth day af the accident. The time lost from these injuries was only a sm part of the total time lost by all injured employees. It amoun to only 11 per cent at coal mines and 18 per cent at metal mi The injured averaged about four days each. Assuming an aver

daily wage of $5 per man they represented a loss of $20 per injured employee. The aggregate wage loss from this class of injuries in the entire coal-mining industry is about half a million dollars per year, provided the mines are in operation during the four days each employee is disabled. This estimate is based on 800,000 employees of whom one-fourth are injured annually. In the metal mining industry the wage loss from the same class of accidents is approximately $100,000 per year. These figures represent the wages lost by the miners. Along with this loss is that sustained by the company incident to furnishing medical and hospital attention and service. A tabular statement has been prepared showing the proportion of injuries and loss of time resulting from accidents of different periods of disability. From the statement the proportionate number of accidents covered by State compensation laws may be seen.

Ages of Injured Employees More than three-fourths of the injured employees were between 20 and 45 years of age. The reports for coal mines showed 77 per cent and those for metal mines 79 per cent of the injured men to belong to this age group. These figures are not significant in themselves because the ages of the uninjured may have been in the same ratio. The main object in examining the accidents according to age of the injured employees was to indicate the amount of time lost from accidents to men of different ages. Little or no difference in duration of disability was observed until age 45, after which the time lost per injury was 22 per cent above the average in coal mines and 34 per cent above the average in metal mines. The lost time per injury for all employees in coal mines was 15.3 days; for those 45 years of age or over the average was 18.7 days. In metal mines the average was 12.2 days per injury for all employees while it was 16.3 days for men 45 years of age or older.

Day of Week and Hour of Day. When the reports were arranged according to day of week, no material difference was observed either in the number of accidents on any given day or in the days lost per injury with the single exception of Sunday. The few accidents reported as occurring on Sunday were apparently less serious than those on regular work days, as the days lost per injury were below the average, both in coal mines and metal mines.

The time of day when most accidents occurred was around 10 o'clock in the morning and 2 o'clock in the afternoon at coal mines. In the metal mines the largest number occurred between 10 and 11 o'clock in the morning and between 3 and 4 o'clock in the afternoon.

There was no significant variation in days lost per injury from accidents occurring at different hours of the day, although the accidents at metal mines between 1 and 2 and those between 3 and 4 o'clock in the afternoon were of shorter duration than the general average. There was no evidence that any significance should be attached to this fact.

Nature of Injuries and Parts of the Body Injured. To those responsible for rendering first aid and for furnishing the supplies needed in

the work, definite information should be made available regardi the nature of the injuries that will be met with and the part of t body requiring treatment. The accident reports received by the bure showed that fractures comprised between 6 and 7 per cent of the tot number of injuries. Falls of roof and haulage accidents caused m of the injuries of this type. Sprains and strains amounted to abo 12 per cent of the total; cuts and lacerations, about 28 per cent. T most numerous type of injuries was bruises and contusions, amounti to 44 per cent of the total. About 10 per cent consisted of burns, fections, hernias, and other classes of injury. The average durati of all fractures at coal mines was 39 days, ranging from 20 days a fractured toe to 61 days for a fractured leg. Sprains averaged days each; cuts 13 days; bruises 14 days. The arms, hands, a fingers were more frequently injured than any other parts of the boc injuries to these members formed 35 per cent of the total numb Injuries to legs, feet, and toes amounted to 30 per cent. Ninet per cent of the injuries were to the head and face; 16 per cent the trunk.

Accident Rates for Different Industries and Occupations. Very mea information is available regarding the number of men employed different classes of work in the mines or the number of hours exposure to risk by the different groups of employees. An atter was made to obtain information of this kind as a basis for calculat the accident rates for different occupations in mining work. A of the companies furnished the data requested, and with these a basis calculations have been made showing the frequency and seve of accidents in proportion to the number of hours of work perform The figures are perhaps more suggestive than representative beca of the small number of companies furnishing the reports. Informat covering a larger number of companies but not segregating the data separate occupations showed an accident-frequency rate of 96 a dents of all kinds per million hours for coal mines and 91 for m mines. These rates included surface accidents as well as those un ground. The severity rate, which means the number of days per thousand hours of work performed by all employees, was 11.4 coal mines and 8.1 for metal mines. The frequency rate for mines be compared with those for other mineral industries as follo quarries producing dimension stone 47; quarries producing crus stone 70; by-product coke ovens 47; beehive coke ovens 49; smelt (not including iron blast furnaces) 64; mills 62. A further com ison may be made with similar rates for other industries which recently published in the *National Safety News*, as follows: paper pulp industry 44; woodworking (including the manufacture of fu ture, sash and doors, boxes, etc.) 42; petroleum refineries 34; chen industries 25; general construction contractors 54.

The severity rates of 11.4 for coal mines and 8.1 for metal m may be compared with the severity rates for other kinds of wor

follows: paper and pulp 2.7; woodworking 3.4; petroleum refineries 2.6; chemical industries 4.8; general contractors engaged in construction work 4.8.

The small number of mining companies that furnished the data for different occupations, showed a combined frequency rate of 88 accidents per million hours for coal mines and 110 for metal mines. Considering first the rate for coal mines, the frequency rate for all underground employees was 103; for all surface employees it was only 40. For miners and others working at the face the rate was 102; for haulage workers, 114; for miscellaneous employees underground the rate was 68. The severity rate per thousand hours was 9.7 for all employees combined; 10.2 for underground men and 7.8 for surface employees. For miners alone the rate was 10.0; for haulage workers, 9.7; for others underground 11.9.

For metal mines the frequency rate for all employees underground was 143; for miners as a separate group it was 194; for haulage workers 179; for other classes of workers underground, 30. The severity rate for all of the men underground was 18. The severity rate for miners alone was 35.2; for haulage employees it was only 0.24 due to the fact that no fatalities were reported for this group, hence the absence of a charge of 6,000 lost days for each fatal accident. The severity rate for miscellaneous employees was only 0.03, due also to the freedom of accidents of a fatal character.

It will be observed that the rates for miners and haulage employees in the metal mines represented by the above figures were seemingly very high. Whether they are typical of normal conditions remains to be seen when a larger amount of information of this kind becomes available. To reveal the actual hazard of different types of mining work, it is hoped that more of the larger companies may find it practicable to keep a record, not only of the accidents and time lost among different classes of employees, but also the corresponding number of employees in each group or the number of hours of work performed by the group. It may not be practicable to maintain such records for each of the many occupations employed in mining operations, but records of at least three classes of underground employees might be established: 1st, miners and all other men who work at the face; 2nd, haulage employees; 3rd, all others underground. A separate record should be kept for men employed above ground.

The business of accident prevention is like other kinds of business in that it is necessary to keep records or accounts and that the various accounts be carefully scrutinized to learn where losses might be eliminated and dividends increased. In actual practice one fundamental difference exists. A company usually knows how much capital is invested in its enterprise and how the investment has been distributed to the different departments of the business. Thus the status of each department may be learned by an examination of the record. On the

other hand, those engaged in the study of mine accidents—and th include practically all operating companies, as well as state and fed agencies—are frequently under the handicap of not knowing the ex of the investment in any given department, that is, the hours of w done or the number of persons exposed to the hazards of any gi class of work. Without knowing the investment or exposure in e department or at least each major department of the mine, how the net losses or gains in any department become known to the c pany? Safety can best be "sold" to the company when we bec able to describe the article, but by a strange quirk of conditions must first make a few sales before we can get the facts which needed in our selling talk.

For statistical studies all lost-time accidents should be recorded that the evidence may be uniform and as nearly complete as it ca made. One of the greatest needs in the attempt to solve the acci problem, yet one that is the least recognized in many quarters, i have mine-accident records made co-extensive with production and records; to have the records maintained on an equally scientific b and receive an equal share of the earnest and solicitous attention of industry. Thus a sound and reliable basis will be established for information and guidance of those engaged in accident-prever work. Thus also will the work be removed from the realm of th subject to the vagaries of individual judgment and brought into realm of things concrete and measurable, known alike to all who the information and subject to loss with the changing fortunes o passing of any individual.—Reports of Investigations, Departmen the Interior, Bureau of Mines.

Note: Tables accompanying this paper may be obtained from the Bure Mines.

DISCUSSION

CHAIRMAN HALL: Gentlemen, we have to thank Mr. W. W. Adam giving us such an excellent paper. We need to know the facts s can sell, as Mr. Adams has put it, the value of certain safety provi to our employers.

These statistics were the result of the demands made by the Se and the co-operation of the members of the Section was asked, a being asked, to make these figures more complete and consequ more valuable.

The Bureau of Mines is willing to compile the tables if we wil vide them with data as to the lost-time accidents at our mines. hope some day to be able to learn just exactly for instance how trip riders are employed and what the accident rate of trip ride when we know what the time loss is with any particular class o ployees, then we will begin to see just how important it is to

safeguards around them. Unfortunately, our statistics haven't been of that character hitherto and for the most part we have had to guess. All we know that may be certain is that men are injured in a certain way, but we don't know how many men there are that are subject to that injury.

MR. E. E. JONES (E. E. White Company, Glen White, W. Va.): Not long ago I had reason to go back into the records of the West Virginia mine accidents for a period of ten years, in order to look up a certain phase of accident rate in mining, and I found what everybody knows already, that for every 250,000 tons of coal mined, there is a fatality. I was surprised to find that the number of accidents due to mine cars and locomotives is almost exactly the same as the number due to explosions, and that the total number of deaths is about evenly divided between falls of roof and all other causes.

MR. J. T. RYAN (Mine Safety Appliances Co., Pittsburgh, Penn.): We have the same problem in the mines here as they have the world over. In every country they are trying to find some means of lowering the high percentage of accidents from falls. In fact, our percentage of accidents from that cause is a little lower than in either Great Britain or in France. In France, in 1922, 70 per cent of their fatalities were face fatalities. In Great Britain about 55 per cent. The British Department of Mines is offering a substantial prize for the best ideas as to the best means of reducing the number of fatalities at the face.

MR. CHRIS S. BENNETT (Kentucky Workman's Compensation Board, Louisville): What is the best method of obtaining reliable statistics regarding accidents—by co-operation between operators, or by state laws, or both?

MR. ADAMS: It is generally known there are no laws back of the Federal Bureau of Mines, nor does it desire any such assistance. It prefers to work on a basis of co-operation. I do not know, however, how any individual state should approach the problem.

WEDNESDAY MORNING SESSION

CHAIRMAN HALL: No section meets more promptly than the Mining Section, because everybody is here at the time the bell rings.

SAFETY IN THE USE OF EXPLOSIVES

N. S. Greensfelder, Editor, The Explosives Engineer, Wilmington, Del.

The Inland Colleries Co., Indianola, Pa., has produced, without a single accident from explosives, a million and a quarter tons of coal, which required 215,850 pounds of explosives and 228,000 detonators for blasting it. This record was not made by chance; it is the result

of a carefully planned and executed system. The following description is based on data supplied by Safety Inspector James Thirtle.

The main storage building or magazine, is situated 1850 feet from the mine shaft and 970 feet from the closest dwelling. Its walls are of brick 18 inches thick. The rofo, which is 5 inches thick, is made of concrete The door is of steel and is provided with steel ventilators. The inside of the building is line dwith wood, and a wooden floor is laid over the concrete. There is an air space for ventilation between the wooden lining and the walls.

A railway line connects the main storage magazine with the magazine used for daily distribution at the shaft. This line is used only for the transportation of explosives from one magazine to the other. The powder is carried in a special car in which no bolts, nails, or iron come in contact with the boxes.

Every precaution has been taken to avoid the possibility of an explosion in the daily distribution magazine, and it is effectively barricaded. This magazine is made of light tile with a specially constructed concrete rooof. The roof which is 3 inches thick is composed of a mixture of six parts sand and one part cement; it would crumble into dust should an explosion occur within. There is an embankment 14 feet higher than the building in the rear. Each side of the magazine is heavily barricaded, as is the front, which faces a high hill. The barricades are shown in the accompanying photograph.

Each miner receives his daily supply of explosives from the attendant at the daily distribution magazine. The amount received by the miner is recorded at the time the explosives are issued to him. He carries his supply for the day into the mine in a heavy canvas sack, which is fitted with a draw string, and is just large enough to hold enough for one day's blasting. When the miner reaches his working place he puts the sack containing the explosives into a wooden box, which he is required to keep at least 50 feet from the working place.

Only shot-firers are allowed to carry blasting caps into the mine. Each shot-firer is given a check number for the box in which he carries blasting caps, and a small locker is provided for every one of these boxes. The lockers are in a special building, which contains nothing else. Keys for all lockers are kept in the lamp room, and no two locker keys are alike. The shot-firer, after placing his blasting cap box in its locker, delivers the key to the lamp-room attendant every day before going home and gets the key when he comes to work next day.

The supply-man refills and checks all of the blasting cap boxes every day. Each blasting cap must be accounted for, both by the shot-firer and the supply-man. Miners who use explosives are given checks which they in turn give to the shot-firer—one check for every blasting cap it is necessary for the shot-firer to use. Every morning the number of detonators used on the last shift is counted and checked with

number of blasting caps on hand. Should a defective cap be found, it must be reported by the shot-firer, or if any caps are used on company work the section foreman obtains the desired number from the shot-firer by official order only.

Batteries

Specially designed Edison Cap Lamp batteries are used by the shot-firers, who are the only ones permitted to fire shots. These batteries have a socket welded on one side, into which two terminals of different length can be placed. These terminals are in a plug on the end of the shot-firing cable. Contact is made by inserting the plug into the socket and pressing it up. The upward pressure which is required eliminates any chance of premature blasts due to accidental contacts. With this apparatus, shot-firers can go into any place where misfires may have occurred without fear of the circuit being accidentally closed.

The Philadelphia and Reading Coal and Iron Co. (Pottsville, Pa.) established an explosives department sixteen years ago. Mr. H. A. Wilson has been in charge of this department since its inception. We are indebted to him for the following valuable information:

"During 1921, the most recent year through which the anthracite mines were operated continuously, we fired about 10,000 shots per day with a daily average of only five misfires or .05 per cent, and an average of one injury for every 294,000 pounds of explosives. Although comparable figures for fifteen years ago are not available, it is known that the injury rate was then much higher.

After a preliminary survey immediately following its establishment, our explosives department found that the desired solution of our problems, which included the prevention of accidents, increased earning power of the miner, and the production of the maximum amount of the larger sizes of coal, involved two distinct factors relating to explosives: First, the selection and adoption of the most suitable explosives for our various conditions, and, second, the proper storage, handling, and use of explosives.

It did not take long for the miners to appreciate our efforts; they soon turned to us for the analysis and solution of all their powder problems. We then carried out a campaign of education, to show the miners the necessity of proper storage, approved methods of priming, loading and tamping, and the bad effects on powder of keeping it too long in the mines before using it. Almost immediately there was a marked reduction in misfires and a noticeable decrease in the amount of fumes and noxious gases. From time to time the foremen and fire bosses are assembled at division headquarters to discuss mining and safety matters. New developments are described and methods for obtaining best results are outlined and approved. Once a year there is a convention at the general office. This is attended by superin-

tendents, foremen, and assistant foremen. At these meetings the heads of each department talk on matters coming under their supervision, and there is a discussion of each subject.

I am a strong advocate of electrical shot-firing. At several of our collieries where all shots are fired by electricity, we have not had an accident from explosives since this method was introduced six years ago. In addition to the increased safety our miners save one cent for each electric blasting cap with six-foot wires that is used instead of cap and fuse, figured at the present prices charged by our company.

In the collieries where fuse is still employed we do everything that is possible to prevent the use of too short lengths. We even check the fuse used by each miner against the amount of dynamite he consumes to determine whether or not he is using enough fuse to insure safety

Avoiding Fires

We take every precaution to avoid fires as a result of blasting. Before going home after a shot, the miner must go back to his place to be sure that no fire has been started in the coal, that there is no burning powder, and that no gas feeders have been ignited. He must also see that the manway is left open for ventilation, and he is required to report any unsafe conditions to the fire-boss. The latter must have any standing gas removed and must see to it that adequate ventilation is provided at all times, that headings are driven at proper intervals, that the breast is securely propped and made safe, and that the mine is using safe and effective methods of blasting.

In gaseous sections, no one is allowed to fire a shot without the permission of the fire-boss. And examination is always made before permission is granted. Locked safety lamps are used in these sections and all shots are fired electrically with a blasting machine.

In my examinations, covering a period in which we have used seventy-five million pounds of explosives, there have been very few complaints for which the explosives manufacturer was responsible; much of our trouble has been caused by improper storage or use of explosives in the mines. The human element, however, is a large factor in the manufacture of explosives, and we have not found that the manufacturers are infallible. Although the occasions have been few, whenever we have found a valid complaint on the quality of an explosive or blasting accessory, we have notified the manufacturer at once, and the material has been taken back after we have shown it was defective.

The Madison Coal Corporaion is actively engaged in educating its miners in the safest and most economical methods of blasting. "We have found" says H. T. Bannister, General Safety Inspector, "that much can be accomplished by tactfully approaching the men and by proper supervising them at the working faces.

All of this company's mines are practically free from gas, and black powder is in general use; but some permissible explosives are co

sumed in places where their use is advisable. Powder is stored in fireproof magazines on the surface; these are isolated as far as is possible, and the ground in their vicinity is kept free from weeds and brush. All magazines are well ventilated and provided with double walls and floors to exclude moisture.

Specially constructed cars, one of which is shown here, are used to transport powder in and around the mines. A lining of thoroughly seasoned wood attached to the car by wooden pegs and wedges, covers all bolts and other metal parts inside the body. A layer of asbestos is fastened against this and held in place by a second lining of wood, also fastened by wooden pegs and wedges.

This construction provides thorough insulation and precludes the possibility of an explosion from contact with live wires. To demonstrate the efficiency of the insulation, the following severe test was made a few years ago before the director of the Department of Mines of Illinois and several of his State Inspectors: A car was filled with kegs of powder and the contents of one keg was poured in such a way that there was loose powder over and around all of the full kegs. The doors were closed and copper wire was wound around the car in all directions. This wire was connected to the power circuit carrying 275 volts. Some of the wires were melted and the wooden sides of the car were charred before the current was turned off, but no explosion occurred. All cars now used for delivering powder are tested in this way. In one instance the wrapped car was connected to a 500-volt circuit without mishap.

Powder is delivered at the working places, where the miners are required to furnish suitable wooden boxes for storing it, and they are also required to keep these boxes locked.

While powder is being delivered underground, the switches on the surface are kept open so that the only current in the mine at the time is that which is needed for lighting the bottom in the vicinity of the shaft, and for charging the storage battery locomotives, for which an independent circuit is provided. As a further precaution, the switches at the bottom are locked open, and the keys are retained by the two men who deliver the powder. These switches cannot be unlocked until all powder has been delivered and both men have returned to the bottom. Thus there is no way in which current can be accidentally put into the circuit at any place where powder is being delivered.

Practically none of the coal is shot off the solid. It is undercut with electric chain machines, and is snubbed with powder or by sledge and wedge, as conditions warrant. The shooting of bottoms left by mining machines is done by special crews who also attend to miscellaneous blasting jobs, such as shooting down the rock roof, or breaking up fallen rock which has to be loaded out. All shots on which dynamite is used are fired electrically under the direct supervision of a foreman. Only sufficient dynamite to take care of the shift's requirements is permitted in the mine.

Supervisors of Explosives

To promote safety and increase the percentage of lump coal, the company employs trained men known as supervisors of explosives These consult the miners in their working places and advise them regarding the location of drill holes, the amount of powder charge and any other matters that may be necessary to secure the best result with a minimum consumption of explosives. Records are kept of the tonnage produced per keg of powder for the different entries and gangs, and, where it is necessary, individual records are kept. These give a basis for the comparison of results from different sections of the mine and from the miners themselves. The supervisors concentrate their efforts to correct careless and incompetent blasting. The work is handled by the Safety Department, headed by the General Safety Inspector.

The companies whose methods are described above are engaged in mining coal; the following are systems employed on hard rock work in the West.

At the Copper Queen Mine of the Phelps-Dodge Corporation powder is stored in a magazine outside the mine. Each month the older powder is moved forward so that it will be used first, and the possibility of any being overlooked and allowed to deteriorate by age is thus avoided. The underground magazines are replenished daily by requisition, approximately a day's supply being stored in each. Since the mine is warm even in winter, no thawing rooms are required. In cold weather, the boxes are opened as soon as they reach the magazine, and the powder is spread out to warm gradually and naturally.

All fuses are capped at a central fuse house on the surface. They are cut to standard lengths and taken underground daily in tight metal containers. Single fuses are used with No. 8 caps.

Forty percent powder is employed for all purposes, and not only the quantity for the round, but also the cartridges to be charged in each hole are specified. The primer is put in the second cartridge from the bottom of the hole and occasionally turned back towards the face. While this practice is not recommended by powder manufacturers because of the possibility of firing the powder by side spit from the fuse—this occurs so seldom that it has caused us no difficulty. When the primer was put in the outside cartridges, there were instances the powder at the bottom of a hole not exploding with the remainder of the charge, either through the occurrence of less sensitive sticks gaps between the sticks, or for some unknown reason, which resulted in serious and sometimes fatal accidents. It was accordingly decided to be safe to detonate the powder at the bottom, in order either explode all the powder, or to scatter it in small particles through muck-pile from which there have been, as yet, no accidents. In

case of a hole having been cut off by an earlier shot the fire is more likely to have travelled past the break, and there is also less chance for the fuse being pulled out. Tamping is issued with the powder in the form of paper cartridges filled with mill-tailings sand.

When fired, the holes are counted in the customary manner and misfires are reported to the next shift, whose duty it is to find the missed holes, and to shoot them without delay before any further drilling is permitted. No charges are removed, but the tamping is taken out and a primed cartridge is inserted into the hole, which is then shot. Drawing of tamping is safer when the cap is near the bottom of the charge. The mine being dry, the proportion of missed holes is very small. Shots, however, are frequently reported short, because of holes going together and making a single report.

Drifts, Raises and Stopes

For drifts, raises and stopes, the routine is similar to the above, differing only in the details imposed by the character of the work.

At the Copper Queen mine, 1 inch steel is used for all machines, and since the diameter at the bottom of a hole of average depth is 1½ inches, this takes 1¼ inch powder easily. It is specified that cartridges be split so that they may be loaded compactly, and fill the drill hole, leaving a minimum air or paper space. This must be done by pressure of the tamping stick and is facilitated by using the cartridge having the largest diameter that can be comfortably put into the hole. Other advantages in using cartridges of large diameter are that gelatin in 1½ inch cartridges has a higher rate of detonation than in ⅞ inch cartridges, and in the larger size the velocity does not diminish as rapidly with storage.

"While the use of powder at the Copper Queen" Mr. Sherman believes "is efficient as in most mines, it can be improved by insisting on the use of quantities not exceeding those determined by experiment to be sufficient for the work required."

William Conibear of the Cleveland Cliff Iron Co. has compiled some unusually valuable and interesting statistics on the method of handling explosives and the comparative safety of blasting in the Michigan iron mines. He says:

"A review of mine accidents clearly shows that other hazards exist which contribute far more than do explosives toward both the loss of life and serious and slight accidents. The contrary view is so often met, because, while everyone is more or less aware of the latent power of explosives, it is by no means so generally known that the explosives' manufacturers have made it possible for the miner to use their products with a degree of safety which makes this risk considerably less than any one of a number of others involved in the mining industry.

Surely an annual fatality rate of one death out of 7,698 men employed, and one serious and three slight accidents among 4,619 men—and doubtless some of these were likewise incorrectly charged—does not argue very strongly that miners are jeopardized to any extraordinary extent by handling explosives. If these figures provide a reliable basis from which to determine the hazard—and we have no other—it is evident that the loss of life or the number of injuries sustained by miners from this cause should not be considered weighty enough to warrant insurance discrimination, which, if it does not deny miners a policy altogether, makes them pay abnormal rates.

At our mines usually only a two or three days' supply of explosives is kept in the underground magazines, while the amounts taken underground at any one time depend upon the hardness of the ground to be broken and the number of miners employed. At least once, but more often two or three times a week, a supply varying from 100 to 2,000 lbs. securely packed in sealed boxes and averaging 50 lbs. to a box, is taken into the mine.

After delivery at the shaft stations, the powder is taken to such magazines or other storage places as may be provided. First, then comes the opening of the boxes, each of which holds 100 sticks, or cartridges. Later, the cartridges are carried in bags or boxes to the stopes, drifts, or raises where the miners work. Each cartridge is placed in a drill hole, if virgin ground is to be broken, or is used for block-hole or mudcap shots.

ORGANIZING THE MINING INDUSTRY FOR SAFETY

Francis Feehan, Mine Safety Commissioner, U. S. Bureau of Mines Pittsburgh, Pa.

The necessity for more efficient safety organization work in the mining industry is brought forcibly to our attention by statistics published by the U. S. Bureau of Mines, entitled "Coal Mine Fatalities in the United States 1923", by Wm. W. Adams. An examination of the death rates from accidents for the last ten years, shows very unsatisfactory progress being made toward reducing these casualties. In 1913 there were 747,644 miners employed; of whom 2,785 were killed in 1923 there were 846,990 miners employed and 2,452 were killed. Recent statistics show that for the first six months of 1923, the death rate was 3.91 men per million tons of coal mined, while for the same period of 1924, the rate was 4.76 men per million tons.

Statistics available for metal mines (Metal Mine Fatalities in the United States, 1922 by W. W. Adams) show that the number of employees in 1915 were 152,118 and the fatalities 553. In 1922 there were 105,697 employed and fatalities numbered 344.

Accident prevention in other industries. Other large industries, it believed show a greater reduction in fatal and non-fatal acciden

presumably due to the fact that the safety movement has made much more substantial progress, safety organization work is being conducted more efficiently, and accident prevention is given the first consideration.

At one of the largest steel plants in the Pittsburgh district, where they have an efficient safety organization, 550 workmen were employed steadily throughout the year 1923 in the transportation and labor department, the most hazardous employment about the plant. They had no fatal and but one lost time accident for the entire year. I regard this as an extraordinary achievement. Mining companies should investigate the progress made in accident prevention in the iron and steel industry, by electric and other manufacturing companies, by the railroads and street railways and so forth, and adopt their safety policy which I will later outline in the form of a mine safety organization.

Standard Plant Safety Organization

The progress of the safety movement within the past ten years has been fruitful of splendid results. Many employers of labor have tried every method proposed, eager in their desire to reduce industrial accidents to a minimum, but it is generally conceded that there is but one plan that is practical to insure premanent progress, and is now recognized as the standard system of plant safety organization, which is applicable to every kind of industry, municipalities, institutions, etc. In every instance where this form of safety organization has been initiated, it has remained permanently an important part of the business policy of the employing concern. It organizes every agency connected with industry on a co-operative basis, to advance and promote safety which insures its success. The employer is the promoter and active head, supported by all the company officials, in conjunction with representatives of the employees, state and federal officials.

The following outline of a mine safety organization is the standard form that has proved so efficient in every kind of employment including mining. It can be made applicable to every industry by changing the titles of the representatives and organizing by divisions or departments when desired. Experience has demonstrated that this form efficiently conducted will bring astonishing results in preventing fatalities, serious and minor injuries to all persons employed in the mining industry and to their wives and families residing in mining communities. At the same time it will affect a substantial saving to the mine worker, and materially reduce the cost of production to the mine owner. Industrial accidents for Penncylvania 1923 caused the loss of over 2,691,600 days by injured employees. A wage loss of $13,354,000 to employees, and a total compensation cost of $13,143,393; 2,412 were killed, 1,167 permanently injured, 104,205 seriously injured, 92,651 less seriously injured, 649 eyes were lost, 308 hands, and 1,468 fingers crushed or severed; 77 arms and 116 legs cut off, 176 feet, and 180

toes removed. Of this number there is charged to mining in Pennsylvania for 1923, 1,017 fatal and 58,865 non-fatal.

With proper enforcement and observance of our present laws, supported by an efficient safety organization at every mine in the United States, at least three-fourth of the fatalities and injuries now occurring can be prevented.

The Plan for a Standard Mine Safety Organization

Chairman
Mine Manager or Superintendent
Secretary
Safety Engineer

Group 1	Group 2	Group 3
Superintendent and assistants	Miners and loaders, three to ten selected from different sections of the mine	Office clerk
Mine foreman and assistants	Motorman and helper	Supply clerk
Mine examiners and firebosses	Tracklayer and helper	Mining engineer
Driver boss	Shotfirers, one or two	Company physician
Tipple foreman	Wireman bricklayer	Timekeeper
Bottom foreman	Timberman and helper	Shipping clerk
Labor foreman	Electrician and helper	State mine inspector
	Machineman and helper	
	Workman at shaft or slope bottom	
	Workman on the outside	

Rules

1. All company officials shall serve as permanent members of the mine safety organization.

2. Group 2 may be selected by the employees, or by the superintendent, mine foreman or safety engineer, and changed every three months.

3. Group 3 may be selected by the mine manager, superintendent or safety engineer.

4. Every class of employees shall be represented where one class of employees exceeds fifty in number; another member may be added for each additional fifty.

6. Meetings shall be held at least once each month, preferably at the mine office after regular working hours. Where two shifts are worked, each turn will have their own safety organization, and joint meetings shall be held when practicable.

6. Where a mining company operates more than one mine convenient to each other, joint meetings of all mine safety organizations shall be held at least every three months.

7. Community safety meetings for all employees, their wives and families shall be held at least every two months. School auditoriums can usually be secured for this purpose. Outdoor meetings can be held when weather permits.

8. The minutes of each safety meeting shall be recorded and kept available for examination, by company officials, employees or state inspectors.

9. Service in the safety organization shall be voluntarily, and no representative shall receive a bonus, or pay for time or service from any source. The safety engineer shall be a monthly employee of the company.

10. By a majority vote, the safety organization in meeting may submit to the manager any recommendations intended to promote safety and accident prevention, and no other subject shall be considered that does not pertain to safety.

Order of Business for Mine Safety Organization

1. Reading the minutes of previous meeting.

2. Report of safety engineer or secretary on recommendations made at previous meetings and disposition of same.

3. Report of accidents occurring since last meeting, how they occurred, and what action has been taken to prevent re-occurrence.

4. Report of mine hazards with recommendations how to safeguard against same.

5. Report on inspections made since last meeting by the superintendent, foreman, safety engineer or State mine inspector.

6. Report on new bulletins, posters and other safety information, published by the U. S. Bureau of Mines, State Department of Mines, mining journals, newspapers, lectures, etc.

7. Report on co-operation of employees, and the number who have qualified in first aid, and mine rescue.

8. Report on community and home hazards, how to remedy same; community and district safety meetings, first aid and mine rescue contests.

9. Report of safety engineer on progress being made, comparison of accident records, and other important statistics.

10. Prepared address on the safety, the subject and speaker to be chosen by the chairman, who shall regulate the discussion on all subjects.

Duties of Members of the Mine Safety Organization

Manager. The success or failure of a safety organization at the mine depends entirely on the manager as chief official spokesman of the mine-owner. He should make known the policy to his company by posting a permanent notice at each mine entrance reading as follows:

The enforcement of the mining laws and observance of all safety rules are conditions of employment at this mine. This applies to all officials and every person in the employ of this company.

Signed.....Manager.

Every official and employee should be informed that dismissal will follow the failure to properly support the policy of the company, and no person should be employed in any capacity who does not give definite assurance that he will support the safety policy referred to. The manager should manifest an interest in all safety activities, attend all safety meetings, and keep properly informed on the progress being made.

Superintendent. The superintendent is really an assistant manager. Frequently he has authority to employ mine foremen and other officials. In this instance what has been said of the duties of the manager applies to him. His ordinary duties will be supervising the work of subordinate officials. He should therefore, be an enthusiastic supporter of the safety organization. He too, must insist that the practice of safety and accident prevention be a condition of employment, and keep thoroughly informed through the safety engineer, foreman and others, of the progress being made, and attend all meetings of the safety organization.

Mine Foreman and Assistants. The successful mine foreman is the one who can maintain the greatest maximum of safety for the employees under his charge. He can not have efficient operation without this. Production is important, but he is a failure if he can not also make safety the first consideration. While a safety engineer is provided in this plan to work in conjunction with him, it is not intended that he shall be relieved of the responsibilities imposed on him by the mining laws, to see that every one employed in the mine is properly safeguarded from accidents. If he and his assistants are unable to influence workmen to volunteer their services on the mine safety organization, they lack executive ability to serve in this capacity. The practice of safety being a condition of employment, they have ample means of rewarding those who support the safety policy of the company. Refusal to serve is direct evidence that they do not intend to co-operate, and are therefore unfit for employment.

The mine foreman should require the rigid enforcement of the mining laws and all safety rules, and discipline those who violate the same, and see that all employees, especially new workmen, receive instructions in accident prevention. With a proper display of earnestness and example, he can secure the necessary support from subordinate officials and the employees.

Safety Engineer. It is difficult to convince mine owners and officials that it is necessary to have a safety engineer employer. This was also true of other industries, but experience has proved that safety organization work can not be efficiently conducted in any industry unless there is some one to supervise and attend to all the details, relieving the superintendent and mine foreman of the unnecessary work. He does not assume their responsibilities but works in conjunction with them under their direction.

The safety engineer should have special qualifications in organizing, and coordinating the efforts of all officials and employees in safety work. He should have a certificate of competency from the United States Bureau of Mines for first-aid and mine-rescue work, and be qualified to train workmen in both. He should also distribute and maintain this equipment efficiently.

He should investigate all fatal and serious accidents, arrange for care of the injured, keep informed as to their condition, and report the same to the superintendent. He should keep all records of accidents, be empowered to provide safeguards where required, and remedy all unhealthy or unsanitary conditions he may know to exist in or about the mine or in the mining community. He should be the official representative of the company at all district, State or na-

tional conferences, and keep informed on new safety devices and practices that are developed, prepare the program for all safety meetings, and arrange for first aid and mine rescue contests.

He should secure all other available information and statistics on accident prevention, and present it to the safety organization. Where a company is operating several mines adjacent to one another, he can efficiently take charge of all the safety work. Large mining companies should have a safety department with a safety director, and a safety engineer at each group of mines. At small operations the safety engineer may be assigned other duties such as time keeping, in charge of supplies, etc. Mining companies will find it good business economy to hire a safety engineer and dismiss their compensation adjuster. An ounce of prevention is worth a pound of cure.

Miners—Skilled Workers and Laborers. This group comprises the workers' representatives in the safety organization. The fact that they are the greatest beneficiaries of accident prevention should inspire them to render every possible assistance in making the mine and mining community a safe place to work and live in. Eliminating the hazards of mining will materially improve the conditions of employment. They should welcome an opportunity to serve on the mine safety organization, and assist the company officials in securing the strict enforcement of all mining laws and safety regulations, and also aid in the punishment of those who violate the same. For this service they will be amply rewarded by safeguarding their own and the lives of their fellow workmen.

Clerks—Engineers—Physician—Inspectors. The representatives in this group can give the safety organization much valuable information. The clerk can report the amount of lost time through accidents, the number of employees, etc. The mining engineer can give valuable information on future development and mining problems. The physician can report the condition and character of the injuries received by the employees or their families, and other general information regarding the health of all persons employed at the mine or residing in the mining community. Other members of this group may assist in a similar way.

The past shocking record of fatal and non-fatal accidents in the mining industry has thoroughly aroused the American public. Demands are being made for more drastic protective legislation. The object of this paper is to secure enforcement of our present laws, and more perfect co-operation of all persons engaged in mining in promoting accident prevention, and organizing the mining industry for safety.

DISCUSSION

MR. B. D. SHOVE (Oliver Iron Mining Co., Ironwood, Mich.): Mr. Feehan stated under "State Mining Laws" that "Each mining state through its legislature enacts its own mining laws and provides" etc. Are you sure the State of Michigan has state mining laws?

MR. FEEHAN: I am not quite certain. There are some states that are backward. I think Michigan, has mine inspectors.

MR. SHOVE: If there are any, I would like to meet them. If they have state mine inspectors, we would like to have them inspect our mines.

MR. FEEHAN: I think they have state mine inspectors.

MR. SHOVE: They have county inspectors.

MR. FEEHAN: They have an inspection system. That is probably as good as state inspection.

CHAIRMAN REED: There are some excellent suggestions in this paper. One statement made is that in nearly every instance where miners have been killed or injured, they have foreseen the danger and were conscious of it and of the likelihood that they would be killed or injured. One of our oldest and most practical miners recently

made an even more forcible statement. He said that a coal miner had never been injured in the fall of a roof without prior knowledge of the danger.

MR. MARTINSON: (Pickands, Mather & Co., Hibbing, Minn.): In this paper Mr. Feehan suggests that we have more mining laws, more state laws in connection with mining and he quotes one of the rules of the Pennsylvania laws, "Every workman employed in the mines shall examine his working place before commencing work; and after any stoppage of work during the shift, he shall repeat such examination."

We haven't any mining laws that amount to anything in Minnesota, but in other places there is a great tendency to enact too many rules and regulations. That tendency is not only in this particular phase of business in which we are interested. It is found in every American legislature. These bodies meet every one or two years, and put on the statute books innumerable statutes that in a short time are forgotten. If this is an example of some of our mining laws I am not at all surprised that the laws are being disobeyed.

I think that the Bureau of Mines could render a wonderful service if they would suggest shorter and more practical mining laws to the various states which would not try to regulate every activity of the workman from the time he comes on the job until he leaves.

Mining, as you all know, differs from other industries, in that we can't have the close supervision of the employee. Without that close supervision, it is almost impossible to enforce laws. It is better to educate the men than to attempt to enforce regulations.

MR. R. V. AGETON (Tri-State Zinc & Lead Ore Producers Assn., Miami, Okla.): When this safety-first work started in the mines some 15 years ago, it was necessary that we advertise accidents in order that we might interest the mining operators, the miners and the general public to the need for preventive measures. In my opinion, that time has passed. There are too many papers, too many bulletins, too much talk regarding the hazards of mining.

The other day we heard a good talk on the intellect and understanding, or as you might say, the conscious and sub-conscious mind. We all realize that we are governed largely by this sub-conscious mind or instinct. You see something; and what you see you attempt to do. If you are shown a man loading from a chute with an iron bar and with a trolley wire near, and he has the iron bar on the trolley wire, in spite of yourself, the fear psychology, every time you approach a chute, is going to get the best of you. A large proportion of our accidents are due to the advertisements we have circulated as to the dangers of mining.

I would like to analyze safety. Safety is security from loss either physical or financial. That is an impossibility. There is no such thing as security. You can't be secured and it was never intended that you should be.

I would like to see us adopt the idea of prevention of accidents. That can be accomplished. We can prevent accidents. We cannot be safe. We are asking for something which is impossible, which we know is impossible, in safety. Along the psychological line of accident prevention, it seems to me the time has arrived when we should start and take a leaf from the books of the salesman. I would suggest that all of us get "Selling Psychology", the psychology of sales, and read it. Know what you are attempting and then try to make your bulletins reach that end. Let's quit the idea of advertising accidents by bulletins showing a man just how he can get hurt.

You see posters which show a man stalled on the railroad track and the locomotive bumping him off. His wife and his children are with him in the car. I am sure in my own instance, and in a number of others probably, every time I cross a track, the stalling of that man's car comes into my mind and I have to fight fear psychology to get my car across the track. The same thing is true every time you have an accident.

Mr. Boardman the other day mentioned his trolley locomotive accidents and when he told me, I accused him of showing all the fellows in the Butte mines how to get killed on the trolleys. I think he is sold on that fact. He had about 8 or 10 accidents of one kind. He told the foremen and they told the men and the men got hurt in the exact way his recital suggested.

I think the time has arrived when we have to switch over; we don' need to sell accidents, we need to sell accident prevention.

DR. E. M. PARLETT (Pittsburgh Limestone Co., New Castle, Penn.) We all know that the latest instincts acquired by the human race were judgment, reason and expression. Being the latest acquired, they ar the least stable and necessarily at times escape us. The controllin factor in the universe from its inception has been fear, and safety firs really is based on self preservation which, in turn, is based on fear.

I wish our children obeyed us because they loved us. They obey u because they are afraid of a licking. I wish we were all Christian because we loved Christianity. I am afraid that it is not the reaso for well-doing of many of us. Some of us are afraid of going to hell.

Now, when we see a man drowning, we need not necessarily drow ourselves to experience the sensation, nor to protect ourselves fro drowning, so that I say, the only thing that Mr. Feehan left out of h paper is physical examination of employees. The next epoch of safe will involve some slight mental test, because now we are faced wi the problem of guarding our morons and others whom we must empl and whom we must impress with the unsafe conditions and the vario hazards, through the elementary processes of fear.

I, therefore, feel that the instruction of our men in all of our i dustries, on the basis of fear, has had much to do with the advance

Your mining sections have made wonderful advances. Today our mines are safer and our accident records are better in our mines than in our quarries, on a 300-hour basis, going to prove that the recommendations from the Bureau of Mines and other sources have been more effective in mines than in quarries because they have been more closely studied. I hope that we will keep in mind that the human race has only recently acquired judgment, reason and expression. Let us not for one moment forget that the prime factor in life, now and from the beginning, is and has been self preservation. We should base much of our work on that factor.

CHAIRMAN REED: I don't know whether I quite agree with the gentleman when he said he was going to take a broad view of the subject. I believe he has taken a rather technical view. He said he was a general engineer; he seems to view the matter as an electrical engineer.

Our time will hardly permit of the turning of safety engineers loose to eat him up, as you might say, on some of the great differences between electrical engineers and safety engineers. An electrical engineer likes to call low voltage anything he can insulate by covering the outside of the wire. A safety engineer calls it such that the contact does not cause instant death. It is a rather different standpoint that of the electrical engineer who is looking for good electrical results and that of the safety engineer whose prime interest is in safety. We have to get together somewhere. We can neither of us go to extremes. I will ask Mr. Hall to take the Chair and make the announcements.

SAFETY IN UNDERGROUND USE OF ELECTRICITY

J. B. Johnson, Mechanical Engineer, United Verde Copper Company, Clarkdale, Ariz.

The growing use of electricity in mining has led to a more strict consideration of safety in its various applications. The last decade of metal mining has witnessed more electrification developments than the entire century preceding.

The prime consideration in electric developments no doubt, has been economy in operation, but as developments have progressed operators have become more and more insistent in demanding safety as well as economy. Today, in the consideration of proposed electrification for the major mining operations the first question usually asked is *Are all safety provisions for employes and property adequately covered?*

The first problems encountered in the electrification of a mine center about the safety of *transmission of power.* The transmission of electric power underground differs quite materially, in methods, from transmission on the surface. Underground clearances are, of necessity, very small and special precautions must be taken in the insulation of main feeder lines as well as branch feeders. In the matter of voltage, safety would demand that nothing in excess of 6,600 volts be used underground. It is

seldom, if ever, necessary to employ voltages over 6,600, and unless an underground transmission line is unusually long, say over two miles, the standard line voltage of 2,200 volts is sufficient. Insulation of main feeder lines carrying 2,200 volts can be made perfectly safe if jute insulation with a lead sheath covering and flexible armor is used. This is a standard insulation and manufactured by all leading wire and cable mills, and although costly will usually pay for itself in the prevention of a single accident due to short circuit or grounds. This method has the further advantage of being proof against moisture and being flexible, so that it can be anchored direct to timber sets or walls of tunnels and drifts. The metal sheaths are proof against stray induction currents, and a number of different feeders can be placed adjacent to each other.

A less costly method consisting of the standard cable in metal conduits is often employed but has many objections from the standpoint of safety. Chief among these is the item of moisture from condensation within the conduits. Whenever local conditions necessitate such a method of installation, adequate provisions must be made for trapping the moisture and draining it off at suitable intervals.

In the splicing of armored cable special precautions must be taken so as to make the splice as safe as the cable line. This is usually accomplished by using a short length of pipe of ample diameter to confine the splice, and a reducing bushing at each end to close the ends of the pipe and at the same time allow the cable to pass through. The copper is spliced by soldering in the usual manner and taped, after which a good quality of insulating compound is poured into the pipe hot, completely filling it and excluding all air.

Feeder Lines in Hoisting Shafts

Every metal mine where ore is mined on different levels utilizes the hoisting shafts for the location of feeder lines that transmit power to the various levels. The problems encountered in the installation of vertical feeder mains, oftentimes several thousand feet long, are radically different from those met with in surface transmission lines. In the first place it is important to secure the conductors to the sheath so as to prevent slipping when hung vertically. The wire manufacturers now make a lead-covered steel armored cable with bands every 8 or 10 feet apart which very effectually prevents slipping of conductors within the sheath when hung in a vertical shaft. The top anchorage must be made secure enough to support at least 800 feet of cable, and enough of the steel armor must be bent away from the cable to make an effective bond in the supporting clamp. Secondary clamps can then be placed around the cable at every level to keep the cable in place in the shaft. The above method presupposes that the cable is suspended within a shaft compartment, and has many advantages over any other. It allows of ready inspection through the entire cable length and greatly shortens the time in locating trouble from grounds. To prevent the communi-

compartment, or if the shaft does not permit room for this the cables themselves can be fireproofed by covering with "gunite" cement, or other suitable fireproof coating.

A less expensive method in concrete lined shafts is to cast conduits in the lining and suspend the cables in these conduits. From a safety standpoint, however, this method lacks much to commend it. It is open to the objection of condensation before mentioned and still more serious in vertical conduits is the liability of ground seepage getting into the conduits at some points with very destructive results when it is remembered that most mine waters are very corrosive. A recent case under the writer's observation, was a concrete lined shaft with vertical conduits cast in the lining where cable had been suspended. After less than four years service the entire cable had to be replaced, and it was found that there were a number of grounds all along the shaft where the insulation had been punctured. In this particular case the insulation was of rubber which is poor insulation material for underground use in a dry mine.

The foregoing discussion pertains particularly to all main feeders upon which the entire mine is dependent, and in completely electrified mines first class construction is a prime requisite of safety, and next and fully as important, is an absolutely first class system of rigid inspection and testing at regular intervals. It is, therefore, necessary that construction men take into full consideration the items of accessibility for inspection as well as repair of all transmission lines.

The same precautions and care should be exercised in the case of distributing feeders as in main feeders, though in a lesser degree, perhaps, from the safety viewpoint. Connections of distributing lines to main feeders in a shaft are made in steel junction boxes in the same manner as in surface work. The box should always open on the outside of the shaft wall and into the station. The grounding of all metal armor and sheaths, conduits, boxes, and transformer cases is as important in underground work as in surface work. However, this precaution is frequently overlooked owing to the underground difficulty of finding suitable ground connections. The safest method is to connect all ground currents to a continuous metallic return to the surface either through shaft or tunnel and connect up to a good system of grounding plates in a suitable location. This is far better than the all too common method of connecting to a water main or a pump column in the shaft.

In mine lighting, the standard voltage of 110 volts is employed. Lighting transformers, single phase, should be distributed and located in the mine so as to keep the voltage loss below a practical maximum as determined by economy rather than safety consideration. 110 volt distributing lines can be run in conduit similar to surface installations.

Voltage

In the various application of electricity to underground operations such as hoisting, haulage, lighting, pumping and ventilation, a safe rule

is to run 2,200 volt lines direct without any transformation to all A.C. motors 50 H.P. or over. Since economy demands that transformers, rotary converters, and motor generators with low voltage secondaries be placed as close as possible to the load, it very frequently is necessary to place such apparatus underground. The case of lighting transformers has already been mentioned. In the case of transforming apparatus of 100 K.W. or more capacity the question of dissipating the heat generated by such apparatus becomes an important item. This subject has not received the consideration which it deserves and consequently there are many such installations in mines where the capacity is seriously curtailed because of overheated room conditions. It is essential in planning for such an installation for safety that a separate station for the equipment be cut adjacent to the main air way and a sufficient amount of air deflected through this station to cool the electrical apparatus. Overheated electrical apparatus is a constant menace to safety. The remedy is, of course, a regular inspection to guard against overloads as well as an abundance of ventilating air to carry away the heat. The most common causes of "blown" coils in motors, transformers and converting apparatus is insufficient ventilation, overloads and poor grounding of frames. As a further precaution against the possible spread of fire in a mine, each set of transformers or converting set of 150 K. W. or more capacity should be placed in separate stations as previously mentioned and such stations must be fireproof and have quick closing air doors for quick isolation in case of accident.

Electric causes of mine accidents can be grouped under 3 main headings:

1. Failure of power, causing interruptions to service.
2. Overloaded lines or equipment.
3. Grounds and short circuits.

The first mentioned of these causes may not be considered as very serious in a surface plant, but in a mine may have very serious consequences if protection against such contingencies were not provided. The hoisting of men and ore is the operation most vitally affected by this item and therefore safety appliances for this class of service have received great deal of attention. Automatic switches, magnetic and solenoid brake trips, and various types of emergency stop switches are being used successfully in connection with motor driven hoists.

Electric Hoists

Electrically operated hoists have so many advantages over other kinds from the economical and operating viewpoint, that it remained only to make electric hoisting as safe as the older methods to make electric hoists entirely acceptable for mining use. It is true that there still exists some prejudice against electric hoists on the grounds of safety, but the development of safety devices that have proven absolutely reliable in years of service will soon overcome any prejudice that still exists. By mea

of very ingenius systems of wiring and safety devices, protection can be had against overwind, overspeed, low voltage and overload, and failure of power. Protection against overwind can best be effected by limit switches placed in the shaft itself. Overspeed can be prevented by a mechanical centrifugal governor geared to the hoist, the governor tripping the safety switch at any predetermined speed to which it may be set. Low voltage and overload devices operate in the usual manner through relays and trip coil to trip the main circuit breaker and disconnect the motor from the line. Failure of power also operates through the same circuit breaker with the same result. In hoisting operations it is, of course, not only necessary to disconnect the motor from the line but just as important to positively set the brake. This is usually accomplished by another set of relays and magnetic trip which simultaneous with the opening of the main circuit breaker sets the brake by tripping the gravity weight. All safety switches and devices which operate to stop the hoist are connected in series in a separate low voltage relay circuit and the disruption of this circuit at any point will operate to stop the hoist. This system provides protection against even the carelessness of the hoist engineer. A complete system of electric safeties for the protection of mine hoisting is very complicated and involves many ingenious details and can therefore only be touched upon here.

Continuous overload on lines and equipment underground should never be permitted and are a constant menace to safety even if the outward inspection does not seem to indicate any danger. A safety margin is always to be recommended. Periodic tests should be conducted to ascertain the loads on all important equipment. Peak loads due to hoisting will throw dangerous surges into the power lines if the proper precautions have not been taken in the control of the hoist motor. Unless conditions permit of a good counterbalance between cages or between cage and counterweight it is not feasible to connect the hoist motor direct to the line. The peak of acceleration under most conditions is too great, compared with the running load, to allow for efficient operation of the system. It is considered the best practice today, on account of the better control, to drive hoists with direct current motors operated from motor generator sets with or without flywheel sets to equalize the peaks depending on whether or not there be sufficient surplus capacity in the power line or in the power station beyond the line supplying the current. The control of direct current motors presents no difficulties to the engineer. In lowering heavy loads full regenerative resistance in the motor is obtained at any speed, so that the brake need not be employed. It is not safe to lower heavy loads exclusively on the brake and many state laws will not permit this practice. In the case of A.C. induction hoist motors, full regenerative control is not possible except when lowering at a considerable speed above the rated hoisting speed in order that the motor may run above synchronous speed. When lowering at lower speeds it is necessary to "plug" the motor, a method which is not only wasteful of electric energy but not as safe as should be desirable. Sometimes conditions are such that balanced operation as before mentioned can be effected and

the accelerating peak considerably reduced. Both efficiency and safety are thereby gained and the A-C induction motor is fully justified. Dynamic or regenerative breaking can, under these conditions, be made amply safe.

Safe Control of Hoist

In any system of electric hoisting, the safe control of the hoist motor is a matter of prime importance. Smooth acceleration and deceleration is necessary to safe operation, as is a complete system of automatic safeties. Apparatus for the control of hoist motors varies for every condition. Electrical manufacturers co-operating with operating engineers have developed control systems suited to every condition. This includes drum controllers, magnetic contactors, resistance grids, and liquid rheostat controllers, reversing contactors, all of which have been specially designed for underground use also for the peculiar service incident to hoisting. Motors for hoisting service are also specially designed, as the standard types of motors are not suitable for this work. It may be added here that the success in electric hoisting has made it possible to install main hoists underground of which a few have already been installed in this country.

Perhaps the most common trouble in underground power tranmission is due to grounds. The only remedy for this prevalent trouble lies, in the first place, in a special emphasis on first class construction and a choice of first class and suitable insulating materials. Next in importance comes the institution of a good system of rigid inspection and tests at least once a month. Bare trolley wires for the haulage system should be protected on both sides with insulating material to clear the trolley and testing for grounds frequently made. Accidents from trolley wire are frequent, but can usually be traced to carelessness of workmen or operatives. This latter cause of accidents we have always with us, and the only remedy is a persistent and thorough educational campaign in the interests of safety.

THURSDAY MORNING SESSION

CHAIRMAN HALL: The address by Mr. R. N. Hosler, I am sorry to say will not be delivered. Mr. Hosler was in doubt from the first whether he would be able to be here and though he made plans to come, he finally decided that he could not manage to be with us, and he has not sent his paper.

ELECTRIC STARTING DEVICES AND FUSES WITH REFERENCE TO SAFETY

G. F. MacWilliams, Electrical Engineer, Pennsylvania Coal and Coke Corporation, Cresson, Pa.

Fuses for electrical circuits may be divided into several classes. The open-type link fuse should be used only when mounted on non-combustible

and non-absorptive material. It is always preferable that it be mounted in fireproof cabinets. This type of fuse is exposed and the liability of a short circuit or injury to anyone working around the fuse or making a renewal is always great. The only advantage that the fuse has is that it is relatively cheap.

Enclosed fuses of the plug type are much safer, but even these fuses may be misused and thus prove ineffective. It is a common practice for some men to insert a piece of metal, about the size of a penny, in the base of the socket and thus make the fuse inoperative. Whenever this type of fuse is used the line wire should be connected to the center contact and the load wire to the threaded part. If this is done the circuit becomes dead the instant the fuse is turned loose from the bottom or line contact. It thus becomes much safer for the workman.

The enclosed-type cartridge fuse is also safer than the open-link type and when provided with ferrule contacts may be used on circuits carrying currents as high as 60 amperes. When equipped with knife-blade contacts the fuses are suitable for use on circuits carrying much larger currents. Some of these fuses having renewable links may be misused so that they will carry a higher current than that for which they were designed. Even non-renewable cartridge fuses are often tampered with and made either inoperative or so that they will operate only at limits much higher than that for which they were designed. This is done by connecting jumper wires between the two terminals.

The enclosed externally operated fuse switch is probably the safest for general work. To renew the fuse the terminals are first of all entirely disconnected from all live parts. The Underwriters' classification of this complete unit is A. A.

Whatever type of fuse is used on a circuit it is always necessary that it be installed and maintained properly. If this is done few accidents will result. When renewing fuses in grounded cabinets care should be taken to avoid short circuits or accidental connection with the ground. All contacts should be kept clean and in proper alignment, otherwise, excessive heating may result.

Automatic circuit breakers will afford much better protection to apparatus than almost any type of fuse. Usually these breakers are designed so as to trip at any current value between certain limits for which the breaker has been made. Such breakers should be installed high enough from the floor and in such a position that the operator or any inflammable material will not be exposed to the arc which arises from the contact tips when the breaker opens. They should also be equipped with a hand trip properly insulated and in such a position that the breaker may be readily opened by hand without injuring the operator's hand or arm, or exposing him to the arc. Such a breaker should always be set to trip at a current value less than that which would cause injury to any connected apparatus or cables. Automatic circuit breakers used for interrupting currents higher than 2,000 amperes should be remotely controlled so as to avoid possibility of danger to the operator if any part should fail when the circuit is being opened.

Automatic Circuit Breakers

Automatic reclosing circuit breakers, if installed outside the power plant or substation should be enclosed in a locked, fireproof box to prevent it from being tampered with. The key should be placed in the hands of a responsible person, familiar with electrical equipment.

This type of breaker is designed so that it will close just as soon as a short circuit or overload has been taken off the line. Therefore, great care should be taken to avoid shock or burns. To obviate any danger when repairing such a switch, or feeder wires connected to it, the control circuit should first of all be opened and the circuit grounded. Unless this is done the workman might begin to work on either the circuit breaker or one of the feeders when the power is off and later find the circuit breaker has closed and receive a severe shock or burn.

If circuit breakers are properly installed and maintained the danger of burning out generators, motors or cables, and the injury of attendants will be greatly reduced. Automatic reclosing circuit breakers may be installed so as to sectionalize feeders and trolley circuits and thus localize any trouble. They also have another advantage in that they may be adjusted so as not to close on any load which would be injurious to the generating or converting equipment.

There are many types of so-called safety switches. One manufactured by the V. V. Fittings Co. appears to be satisfactory. This switch is enclosed in an iron box and is provided with a curved operating handle locked in position when the switch is closed. This handle has a socket at the end which must be entered into a slot in an extension at the lower right hand corner of the box. The shaft operating the switch is protected by this extension so that it cannot be operated with a wrench or plier. A lineman wishing to work on the circuit controlled by this switch, opens the switch and unlocks the handle which he takes with him. In this way he is assured that no one will close the switch without his knowledge.

Some oil switches are often required to open circuits carrying currents much larger than that for which the switch is designed. The oil is placed in these switches to prevent an arc being formed when the current is interrupted. These arcs cause carbonization of the oil which reduces the insulating characteristics and may cause trouble. Dust and dirt also enter the tanks and in many cases form a conducting material.

Whenever an arc is broken under oil the oil dissipates some of this heat and itself becomes heated. This causes an expansion of the oil and a certain quantity of air is expelled from the tank. When the oil cools and contracts, it causes new air to be taken into the tank. If this air contains moisture, which it nearly always does, fine particles of water-vapor form on the sides of the tank and drop into the oil.

Keeping Switches Clean

If much moisture and dirt is permitted to collect in the oil and tank switch to explode. Switches of this type with

vertical contact boards permit dust and dirt to drop into the tank rather easily, whereas horizontal boards prevent much of the dust from getting into the oil. Dust and dirt collect on the outside of a switch, due to the presence of oil which holds any floating particle of dirt which comes in contact with it. Dust and dirt in this manner form a conductor between the switch terminals and often cause leakage of current to ground or from one line wire to another.

To avoid accidents it is necessary therefore to keep the switch as clean as possible and make periodic inspections of all current-carrying parts and also of the oil. Sludge in the bottom of an oil tank may become so deep as to cause current to leak from one of the line wires to ground. If the switch is not grounded the tank and supports will become charged and dangerous.

Depending upon the service rendered by an oil switch, the oil should be changed every month or every few years. In dusty damp places it may be necessary to renew the oil every few months. In dry clean places it may be necessary to renew the oil not oftener than every four years. No set rule can be formulated, as the time will depend on the location and severity of the service. Every oil switch should be inspected at least once a year. If the contacts are damaged, accidents of course, will be likely to occur.

At our mines, unless a switch has been in abnormal service it is inspected once a year. If moisture or sludge appears in the tank it is cleaned out, the contacts adjusted and new oil installed. Any oil which appears to be satisfactory is tested before it is used. Oil that appears to be good is often, upon further inspection and test, found to be unsuitable for further use until filtered. For this purpose a filter press is provided.

New or filtered oil must not break down at a voltage less than 35,000 volts when tested between sphere gaps ½ in. in diameter and set 0.15 in. apart. The flash point should not be lower than 171 deg. C. and the fire point not less than 178 deg. C.

Graded-resistance type motor starters are used on both alternating and direct-current circuits. These starters have a number of contact points or small switches which must be periodically inspected, perfect contact should be made at each point.

Most of these starters are provided with a blowout coil for preventing serious arcing. These coils always must be kept in good condition, otherwise they will not function properly and serious damage may result. When shutting off the current with this type controller each contact should be broken quickly; under some severe conditions, unless this is done, the controller cover may be blown out and the operator injured.

A compensator is a combination switch and transformer and is, therefore, subject to the same dangers as mentioned above and should be protected and cared for in the same manner as other switches.

Wedge-type contacts make a more perfect connection than other types and consequently greatly reduce arcing.

Automatic motor starters, when properly designed and maintained, are the safest equipment to use for starting motors. They can be located where there is little danger of fire or accident to the operator and can be made to perform their duty accurately each time they are used.

If six motor leads were brought out of delta-connected induction motors each phase could be protected independently by six fuses or relays. With this arrangement better protection could be afforded the operator and equipment.

Line Fuses

Line fuses have always been a great source of trouble and danger to power users and power companies. We have found, after several years' experience with many different types, that the Schweitzer & Conrad, Type E ejector cutout, while perhaps more expensive than others, gives satisfactory results. This fuse is simple and compact, the fuse element proper consists of a strip of high-resistant, fusible wire of high tensile strength which is held in tension by a coil spring.

The fuse is provided with slots for quick insertion under terminal screws and enclosed in a cork which protects it from corrosion and also acts as an arc barrier. The cork itself is enclosed in a tube so there is little possibility of the fuse being affected by external atmospheric conditions. The complete operating mechanism is enclosed in a bakelite tube which is screwed to the operating handle. Current passes from the base of the coil spring to the fuse element, through a flexible copper cable. This cable shunts the spring, and, therefore, the current in the spring is negligible.

When the fuse link is broken from any cause whatever, the spring contracts and introduces a long gap between the two fuse ends in the tube. This quick, positive rupturing feature is assisted by the barrier effect of the cork. The result is that if the fuse operates on an overload barely sufficient to melt the fuse link, a positive break is secured. In case of a short circuit, the cork is ejected by the explosive action of the arc, and besides acting as a barrier, it helps to interrupt the arc by sweeping it out of the fuse tube.

The whole fuse outfit is mounted on a crossarm at such an angle that any flame or gases escaping from the open end at the bottom are directed away from the lineman. A new fuse is put into position by a quick motion. This is important if the operator is closing the circuit on an extremely heavy load.

If oil switches were designed so that it would be necessary to open the switch before a short circuit or ground could be applied, a great step toward protection of operators would be accomplished.

In short circuiting and grounding compartment-type switches, the ground connection should be made first. If the doors on the compartment are hinged at the top, do not remove them but swing them forward sufficiently so that you can reach by and apply the connection to the switch. By this procedure the door will act as a barrier in case the switch is charged.

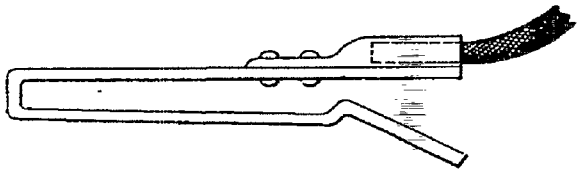


Fig. 1

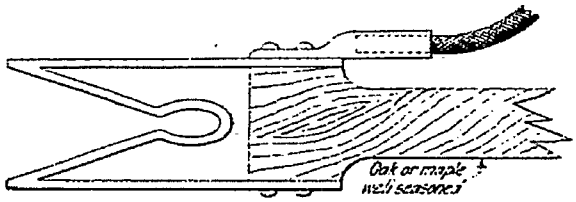


Fig. 2

When men are working on lines, the conductor should be grounded and short circuited. The ground connection should be made first, and the short circuiting devices applied afterwards. This should be done whether the work is to be performed inside the plant or outside on the line. The apparatus for this work should consist of not less than No. 6 flexible cable having for station work a clip, as shown in Fig. 1, which hooks over the ground bus and locks in place. On the other end of the cable a set of spring clips fitting the contacts on the line terminals and mounted on wood handles should be used. For grounding outside line wires a piece of ¾-in. pipe should be used not less than 5 ft. long with a connection head on one end and a point on the other. A clip similar to that shown in Fig. 2 made of copper and mounted on wood handles should be used for attaching to the line wires.

Ground connections should be made to provide safety to equipment, discharge of abnormal potentials, and for providing a path for current leaks from equipment. Such means will reduce the hazards accompanying the operation of electrical apparatus. Sometimes it is not feasible to ground electrical apparatus and by doing so the hazards to the operator are increased rather than decreased. In any case, the grounding of equipment supports, etc., must be understood to be done for the protection of the operator from shock should these parts become charged. Grounded frame parts actually increase the danger of shock to the operator should he make contact between current-carrying parts and grounded frame parts. All ground connections should be tested occasionally so as to make sure that they are effective.

A low-voltage release with short time limit will be found more preferable than the no-voltage release when equipment may be subjected to severe shock by a sudden restoration of normal voltage. The short time limit avoids the complete interruption of service if the drop of voltage is quickly followed by its return.

Line Protectors

Linemen should always use line protectors in the form of line hose, tie caps, rubber pigs, etc. These men should also use transformer fuse pullers whenever required to remove or install fuse plugs on transformers which may be heavily loaded or in damaged condition.

Some form of simple tester for determining whether the line wires are charged has often prevented serious injury to persons required to make repairs. A simple, cheap tester that can be easily carried is made

by the Minerallac Co. of Chicago, and is called the Pocket Electrosco
It is our practice to furnish our men with this instrument.

Welders should be provided with lenses of suitable quality for p
tecting the eyes. Such glasses should give the greatest protecti
against the ultra-violet and infra-red rays. Combinations of red and bl
or red and green glasses give fair protection, but we are using at pres
a metallic glass which appears to give our welders less trouble th
other glasses. Frames for helmets should be made of a material wh
will not conduct heat or light. Operators should be required to
asbestos gloves and aprons on all occasions so as to avoid danger
burns.

A mechanical test of rubber gloves is important. Any 2-in. section
the rubber should stretch to 6-in. without injury. All gloves not u
with an outer protecting cover should not be less than 60 mils, in th
ness at any part. Gloves used with outer protecting cover should not
less than 50 mils thick. Variation from these thicknesses should
be more than 15 per cent. An air test for punctures in gloves is ea
made by rolling the gloves from the cuff toward the finger tips. L
age at any point can easily be observed by moistening the glove. W
immersed in, and filled with, water all gloves when tested with 10
volts for 2 min. should not show a leakage in excess of 10 milliampere

In laying out a new wiring installation all conductors should be
ranged so as to indicate to the workmen the pressures of the diffe
wires. Colored cables and conductors, also insulators and supports,
be used to indicate the pressure of the conductors. Where many di
ent circuits are laid out together, it is possible sometimes to arrange t
conductors carrying the highest voltage in places where they wil
safest. In some installations it may be possible to locate conduc
carrying high voltages on the uppermost arm or rack.

When using insulated wires it is well to use only conductors havin
insulation which, under nearly all conditions, could never become
gerous. If this cannot be done, bare wires should be installed as
can in no way convey to the workmen a false idea of security. M
people have been injured by mistaking weatherproof wire for insu
wire. The number of such accidents would have probably been
less had the wire been bare. All cable sheathes and conduits, car
conductors, should be grounded. Metal tags may be placed on
sheathes indicating the voltage carried by the conductors, and end
or pot heads should be plainly marked. All cables or wires s
receive a test of two and one-half times their working pressure
after being installed.

It is hardly necessary in these days to install a switchboard h
any parts at the front of the board carrying high-voltage circuits. R
matting is a wise precaution, if proper care is given to it, that is, i
kept clean and dry; otherwise it may become a menace. Wood plati
in the opinion of the writer, are dangerous. It is easy to stumble

them; they will absorb oil, and if not carefully made the nails or screws in them can easily defeat their purpose. Any device installed as a safeguard is more dangerous than nothing at all, if defective, as the attendant is misled into thinking he is safe when actually he is in great danger.

To avoid serious arcing all switches should be opened and closed as quickly as possible. To facilitate the rapid operation of the switch its blades and contacts should be perfectly aligned.

Switch Handles

Switch handles should be strong and well insulated. Fiber guards should be provided to prevent switches being closed on circuits which should be left open. Any switch connected to a circuit, where there is a possibility of any flashing, should be provided with barriers of non-absorptive and non-combustible material. In general, disconnecting switches on 2,000 volt circuits or higher should be provided with such barriers.

Arcing horns for taking up surges, flashovers and overloads, should be installed so that the operator or equipment will not be in danger when the arcing horns operate. They should be installed only in places where the arc will not cause damage to overhead equipment. If located in a low position, or near other apparatus, side barriers should be installed. The horns themselves should have sufficient spread so that any arc passing along them will be quickly interrupted.

Almost any expense incurred in making electrical equipment safe is a good investment. Where operators feel secure from shock or other accidents, equipment is usually better cared for and better operated. By eliminating dangers to operators, many of the expensive delays and injuries to equipment are obviated.

DISCUSSION

CHAIRMAN HALL: I am sure we are very much indebted to Mr. MacWilliams for this extremely interesting paper. One of the difficulties engineers of all kinds discover is that safety devices need themselves to be made safe. It doesn't always follow that you have arrived at safety when you put in a safety device. You want to see that the safety device in itself is of a safe character, and Mr. MacWilliams has, in his paper, indicated how fuses and other starting devices which are absolutely necessary for safety can be made perfectly safe to those who operate them.

MR. J. B. JOHNSON (United Verde Copper Co., Clarkdale, Ariz.): Conductor sheaths, conduits, metal frames, switches and cases need careful grounding. As Mr. MacWilliams stated, we sometimes ground this apparatus to a pipe and then think that the apparatus is sufficiently well grounded.

As I stated in my paper yesterday, the best way is to have a metallic ground clear to the surface, a continuous metallic ground. Don't think a water pipe will serve this purpose. It may be empty, and there may be a gasket between the flanges and that will destroy the ground.

CHAIRMAN HALL: I think that Mr. MacWilliams had mainly in mind the grounds which are made to the actual earth, what they call in England, I believe, "earthing". In the mining regions, the natural moisture of the ground is largely destroyed by the mining and the pumping of the water from the mine, thus reducing the natural moisture which would normally take away the current, and he was talking to me this morning, emphasizing the possibilities that the resistance of a ground which should be about half an ohm, may be found as high as 80 ohms.

MR. J. L. BOARDMAN (Anaconda Copper Mining Company, Butte, Montana): We, of course, all have electrical engineers and electrical experts who make these installations for us. But sometimes the chiefs of the divisions don't follow the work as closely as they might, and we, as safety men, must take care of the details. While doing that, we must realize that the electricians are subject to the same failures as others and are liable to pull off some funny stunts at times.

When I come to these meetings, I depend more on the personal contacts and the little suggestions which are dropped than I do on the main papers, because the papers are available later. Therefore, I make the suggestions that we, each of us, when we go home, pay special attention to the details of electrical work.

I have in mind two cases which illustrate what I mean: Some electricians were installing an underground fan of low power, and they were in a hurry. They had worked some overtime and possibly there was some excuse for their hurry, but the ground, which possibly would have taken them five or ten minutes to connect, was omitted. As they didn't think it would be needed until the next morning, they left off the ground wire. Within five minutes after they left the place, a man was killed on the motor.

Here is another case of the dangerous effect of inefficient grounding: In this mine—fortunately it isn't standard practice and not permissible in the Anaconda mines—two lights were strung in series from the 220-volt trolley wire. These were grounded to a compressed-air pipe. This pipe was not being used at the time, and a fall of ground further in broke it in two. The line was set up on brackets supported by the timbers. When the line broke, it broke the electrical ground. A miner coming along a short time after this fall, stepped on the pipe and took hold of one of the cars and was killed.

THE JOSEPH A. HOLMES SAFETY ASSOCIATION PLAN

C. Lorimer Colburn, formerly director, Joseph A. Holmes Safety Chapters

This plan would not interfere with the present safety organization at any company. It is a joint movement whereby the various mining.

metallurgical, and petroleum companies are co-operating in developing and maintaining safety interests. In order to understand the plan fully it is necessary to start at the beginning and explain the development of the Joseph A. Holmes Safety Association, what it is and how it functions.

Joseph A. Holmes Safety Association

The Joseph A. Holmes Safety Association was organized in 1916 by twenty-four of the leading technical societies and mining organizations of the country to perpetuate the life work and endeavor of Dr. Joseph A. Holmes. He gave his life in developing safety in the mining industry, and this association is devoted to perpetuating this work and bringing together and co-ordinating the work of all safety associations that are in any way concerned in the mining, metallurgical, petroleum, or quarrying industries. This organization was effected at meetings held at Washington, D. C., on January 15th and March 4, 1916. The organizers of this association tied up the association very closely with the United States Bureau of Mines for two reasons:

First, because Dr. Holmes was the first director of the Bureau of Mines, and his life work centered largerly in the development of mine safety research and mine safety service work of the Bureau.

Second, because it was the intention of the organizers to link closely the activity of the Joseph A. Holmes Safety Association with that of the Bureau of Mines. The director of the Bureau of Mines, by the Constitution was made the president of the Joseph A. Holmes Safety Association.

A council consisting of a delegate from each member organization is the ruling body of the association, with full power to act in all matters concerning the association.

Activities of The Joseph A. Holmes Safety Association

The activities of the Joseph A. Holmes Safety Association can be divided into three sections, as follows:

First, the awarding of honorariums to operating companies who have developed and installed the most efficient safety devices, appliances, or methods.

Second, the awarding of hero medals and diplomas to those individuals in the mining industry who have risked their lives in an effort to save the life of a fellow worker.

Third, the organization of Holmes Safety Chapters at advantageous places throughout the country for the advancement and maintaining of safety.

The council of the Joseph A. Holmes Safety Association has not worked out a plan for awarding honorariums to mining companies according to the first plan of organization, but it is expected that progress will be made along this line in the near future.

At the time of the organization of the Joseph A. Holmes Safety Organization a committee, headed by Dr. David T. Day, raised the sum of $10,000 which is now the invested capital of this association. The interest on this money is used to purchase hero medals in accordance with the second object of the association. Up to the present time the association has awarded about fifty hero medals for conspicuous and heroic service as outlined above.

In 1922 the council decided that it was the opportune time for organizing Holmes Safety Chapters, and to start the development of a plan that would take safety into every mining, metallurgical, or petroleum plant in the country and into homes of the workers in these industries. Therefore, in that year the council authorized the Bureau of Mines to issue charters to chapters where the officials of the Bureau felt that the conditions were favorable for the proper maintenance of the chapter. With no particular effort to form chapters, members of the Bureau of Mines staff have organized chapters in almost every section of the country, the present total being over one hundred. The majority of these chapters have been instrumental in developing and maintaining safety in their community to a high degree, and it is now considered that this safety chapter work is one of the most important developments in safety at the present time. On account of the different methods of mining it has been found advisable to organize chapters in groups, and to center the activity of each group in a local council which will be particularly fitted to administer to local needs. Therefore, as the opportunity presents itself, local councils are being organized to become responsible for the success of a local group of chapters.

The Holmes Safety Chapter Plan

The Holmes Safety Chapter Plan, therefore, is as follows:

In each section of the country where there is a natural division of mining, metallurgical, or petroleum operations, such as iron mining in the Lake Superior district, coal and iron mining in Alabama, petroleum operations in the mid-Continental fields, etc., a group of chapters being organized responsible to a local council. Therefore it is advisable to have representatives from all of these companies that maintain an support of first-class safety organization, representatives of the Bureau of Mines, and representatives from societies that are particularly concerned in safety in the industry to be served. The local council should select an executive committee, and should plan a safety campaign for a year in advance. The local council should see that safety chapters are organized in those communities that can profit by such an organization and should see that the local chapter is supplied with speakers and safety demonstrators in order to make the chapter the maximum success. The council is in a position to draw upon the resources of the government departments and the local agencies in developing their safe

Service Given to the Chapters by the Bureau of Mines

1. All field representatives of the Safety Service Division of the Bureau are instructed to visit chapters and participate in their meetings wherever practical.

2. Safety Directors of the chapters are given special instructions so as to become competent first-aid teachers.

3. The Bureau provides office space and clerical assistance for the chapters at the Pittsburgh Experiment Station and elsewhere.

4. The Bureau is fostering chapters in building up the association's influence and prestige wherever possible.

5. The Bureau sends representatives to assist in holding first-aid contests and safety demonstrations wherever the chapters sponsor such a contest or demonstration.

6. The Bureau furnishes an engineer of its staff to act as director of the chapters and to keep in touch with the chapters and their development.

What is the Headquarters Organization Doing to Assist the Chapters

The Headquarters Organization consists of the secretary, the director of safety chapters, and other officials serving directly under the council. These officials do the majority of the planning for the chapter extension work according to the action of the council. All moneys received in dues and fees from safety chapters is set aside to be used for the benefit of the chapters. To further the chapter plan the officials, therefore, perform the following functions:

1. They send out printed matter to the various chapters on information concerning safety.

2. They publish each month the Holmes Safety Chapter Notes, a publication dealing primarily with the activity of the different chapters.

3. They arrange for the distribution of motion-picture films to the various chapters.

4. They make arrangements for the men of national repute to visit chapters and participate in their meetings.

5. They have worked up an arrangement with Westinghouse Electric and Manufacturing Company so that safety talks are radiocast on alternate Fridays at 7:30 p. m. from Station KDKA to the chapters.

6. They co-operate with local councils in the development of local interest and local enthusiasm in safety.

Value of This Plan

The value of this plan is that a variety of forces are brought together to maintain safety interest and so encourage the men to put forth more effort in safety. Through the Holmes Safety Plan a greater efficiency is developed for the promotion of safety, and better co-operation is

obtained from such agencies as the U. S. Bureau of Mines, State Inspection Departments, and interested societies. This plan also promotes greater and more efficient safety work at the individual plant. Development of safety for accident prevention is one thing, but encouragement and maintenance therein is most important for the future of the movement.

REPORT OF NOMINATING COMMITTEE

SECRETARY COLBURN: I would move, first that in the future, the nominating committee be appointed by the chairman previous to the convening of the annual meeting in order to give sufficient time for the committee to canvass the situation and nominate officials who will not only be fitted for the office, but who will be willing to devote time to the duties of the office.

CHAIRMAN HALL: You have heard the motion, gentlemen. What is your pleasure.

(The motion was carried.)

CHAIRMAN HALL: It was Vice-President Reninger's idea that this should be done in every section and it has considerable advantages.

SECRETARY COLBURN: My second motion should be made now and passed on next year. It is this: That the chairmen of the local sections of the Mining Section become automatically, by their election, vice-chairmen of the Mining Section. I might add that we organized two years age, three mining sections connected with the Mining Section the National Safety Council. One is the Lake Superior Mining Section another is the Northwest, and third is the Southwest Mining Section. Each of those sections have a chairman and committee that carry on the work in those sections. I think they should be recognized by making the Chairman of each of those sections a Vice-Chairman of the section.

(The motion was seconded.)

CHAIRMAN HALL: Gentlemen, I think that matter is one that should be taken under serious consideration, and I quite agree with Mr. Colburn that it ought to be left until some future session, rather than voted on at present. The sections are not national but confined to certain parts of the country. If they were to become numerous, we would have a large number of vice-chairmen. The custom is to place the names of the vice-chairmen on the program, and if all of the organizations here were to put on the names of the vice-chairmen on the program and they had a large number of vice-chairmen, the program would be full of names.

If we were to take the chairman of the sections and make them vice-chairmen of this section, I think we would find that they represent

seeing that the metal-mining sections have been more active than the coal sections, we would always have most of our vice-chairmen from the metal-mining sections. It has been the case in the past. I rather think the vice-chairmen should be representative of all parts of the industry. It is not creditable to the coal industry that the metal industry has gone so far ahead. I don't think we should recognize it and say that we should let the metal regions run the Mining Section of the National Safety Council. I think it would be a bad principle.

The only way to avoid that would be by appointing Vice-Chairmen of another kind, and we would then have such a long list that it might defeat the very purpose we have in mind. Our vice-chairmen would cease to be honored by their appointment in view of the fact that there were so many of them bearing that title. This is a matter that should be thought out carefully before final decision is made in the matter.

MR. J. L. BOARDMAN For chairman we nominate Mr. R. Dawson Hall, the present incumbent.

After making this decision, a majority of your committee abandoned their trust, violated the ethics of their commission, took a mean advantage of force of numbers, and stooped to a compromise in nominating for first vice-chairman, the present incumbent, Mr. J. L. Boardman.

For second vice-chairman we nominate a man who has served well and faithfully in the most important service which this association can offer its members, namely the Safety Education, or Bulletin Committee—Mr. J. W. Reed.

For third Vice-chairman, we nominate a man who has created not safety, but accident prevention, where none grew before. In doing this, he first studied the climatic conditions, analyzed the soil, fertilized it, plowed it and then planted the seed, and his first crop of prevented accidents is now on exhibition as an evidence of his thorough-going ability in the Tri-State field, and we could not refrain from asking that he give the Mining Section a similar service—Mr. R. V. Ageton, Safety Engineer, Tri-State Zinc & Lead Producers Association, Miami, Okla.

Taking advantage of our opportunity to choose from the best, a super best, as demonstrated by his actual accomplishments at home, a man who plays the game from any angle or in any position, a co-operator who believes that co-operation is eight-tenths operation, we nominate for fourth vice-chairman, Mr. A. A. Bawden of Pickands. Mather & Company of Ironwood, Mich.

For Secretary: We recognize and appreciate the excellent service, genial manner and wide experience of the incumbent, but realize that since he expects to become a Mining Engineer ("when he gets a client"), it would hardly be fair to ask him to carry the real burden of work-

horse for the section during that precarious period which, usually, precedes a successful professional career, and which success we all sincerely hope Mr. Colburn will enjoy. We have, therefore, decided to turn our attention to another who is so situated as to be able to fill this difficult position. The man we have in mind has a government position through which we can maintain contact with the invaluable United States Bureau of Mines. We feel that through this fact, all our elements will be equally and fully served and that this job will give him an opportunity to maintain a contact with each individual member which will enable him to broaden his usefulness as Director of the Safety Service Section of the Bureau of Mines—Dr. T. T. Reed.

(The report was accepted.)

ADJOURNMENT

Packers and Tanners Sectio

September 30 and October 1, 1924

W. F. McCLELLAN, Chairman
Safety Supervisor, Armour & Company, Union Stock Yards, Chicago,

A. B. DRUMMOND, Vice-Chairman
Wilson & Company, Union Stock Yards, Chicago, Ill.

F. L. SCHWARZE, Vice-Chairman
Manager, Labor Bureau, Pfister & Vogel Leather Company, Milwaukee, Wis.

HAROLD F. NORTH, Secretary
Swift & Company, Union Stock Yards, Chicago, Ill.

TUESDAY MORNING SESSION

CHAIRMAN McCLELLAN: On our nominating committee we h Mr. Oliver F. W. Cromwell, Elk Tanning Company, Ridgway, Pe sylvania; Mr. N. L. Brainard of Swift & Company, Chicago; and Mr. S Jensen of Armour & Company, Chicago.

CO-OPERATION OF THE MEDICAL DEPARTMENT AND THE SAFETY DEPARTMENT

Oliver F. W. Cromwell, Elk Tanning Company, Ridgway, Pa.

Towns, cities and communities have found it advisable to have sanit departments, medical departments and, also, free clinics for the tr ment of citizens. Some plants have so many employees that they larger than some of our small cities. Since this is so why shoul these plants have up to date medical departments, size and perso depending upon the number of employees?

Let us consider the needs of the very small plant, the medium s plant and the large plant.

The very small plant usually has only a first aid kit. Either owner, foreman or the bookkeeper is taught to use it. Such kits take care of slight injuries, such as knife cuts, splinters, etc., an render first aid till the doctor can be summoned or the employee t

to a doctor's office. It would not pay such a plant to maintain a medical department. In some cases the company can arrange with one of the nearby doctors to treat all cases for a certain fixed sum.

The medium sized plant usually has a higher or more efficient type of first aid treatment. It usually has a first aid room with sterilizing cabinet and a few of the more common surgical or first aid instruments. It also employs a nurse who takes care of all cases and, when necessary, calls in a doctor. Some plants in this group have added a cot or bed to their equipment. The nurse usually takes care of the records.

The large plant generally has a small hospital consisting of a first aid room, a small operating room, a consulting room and a small visiting room. Equipment consitss of first aid material, surgical instruments, operating table, etc. A clerk is employed to keep records. A nurse or several nurses, depending on the size of the plant, and one or more doctors are in supervision. The number of nurses and doctors employed depends on whether or not they make home calls. This equipment should take care of any case that might come in.

The safety engineer and the medical department are closely related. The safety engineer should be familiar with the medical department and should establish one in proportion to the size of the plant. There are a number of factors that have to be considered. He may have a number of small plants scattered over many states or there may be a number of small ones in the same state. In this case, his medical department is not exceedingly complicated. He may have a number of medium sized plants under the same conditions as mentioned above. Again his records will be very simple.

On the other hand, if he has a large plant, his records will be very minute. The medical department's aid is very valuable. It should co-operate with the safety engineer to the fullest extent, and he should return this co-operation.

In selecting a doctor, the following facts should be borne in mind. Most men will talk to a doctor who has a pleasing and sympathetic manner, and thus secure many facts. The doctor has a chance to speak to the man about the prevention of accidents and diseases from many angles and should be of convincing personality. It should be the doctor's aim to prevent accidents and disease and not to cure the patient after they have some. He should be paid for the prevention and not for the cure.

The doctor should speak in the language of the shops. The safety engineer learned this sometime ago. The doctor should realize that he, like the safety engineer, is employed to give advice to reduce the hazards of the industry.

The doctor should attend safety meetings and should be a member of the committee, the same as the safety engineer.

The doctor should not depend on the safety man to hunt up work for him, but must be a live aggressive man. He should not sit in his

office when not busy, but should get out in the plant with the rest of the men. In this way, he gets to know them. He also becomes acquainted with the individual hazards of their employment. If he visits the complaining or ailing man at his work, he may be able to determine the nature of the cause of the ailment at its source. If a man does not fit in his present job, it is up to the doctor and safety engineer to get together and have him transferred to a department where he will fit in. Don't fire the man because he doesn't fit. There is some place for him. If a machine doesn't do the work right we do not discard it but locate the trouble and adjust or repair it until it does work properly.

Speaking of machines, we examine machines carefully at frequent intervals. Why shouldn't we give our employees medical examinations at frequent intervals? Why not a medical examination before they are employed? A machine is only profitable when it is working well. The same thing applies to an employee. In giving the medical examination, the man should not be taken away from a department for the examination if the foreman says he cannot be spared. The doctor, safety engineer and foreman should co-operate in getting the man back to work again as soon as possible aoter an accident. If not his regular work, then some light work. Another thing to insist upon is prompt attention to an injury. The doctor and the foreman must work together on this. Both are working for production. Even if a man's production is not up to the scratch, the safety engineer and the doctor should get together and find out what the trouble is. The doctor should be selected with us much care as a superintendent. Why shouldn't there be just as much care used in selecting a location for his office? The location should be handy to the rest of the plant, a place where men will go willingly. It should be in operation all day. Our industrial laboratories are well equipped, why not the medical department?

Let us look at this subject from the employees' standpoint. To begin with, the management should properly introduce the safety engineer and the doctor and at the same time clearly outline the policies of the company. It should be understood from the first and mutually agreed that the two men will co-operate to the fullest extent. Then, if there are any complaints later on about either department, they should be thoroughly investigated. Both of these departments are maintained for service.

DISCUSSION

CHAIRMAN MCCLELLAN: I would like to ask Mr. Cromwell if he has physical examinations made at the plant. He says, "Don't fire the man because he doesn't fit. There must be some place for him." Do you always place him in another department?

MR. CROMWELL: Yes, we do.

CHAIRMAN MCCLELLAN (Safety Supervisor, Armour & Company, Union Stock Yards, Chicago, Ill.): When you make examinations for the mutual benefit association and you find the man has hernia, do you accept him i

MR. N. L. BRAINARD (Swift & Company, Chicago): I would say yes, Mr. McClellan. The same as in life insurance. He signs a waiver accepting the liability arising therefrom.

MR. OLIVER F. W. CROMWELL (Elk Tanning Company, Ridgeway, Pa.): Mr. Brainard, don't you do that with any defect he may have?

MR. N. L. BRAINARD (Swift & Company, Chicago): I couldn't say to what extent that is done, but I think hernia is the principal one.

MR. CROMWELL: He might have leakage of the heart.

MR. BRAINARD: I think they are rejected. Heart trouble or any disposition toward some other diseases are rejected.

MR. WILLIAM CAMPBELL (Graton & Knight Manufacturing Company, Worcester, Mass.): We give the man a physical examination before he enters our employ and then we give him a physical examination once a year, and if he has hernia we won't employ him. Then we go to the benefit association and examine him again.

REDUCING ACCIDENTS CAUSED BY MACHINERY AND CHEMICAL BURNS

Fred Schwarze, Pfister & Vogel Leather Company, Milwaukee, Wis.

Let us assume that we are talking about a well guarded up-to-date plant where codnitions are the best and we no doubt will agree that we must admit that we are confronted with conditions adverse to safety, but which conditions cannot for just reasons be overcome or eliminated.

These conditions can be readily divided as pertaining to the human element or contingent on production. By contingent on production, I mean that condition which does not permit for the effect in safe guarding machinery on account of the hampering of production

What can be done under these conditions to avoid accidents? Who is to be burdened with the obligations and, in the event of an accident, the consequent liability?

Is it the employee? No. While he has a more or less limited part to perform, he has very little legal liability, inasmuch as legislation has eliminated the factor of contributory negligence on the part of the employee. It is very obvious that the responsibility is cited on the employer and he must consider it not only a matter of cost of production, but also an obligation which he must recognize and carry out conscientiously, be he a self-insurer or a risk insurer. It is purely a human indifference on the part of the employer who is paid by the insured employee in increased premiums or penalties, whereas a self insurer makes such liability as a direct loss.

It is not a dollar and cents proposition. It is a matter of conservation of life, limb, alleviation of suffering.

It is very evident that the employe must contribute to further safety and self preservation. The employe will readily allow for cooperation through the medium of proper supervision and the education feature.

No one but an insane man would jeopardize his life or limb. It is seldom cussed meanness, forgetfulness, boneheadedness and other similar elements are the cause of most accidents. Where the human element is present the possibilities run limited and there is no telling what a person will do. When we stop to think what we are all apt to do and what a good many of us have done, we will readily see the possibility of error and grave consequence.

No doubt a number of us have passed up traffic officers at street corners, knowing of their presence, but for some reason or other our attention was not in the right direction. So it is with the average employe. His mind may wander and his thought may not be on his task.

The burden of safety work falls on the supervisory staff of the plant and it makes no difference whether those responsible for supervision be financially independent or not; the moral obligation is the same and he who ignores such a moral obligation borders on criminal negligence.

No doubt the foreman who sees that the plant policy is in proper accord is a logical man who can do much in the way of enlisting the cooperation of the workers and their regard for the safety of all concerned. Plant safety committees, safety engineers, etc., are necessary mediums. However, the cooperation and good will of the worker is the principle requisite.

Any efforts that may be put forth by the management to further the cause of safety are not effected without the good will of the worker; they must be in accord. It is like the horse that is taken to the watering trough. He may not want to drink. The rank and file of the plant must be sold on the idea of safety.

Most Common Hazards

What hazard in common have the packing and tanning industries to combat? I have summarized such hazards into several different classes as follows, allowing for the hazards that are peculiar to the respective industries: First, we have the machinery, the kind that is considered 100 per cent safe and the other which I have arbitrarily classed as 60 per cent or less safe. The 100 per cent class is the type of machine which in most cases is peculiar to the process with which it is associated.

Second, we have plant environment which classification includes buildings, the yards, etc.

Third, material handling, which is common to all industries and is usually associated with the use of trucks, elevators, conveyors and similar equipment.

Fourth, we have the human element from which source the possibilities of error are practically unlimited. The human element is divided into two classes. The first group embodying the employe at his task for which he alone is responsible for safety. Then we have the other man who through inheritance, wilfully or otherwise, is the cause of injury to the man who is carrying out his own task and is ignorant of the interference forthcoming from the other fellow. The worker alone controls his safety at particular jobs. As an example I might cite the ordinary emery-wheel common to all of us. The point of operation being exposed it depends entirely on the willingness of the operator to exercise caution and should he be careless, there is no safeguard that will avoid an injury.

The burden of responsibility having been saddled on the supervisory staff of the plant, it is apparent that the remedy lies principally in their hands and is principally a matter of control. The safeguarding of machinery being recognized as an essential factor, it is then very clear to us all that the matter of housekeeping closely follows such safeguarding. By housekeeping, I refer to the shop practice which is responsible for proper maintenance of machinery, floors, building sanitation and every element that enters into the well-keeping of an industrial plant.

The control of the human element is equally as important as plant maintenance. The control of the human element begins with the selection of the employe at the time of employment with subsequent efficiency provision and in the event of unfavorable performance, the elimination of such employe.

Machinery and labor are in a way similar to industry. They are both necessary factors and can be accorded similar consideration from a standpoint of utility.

Repair of Machinery

In the event that machinery or other equipment is not in condition, it is repaired. If it is not suited to the purpose for which it is intended, it is corrected or replaced. These facts can be closely allied with labor where conditions will permit, and while educational measures and correction may improve the quality of labor, yet in case of failure. elimination is the only choice. I have referred to the class of machine ordinarily recognized as 100 per cent safe, however, without doubt many of us have used machines which are lesser safe. It is particular that type of machine where the point of operation cannot be satisfactory.

Assuming that the pulleys and gears are satisfactorily guarded, the point of operation be hazardous to the operator, the elimination of accidents is entirely up to the company. In the tanning industry we

have those types of machines with the vertical horizontal motion similar to press operation; also the horizontal motion peculiar to jacking and brushing machines and rolling machines. Most of the machines more difficult to guard are found principally in beam houses, apartments, and are representative of the washer or colander type.

The serial table set up machines have long been recognized as a severe hazard to our industry. Referring to the safety device designed by Mr. C. P. Bossard of Pfister & Vogel, recent devices have been perfected which will permit practically 100 per cent safety operation of these machines.

Paddles are divided into two classes, namely, that type which is set flush with the floor and considered safe, and that type which is set above the floor and considered the safer of the two. To insure safety of the floors, it is necessary to have two sliding gates and chains over the vat above the water level. In the event of the men rolling from panels which are in motion, it is recommended that two men perform such tasks.

Rotating drums, although considered slow moving machinery, prevent serious accidents, as the projecting part of the drum door locking device is recognized as a hazard.

The machinery in the finishing department consisting of jacks, presses, boxes or rolling brushes, stackers, shaving and buffing machines can be more or less effectively guarded, depending on the nature of the process and the kind of stock. As an added interest. I might cite data from the 1923 Industrial Examiner's Report stating that 20 per cent of the accidents in the tanning industry originated from stacking machines. Individual contral of machinery together with provision of shifts, locks and provision of locking devices to insure against unauthorized starting of machinery not in motion are details that should be carefully considered, inasmuch as the same will allow for a better assurance against accidents. While the question of individual control is a matter of engineering detail, the question of efficiency may enter in unless the fact of safety should be predominant

Acid and Chemical Problems: After a careful study of a list of chemicals and materials used generally in the tanning industry and their effects etc., I think this phase of accident prevention work is one that must be treated as a generality and rests with the peculiarities of the processes with which such materials are associated. However, it is very evident that the industry of rubber gloves and goggles proper containers and devices will eliminate the possibility of accident to a great extent. Gas masks, aprons and rubber boots are necessary under some conditions.

The location of storage space for chemicals is one that must be carefully considered. As an example, I might cite a condition which arose in the plant sometime ago, due to the location of a sulphur gas tank over salt storage bins. On account of a leakage, the sulphur acid dropped on the salt, causing the gas to illuminate.

The kind of floors in the departments where men carry acid should be of such material as will prevent slipping. Our experience indicates that red nitric floors are best suited for acid tanks and such areas where men walk while carrying acid. Care is the most likely requisite in the handling of acids and the human element controls the danger to a greater degree than machinery operation. Inasmuch as accident prevention work is not a matter of choice, but is of importance to our very existence, it is obvious that man must continue to improve conditions as of old, and it is evident that the task is one which is everlasting and which we should perform in a manner which will benefit mankind.

DISCUSSION

MR. WILLIAM CAMPBELL (Grason & Knight Manufacturing Company, Worcester, Mass.): We don't use any acid in our plants and we seldom have any burns.

CHAIRMAN MCCLELLAN: Mr. Schwarze. you say. vitrified brick floor eliminates slipping in handling. etc.

MR. FRED SCHWARZE (Pfister & Vogel Leather Company, Milwaukee, Wis.): If you confine it to the adjacent acid tanks. We ran brick floors in for 11 or 12 years in one department and we are still doing it.

MR. WILLIAM CAMPBELL. (Grason & Knight Manufacturing Company, Worcester, Mass.): We have cement floors.

MR. CROMWELL: (Elk Tanning Company, Ridgway, Pa.): Last year we had acid. Acid will eat it right out inside of a month. Every month we put lime over it. We have very few accidents in slipping because we installed huge machinery in there last year that cost over $200,000.

CHAIRMAN MCCLELLAN: (Armour & Company, Chicago): You have all overhead cranes?

MR. CAMPBELL: The machine goes right up and conveys it right back.

MR. CROMWELL: I misunderstood Mr. Campbell.

MR. CAMPBELL: You take them over the electricity. Then we used to have to pull the hides out. We left them in there for three months; didn't touch the mat all. That makes less work in taking them out.

CHAIRMAN MCCLELLAN: You use a paddle for that.

MR. CAMPBELL: No; rockers.

CHAIRMAN MCCLELLAN: Have you any questions you would like to ask Mr. Schwarze?

MR. CROMWELL: There are only about two machines in the sole leather game that I believe you can guard. Half of the accidents in

the finishing department are on rolling machines. The others come from overhead hanging, etc.

CHAIRMAN MCCLELLAN: Do you have your glazing jacks guarded?

MR. SCHWARZE: We haven't them guarded except on kid leather.

MR. CROMWELL: (Elk Tanning Company, Ridgway, Pa.): Another press I believe you can't guard is your embossing press. We have a heat embossing press that we use for polishing leather.

MR. SCHWARZE: We have a certain press for upper leather and one for sole leather.

I might offer a little explanation on the device that I referred to invented by Mr. Bossard. It is a device with an electric drive that shuts off the power on the motor. It is practically instantaneous.

WEDNESDAY MORNING SESSION

CHAIRMAN MCCLELLAN: The first order of business this morning wil be the report of our nominating committee and the election of of ficers.

REPORT OF NOMINATING COMMITTEE

Mr. Oliver F. W. Cromwell of Central Leather Company, Ridgwa; Pa., read the names of the officers for the year 1925 and the repo of the nominating committee which are as follows:

Chairman: Mr. Fred A. Schwarze, superintendent, labor burea Pfister & Vogel Leather Company, Milwaukee, Wis.

Vice-Chairman: Mr. Oliver F. W. Cromwell, safety engineer, Cen ral Leather Company, Ridgway, Pa.

Vice-Chairman: Mr. Robert M. Meehan, asst. M. M., Jacob Do Packing Company, Buffalo, N. Y.

Secretary. Mr. Dana C. Lamb, Fred Rueping Leather Compan Fond Du Lac, Wis.

(The report was accepted by unanimous vote.)

SECURING CO-OPERATION OF EMPLOYES IN SAFETY WORK

Harold F. North, Training Division, Swift and Company, Chicago, Ill

Much has been accomplished during the past 10 years in the prot tion of people from the outstanding hazards of industrial and civil l When we consider the variety of safety devices designed to gu against even the most remote hazards, it would seem that all has b done that is humanly possible. Yet, in spite of these precautions, a dents continue to happen with alarming frequency. Accident statis

show that, to a certain degree, mechanical perfection has been reached in the prevention of accidents. If this is true, the element which predominates in the causes of accidents is a human one. Here is our problem. How can it be solved? Who shall solve it? The solution is found in cooperation, and cooperation is the job of every last one of us.

We want to secure the cooperation of employees in safety work. Before we can begin to do this we must know two things about cooperation:

1. *What does cooperation mean?*

   Webster has given as a definition, "to act or operate jointly with another or others." Assuming that we know our problem and goal, this means a concerted action toward a common end.

   One of the most difficult things for man to understand is the other fellow's "point of view." If we ever hope to realize cooperation, even in its vaguest sense, we must know our fellow man's viewpoint, understand it, and accept it for its full value. Too many times we fail to do this and, in doing so, blame the other fellow for a failure to cooperate. We should have a mutual understanding of the problems whose solution make for safety.

2. *Who are the employees we want to cooperate?*

   When we speak of employees we generally create in the minds of many people a picture of the man who labors and rarely, if ever, do they think of the man who decides or passes on an order as being one of the same group. The man who labors at a skilled job or an unskilled one cannot cooperate without someone to cooperate with; nor can anyone else. He must cooperate with his foreman, with the safety committee or engineer, with the medical department; and they all must cooperate with the executives. The executive, though not generally considered an employee, is in a sense one and for our purposes here let us consider him as such.

   Each of these persons or groups has a definite responsibility to the others, and it is only when this is recognized that cooperation in the true sense of the word can be achieved and accidents prevented.

It is my purpose to present some idea of the functions and responsibilities of the several industrial groups concerned in safety work and the value of education as a means of securing cooperation.

The Executive's Place in Safety

In the early days of our industrial system, organizations were so small that the executive was closely associated with the workmen. He knew their strong points and their weak points. Moreover, he knew the details of their jobs. With knowledge of this kind he was in a position to promote safety first hand. If one of his men was injured, he immediately took personal charge of the case. Close contact prevented many phases of modern industrial relations from assuming the serious nature which they exhibit in the complexity of industry today if, indeed, they appeared as problems at all.

Our industrial system has changed, but I don't believe the spirit of the executive, which made possible this close association, has changed one particle. What has happened is that industry has grown to such proportions that where hundreds were employed, today there are thousands. The increased responsibilities of the employer have removed him from close contact with his workmen by placing between them a large number of subordinate executives among whose duties and responsibilities is that of perpetuating the interest in the safety of the employee that existed when the organization was not so large. Even these subordinate executives are removed from the actual conditions which cause accidents, and so we have the introduction of the safety engineer, safety committee, and medical department, who along with the foreman, are charged with the big responsibility of promoting safety.

What, then, is expected of the executive of today? He must coordinate the activities of these various groups. He must maintain an interest in safety work, and by the example of his action in all matters pertaining to it, show that he is an ardent supporter of safety. There is nothing more discouraging to those actively engaged in safety work than failure on the part of the executive to give serious consideration to and take prompt action upon a recommendation, even though it may not be approved. Procrastination is evidence of lack of interest, and that is not a part of cooperation.

The Medical Department

The medical department, while not very large, has indeed a large responsibility. Very often it is looked upon only as a place where injuries are treated. While this is its primary and immediate work, we cannot overlook the possibility which the performance of its function and the trained personnel of the department offer in the promotion of safety. For example, this department can and should examine applicants for employment. Such examination aids materially in placing employees in jobs which they are physically able to perform. This means working with the employment office, getting a record of all persons employed, examining them, and reporting the results of such examinations to the employment manager, who must then place the man accordingly. The ideal time for such an examination is before the man goes to work, although in many places examinations are made the first or second day of employment.

In the treatment of injuries the medical department can learn from the injured person everything about how the injury occurred and the type of work which he was doing at the time. This information, with at least excerpts of the original examination at the time of employment and the recommendations then made, should be passed on to the executives and safety engineer or committee for study and action to prevent a similar accident from occurring in future.

Work of this kind by the medical departments undoubtedly will bring a reduction in accidents, and certainly will have an effect in minimizing the seriousness of many others which will continue to happen.

The Safety Engineer or Safety Committee

Whether the direct responsibility for the supervision of safety work should be placed in the hands of one man or a committee depends largely upon the size of an organization and the nature of the hazards which it involves. Some organizations have a safety engineer and a safety committee as well, while others have one without the other. While in some respects they are equally useful, each has its own advantage over the other. The safety engineer has the advantage of his training in the location of hazards and guarding against accidents. The committee, usually made up of men of long standing in the organization, has the advantage of familiarity with local conditions.

Safety committees are formed in several ways. Some organizations select them from among the local executives, while others select them from the ranks of the workmen. Either of these methods produces good results if the committee is active and supported, but a combination of local executives and workmen, including the safety engineer if there is one, seems to work out best. A committee of this kind usually comes to an agreement based upon the impressions of two groups which view the problem from different angles.

The duty of a safety engineer or committee is to investigate conditions under which men work, locate the dangers and devise means for protection from them before accidents occur. All accidents should be investigated by them separately or by classified groups. From information of this sort, combined with the reports of the medical department, they will be in a position to compile data that should be invaluable in the cause of safety.

Casualty companies are constantly preparing data on accidents for the purpose of determining rates. It seems that the packing industry has not yet fully recognized the use they could make of information about accidents which occur in packing plants. Some of the forms of classifying accidents are by causes, distinguishing between mechanical and human as fully as practicable, and by location of the injury, by occupation, hour of occurrence, length of service, age, nationality, literacy and illiteracy of the injured.

It is almost impossible to get any definite information, that would be of value in general or specific accident prevention work, from the study of single cases. But when enough cases have been recorded in any or all of the classes we have just mentioned no matter what the average of these cases proves to be, certain places or groups will prove to be exceptions to the average. And it is through these exceptions the safety men and management are able to form definite conclusions about certain causes and determine the action necessary to better the situation.

To illustrate the thought I want to leave with you, let us suppose that in one of our plants we have made a classification of accidents. The results show that 30 per cent of all accidents are caused by handling objects, 27 per cent through the use of hand tools, and, 15 per cent by

falls of persons, with the remaining 28 per cent accounted for by eight other different causes. Now going a step further we find that in one department, handling objects caused 65 per cent of its accidents. It is also found that men between the ages of 20 and 24, and of certain nationality are the most likely to be injured.

Here's what these figures tell us and the effect they have on securing cooperation. In the first place we see that the outstanding causes of injuries are "handling objects" and "hand tools." We must, therefore, direct general safety activity and propaganda with a view to eliminating these causes. Secondly, it has shown the place where this particular cause is most frequent and enables the safety men to act against a specific cause. Third, it points out those persons in the department who are most likely to injuries through these causes. Fourth, it may result in investigation that will show some method or practice in the department is responsible for the high rate.

With this information, the safety committee, or some designated person can arrange a meeting, to be attended by all persons of this department, whose age or nationality place them among those most likely to be injured. They can then be told what the outstanding cause of injury to them is; that they are a group in which, the figures show, workmen are most frequently injured by this cause. How they can guard against such injury?

What We Should Expect of a Foreman

It is the foreman who makes for safety or the disregard of it by the workman. For many years the job of the foreman was looked upon as one to be occupied by a man whose only responsibility was for standard of quality at minimum cost of operation. While this is a most important phase of his job, the foreman is in a position which makes him invaluable as a safety booster. He is the contact man between those people to whom accidents most frequently occur and those who are otherwise interested in the prevention of accidents. It is around the foreman that the major part of co-operation is built. No matter how capable or active the other groups may be, their effectiveness and success is affected materially by the attitude and action of the foreman.

Now, if the foreman is in such an important position, for what shall we hold him responsible? He should make frequent and careful inspection of conditions in his department. This includes machines, tools and miscellaneous equipment such as trucks, tables, etc. The condition of buildings with particular reference to the flooring, floor loads, condition of joists and rafters, is quite important and should have the careful and constant attention of the foreman. Thought has to be given to the lighting facilities of the department, and all places where men are at work or have occasion to travel must be well lighted. Inspection of this kind will bring to light numerous hazards that result from wear and tear on equipment. The good foreman knows what machinery

his department is dangerous when out of order and has it overhauled as often as necessary to keep it safe to operate. He also sees that safeguarding provision is made and maintained.

What we have said of the foreman's job so far has had to do with the care of equipment in his department. He has another responsibility far more important in the matter of safety which is more likely to be overlooked than the equipment. It is to *devise safe methods and make safe assignments.* We must get the foreman to study the methods of his department to make them safe just as earnestly as he studies them to increase production. He must realize that men are not equally qualified either physically or mentally to do a job with safety as well as skill, and then assign men to work which they are physically able and mentally proficient to perform.

Finally, the foreman should learn the lesson taught by every accident in his department, giving the necessary study and taking the necessary action to prevent a similar accident from happening. Prompt and interested attention should be given to all injuries, no matter how slight, to prevent their serious development. This is really difficult for the reason that many men neglect slight injuries such as scratches and nail punctures because of either a false sense of pride or loyalty. The foreman should make the men under him feel that to stop to have an injury treated is good sense rather than weakness for which he may be joked about by his fellow men in the department.

Education as a Means of Securing Co-operation

The employee on the job must be made a safety man through education. Almost without exception, the new employee is hired with little or no knowledge of standards and quality of production he will be required to meet, much less a knowledge of hazards in the department. It goes without saying that he will be carefully instructed about the former and repeatedly checked up to see that his work meets requirements, but there are very few foremen who will take a new man aside and show him the places or practices where danger lurks in spite of guards, and how to avoid injury; who will encourage him to be constantly alert in looking for conditions which may cause injury to himself or fellow men, and report such conditions promptly to the proper persons; who will spend a few moments advising the man how to treat accidents he may sustain, even though they may be slight; and where he may get medical attention. Failure on the part of foremen to take proper interest in the treatment of injuries has ruined more than one man's respect for safety work and will continue to do so as long as it is practiced.

The foreman who does instruct the new man, encourage him to see and report unsafe conditions and practices, and takes an interest in having injuries treated, will certainly find co-operation on the part of the workman and fewer accidents in his department. It has been well

said and many times demonstrated that the attitude of the foreman i matters of safety is reflected in the practices of the men who look t him for instructions. This is a means of creating an interest in safet or fellow men, and report such conditions promptly to the proper persons in the mind of an employee at the very outset of his association wit his job and the first step in making him a safety man.

Once the interest of the man is aroused, it can be kept active throug safety campaigns, the use of bulletin boards throughout the plant fc displaying illustrated bulletins and safety slogans, and above all b sincere interest and action at all times in matters of safety work.

When you find a place where the executive supports all safety wor and reports with prompt action; where the medical department giv thought and study to the causes of accidents, as well as to the treatme of them; where the safety committee or engineer is working for t elimination of hazards as well as the discovery of them; where t foreman is thinking of the methods of his department from a safe standpoint and giving thought and time to the instruction of ne employees about safety and the presence of known hazards; whe steps are taken to maintain an interest; it is there you will find a pla where the employees have begun to cooperate.

SAFETY IN MOTOR TRUCK OPERATION

Zach C. Elkin, Chicago Motor Club, Chicago, Ill.

From our point of view, as a motor club serving thousands of membe we are interested in making motoring conditions safer for everybo We study the causes of accidents in much the same manner that physician diagnoses the ailments of a patient. Having no particular cl to serve or support we confine our investigations to the cause and remedy. In an earnest endeavor to present some definite conclusi based on facts we have examined such records as are available, and h talked to hundreds of truck drivers, organizations and employers.

The real safety enthusiast interested primarily in the saving of li and reduction of accidents from a humanitarian viewpoint usually o looks the fact that this subject has its selfish side, and we all know t executives look at most of these matters with an eye on the led balance. To get anywhere we must realize the economic side of accid prevention work as well as the altruistic viewpoint, and in no phas our activities is the need for real work more apparent than in the f of commercial motor vehicle transportation.

We have seen the development of the motor truck from an an production of 411 commercial motor vehicles in 1904, to the produc of 392,760 similar vehicles in 1924. The total truck registration January 1 of this year was 1,627,569 for the United States, a gai approximately 18 per cent over the previous year.

The wholesale value of the trucks manufactured last year was $311,144,434.00, and this is but a fraction of the money invested in trucks now in use.

With this tremendous investment in considerably over a million and a half trucks that are operating in the United States today, the loss to industry through accidents which cause even a small percentage of these vehicles to be withdrawn from actual use runs into the millions of dollars. It has been said that street accidents cost the operators of commercial vehicles more than a million dollars per week in insurance premiums alone, to say nothing of the lost time, disorganization of working schedules, etc.

Add to this the appalling loss of life and the thousands who are permanently injured each year and you will begin to arrive at a realization of what we are paying for carelessness. It is possible to save at least 75 per cent of the number of people killed and to avert the injury of over 200,000 people annually by organized effort. You cannot continue to sit idly by and expect some miracle to happen that will bring about desired results. We have to pay for it in money, in time, and in intelligent effort; and we cannot invest our money in any manner that will bring us greater returns. Not only a big actual monetary return which will show on the books, but that greater reward which comes from the knowledge that we are averting death and injury, that we are making our communities better places to live in.

We can accomplish this by making it profitable for everybody to be more careful and I don't believe it can be accomplished in any other way. We can talk until dooms-day without denting the surface unless we can back up that talk with concrete facts and figures; with added dollars in the pay envelopes of the men who are responsible for fewer accidents. And when I say added dollars in the pay envelopes I don't propose to increase your haulage costs but rather to reduce them.

You will pay more to the careful man operating your trucks, but you will pay it out of increased earnings from those trucks, out of savings in insurance premiums and out of smaller expenditures for repairs and property damage claims.

Study Accident Costs

You industrial managers are paying a not inconsiderable amount of money for the prevention of accidents in industry and yet three-fourths of all the accidents today are happening outside of industry. You are, figuratively speaking, saving at the spigot and losing three-fourths at the bung-hole. Get down to "brass tacks" and study your accident costs as you do your manufacturing costs. Take a lesson from the street railway companies and the steam railroads in accident prevention work. Your problem is no different from theirs because your vehicles run on rubber instead of on rails. You have the same problem of selecting the right type of men and training those men properly before turning them

loose on the public with a big powerful instrument capable of killing and maiming people. You have the fool public to contend with in the form of the jay walker and irresponsible children and you cannot expect to convert them all over night. It means a long hard campaign of education, directed by real executives, bringing into close cooperation all the agencies that are, or should be, interested in the subject. I would include in this the insurance companies, the public press, the school teachers, the parent-teachers associations, the employees who man your trucks, and all others who are even remotely interested in the reduction of accidents.

The truck manufacturer has a very great duty to perform in this campaign, but the responsibility is not his alone. The greater responsibility rests with the employer and a fair share with the truck driver himself, and it is only by co-ordinating these various factors that we will arrive at a solution of our problem.

The manufacturer might equip his trucks with a dependable governor, but it is equally important for the truck owner to so lay out his deliveries that a driver will not have to drive at an excessive speed to cover the delivery route in the time allowed.

The manufacturer should equip his truck with a generator and dependable electric lights. Examination of the facts surrounding a large number of accidents indicate that one of the contributory causes in truck accidents was no lights, or oil lamp lights, so dim that they could not be seen distinctly.

Effective brakes of ample capacity are an absolute necessity, and this matter has not had the attention it should have from the manufacturer, who frequently figures out the braking surface specifications which are all right for an empty truck and totally inadequate when that truck is loaded to capacity. A margin of safety must be provided for overloads and wet street conditions. The standard caution plate suggested by the National Automobile Chamber of Commerce to be attached to all motor trucks provide for maximum speed, and the number of feet at which the truck can be stopped when loaded to maximum capacity on a dry, hard, level road, but this does not go far enough. It is the unusual condition that we have to guard against, and any manufacturer or truck operator is not doing his full share when he turns a truck over to a driver without positive instruction in its operation that will enable that driver to know what he can do under unusual conditions such as wet, slippery streets, etc. Too many truck owners purchase a chassis from a manufacturer and absolutely ignore the body specifications furnished with the chassis, both as to weight and dimensions. This frequently encourages over-loading which in turn causes many bad accidents, due to the unusual strain involved on steering knuckles, radius rods, gear axles and other parts.

It is highly important that standard caution plates such as referred to above be affixed to all trucks and that the driver should be governed by

them. They would also give a basis for all enforcement officers to use in checking up the operation and adjustment of trucks.

Proper Windshield Construction

The average cab and windshield furnished with the truck chassis is designed to handicap the driver rather than to aid him in the operation of a truck through the construction of the windshield, absence of ventilation in the cab, obstruction of the view, and other practices which would not be tolerated in a touring car.

The use of windshields in two sections with wood frames and a wooden fixed center brace, should not be permitted as the wide wood frames and fixed center braces produce an interrupted vision, and at certain angles cut off entirely the driver's view of a portion of the road. In fact, the only windshields allowable should be constructed in two horizontal sections with no obstruction across the center. The frame should be of metal and not over one inch wide. Cabs should be built with uninterrupted view from both sides and the rear. Also they should be provided with rear vision mirrors.

The record of deaths from carbon monoxide poisoning during the last few years makes it advisable that special attention should be given to cab ventilation, particularly enclosed cabs of commercial vehicles which should be well ventilated to avoid the trapping of exhaust gases from the motor which cause drowsiness or possibly slight attacks of monoxide poisoning.

The truck manufacturers could well afford to maintain at their various branches, testing stations where free adjustment would be made of brakes and where headlights could be properly focused, as these two parts are constantly getting out of order through the use of the vehicle. The danger from bright headlights is not nearly so great as is the danger from poor lights, or from the absence of lights. This fact has been recognized by revision of state vehicle laws in some states and maintenance of headlight focusing and testing stations by the state in all the principal communities, so that the motorist has no excuse for not complying with the law.

I won't attempt to point out a remedy for every fault, but I do believe each class should shoulder their own responsibility and that of the employer seems the greater as between the employer and driver.

Much has been said about the driver and most of the blame has been laid at his door. When all is said and done, however, we only want him to drive our trucks safely and economically. It is largely a matter of careful education, securing his interest and making him understand what we are trying to accomplish. Too many employers treat their drivers as a piece of the truck itself rather than as a human being. Upon you, who have to do with the employment of drivers for your trucks, rests the responsibility for their safe operation to a very large extent. Pick out men of mature judgment. A recent examination of several thousand truck accident reports show the reckless drivers were between 18 and 25

years of age, and the careful ones between 30 and 40 years. Responsibility comes only with maturity. A good physical constitution is necessary for this work. Men of nervous, impatient, high-strung temperament have no place behind the steering wheel of a truck, these individuals being too prone to take their feelings out on the truck. Drivers must possess caution, dependability and judgment. Pick men who have a natural smile that comes from the heart. A man for this work must have good eyesight and hearing. His manner of living must be right, otherwise he is not fit to handle a vehicle under present traffic conditions.

I cannot lay too much stress on the necessity of selecting men of the highest order obtainable for this work. In too many instances I have seen team drivers promoted to chauffeurs because of long years of service, or because they knew the delivery routes and customers, when they were physically and temperamentally unfit to handle a truck. You and I both know of cases where men have been put on trucks because their eyesight is too poor for inside jobs or the condition of their health requires outdoor work.

Scientific Selection

Many advocate the scientific selection of vehicle drivers. This may come but at present we can do wonders by selecting men of ordinary intelligence and seeing to it that they know the state law governing motor vehicles, know that they will personally suffer loss if they persistently violate the law, and inculcate in them by systematic teaching a respect for the law and the rights of others, with offer of a definite reward for a good record. The seat of a motor truck is no place for the careless half-wit, and as I once heard an employer of a large force of drivers say: "Too many chauffeurs and drivers are operating vehicles today who are only a lap or so ahead of their keeper. They are to be found among those who sound a warning or blow the horn and feel that their duty is ended and then proceed to run over or into whatever object comes across their path. A pedestrian naturally assumes that the driver of a vehicle will do all in his power to avoid running him down, and have an idea that a great many accidents can be traced to the natural assumption of the man on foot that the approaching vehicle is being driven of a normal man, when as a matter of fact, the driver may be full grown physically but about ten years old mentally."

After the selection of the proper type of man for your truck operation comes the matter of his training. Education in proper operation of vehicle equipment so that in emergencies the driver will act instinctively is necessary. No driver or chauffeur should be permitted to work out his own salvation. A carefully worked out set of principles and rules must be laid down and the men held strictly accountable for their observance.

In too many cases where I have investigated the causes of accidents I found a driver had been hired because he was a half-baked mechanic instead of a properly selected and educated motor truck operator. You

cannot reasonably expect a motor truck operator who has handled several tons of merchandise during the day to spend much time after his day's work is done in adjusting brakes, taking up excess play in steering wheels, and similar tasks. Put your truck operator in the same position as the engineer of a locomotive who runs his engine into the roundhouse where mechanics attend to the repairs and adjustments.

It is true an operator should know the mechanical makeup of his truck; what the relation of the component parts are to each other and thus be able to detect any defect in its proper operation, but don't expect him to make the repairs. His value to you is his skill and ability to guard against the incompetence or recklessness of other drivers, and to save pedestrians and other motorists from the results of their own thoughtlessness.

One of the outstanding examples of success in selecting and training motor vehicle operators is a prominent taxicab company in Chicago, and we will do well to consider some of their methods. They have extended their welfare work to the home life of their employees to a much greater extent than smaller organizations could afford, but we can all make some effort along this line. We all realize that worry, fear, ill health, anger and other disturbing influences make a man more liable to accident.

Consideration for the feelings of employees on the part of executives and supervisors makes for better relations and greater safety. Some men are able to administer an effective reprimand which will make an employee see the error of his ways without arousing his antagonism; others cannot call attention to a mistake without robbing the employee of his self respect. Their reprimands are directed against the individual rather than against the offense. An operator who has been subjected to a virulent "bawling out" for some error of judgment may nurse a grievance which will make him a potentially unsafe driver for several hours. Many an accident, apparently due to the driver's carelessness, may have had its origin in the boss's office several hours before. Shipping clerks and garage men may also irritate the drivers unnecessarily, and no man can be a safe driver when a grudge is uppermost in his mind. The trouble maker, regardless of his position, is an undesirable individual in any organization.

Accidents Result from Fatique

In studying a large number of motor truck accident reports in Chicago, it is interesting to note that 40 per cent of all accidents occurred between the hours of three and six p. m., and over 30 per cent were between four and six o'clock, while the records up to noon show comparatively few accidents. These figures point to several probable causes, such as the usual lagging that comes with the fatigue of work in any industry, but the pronounced increase in the late afternoon can be accounted for very largely by the habit we all have fallen into of accumulating our day's work in the office of shop and dumping it all at one time just before closing time.

Teach your man something of the impact force of a heavily loaded truck and the inability of stop quickly on a wet or slippery pavement. See to it that his brakes are right every day in the year, supply him with skid chains and make him use them. Check up on the steering mechanism frequently. Have the Safety Council furnish you with their little windshield card holder which goes with 52 tersely worded accident prevention warnings, one for each week in the year. See that your trucks are controlled by governors and schedule your deliveries so they can be made at the rated speed within the time specified.

Organize a driver's club, with the drivers as officers—the executive spirit being the owner of the trucks. Outline the purpose of the club and base rewards on individual results. Then get the drivers together and carefully explain to them the situation with regard to accidents; that they are vitally interested themselves because the next victim may be their own wife or child; that the vast sums spent by you for advertising are largely for the purpose of building up good-will, which is destroyed by injuries to the public. After this platform is thoroughly understood and all pledged to work for its success, the next meeting should be a demand for safer driving on account of increased costs in insurance rates, delays in delivery and excessive repair bills.

If you only employ a small group of drivers help to organize a Safe Drivers Club composed of groups of drivers in different lines of business Let them have their own safety committee and fix the penalty for acci dents due to carelessness. Schools for drivers maintained by groups o employers who will finance a dinner or evening's entertainment for th drivers occasionally will keep up the interest.

Any carefully kept record will indicate high repair bills go hand i hand with accidents. Be frank in your statements that you want to cu down the number of accidents, primarily from a human standpoint, an also because it will save money for your business. Explain to them tha you can get a rebate on your insurance premium at the end of the yea if your low accident record justifies it. Get rid of the idea most of the have that in case of accident the insurance company pays the bills. The don't. We pay in the form of insurance premiums. Inculcate in you employees a sense of responsibility toward his fellow man. Teach hi that respect for the rights of others which will come from a thoroug knowledge of the vehicle laws and their uniform strict enforcemen Make your driver know that using his head and driving carefully wi pay him big dividends, and the opposite course will cost him his job.

Bulletins and Bonuses

Issue bulletins to your employees whenever an accident happens, poi ing out the cause. Accidents don't happen, they are caused, and t cause in 98 per cent of them is due to carelessness on the part of someo Invite the public to report to you incidents of reckless driving on the pa of your employees. Teach your operators that the traffic officer is t

friend. Take an active part in traffic regulation in your city. Your problems are the same as the other fellow and if you get together they may be worked out.

Look into the bonus systems in use by many companies and you will find they save you money instead of adding to your delivery costs, lower insurance premiums, less money for repair bills, few damage claims and the knowledge that you are doing your part in saving human life and injury. Furnish a truck and the business and put your driver in as manager of that part of the company operations. He is out beyond your personal supervision most of the time, and this makes it all the more necessary to have his interest identical with yours.

There are all kinds of bonus systems and many of them have their weak points, but the main fact that interests you is they do reduce accidents. A recent account in the *National Safety News* tells of a Massachusetts contractor who reduced his accident record 92 per cent in 1½ years by a bonus system and then in the following six months covered 8,300 miles in an area of 600 square miles including 42 cities *without a single accident.* The St. Paul, Minnesota, post office operated 31 trucks for 367 days without any injury to drivers or pedestrians covering day and night runs in all kinds of weather at greater rates of speed than is necessary for ordinary commercial vehicles.

Well thought out systematic safety campaigns reduced accidents in 35 cities last year in the face of greatly increased vehicle registrations, and the same methods used there are open to all of us. They include the points I have touched on in my talk and nothing else. The Safety Council or any motor club worthy of the name will be glad to help you organize your employees or your community for a safety campaign. Not for a week or a month, but a continuous drive to be carried on throughout the year.

At the close of 1923 our organization compiled figures in which we analyzed the fatal accidents in Cook county which means Chicago and immediate vicinity. We found that commercial motor vehicles, while only 15.8 per cent of the total motor vehicles in operation caused 20.9 per cent of the accidents. Or in other words, one truck out of every 306 was a death car. We have pounded this fact home to employers and drivers in every way we could, and I am glad to say that the records for the first six months of 1924 show a decided improvement. In fact, a reduction amounting to 36 per cent. This is just another illustration of the good results from a concentrated drive on one particular class of accidents. We have talked to over 500,000 school children, shown them motion pictures depicting the dangers of the highways, and with the aid of the parent-teachers associations have cut down the deaths of children from motor vehicle accidents. We have made a special appeal to keep children from crossing the street in the middle of the block and have shown a 35 per cent reduction in this class of accidents for the first six months of this year, over a similar period of 1923.

The present laws of some states almost prohibit the sale of mot trucks while other states tax them so heavily as to practically prohib their use. Restrictive legislation is pending in many states and mo of it is due to the general feeling of antipathy against the motor tru drivers. Unless you organize to improve conditions you will contin to suffer the penalty of your indifference and be the prey of the wil eyed politician. The Motor Truck Division of the American Automobi Association, co-operating with the National Automobile Chamber Commerce, is a power in legislative matters and any general safe program will receive their whole-hearted support in removing that feeli of antagonism which the general public has towards truck operators tod

PROGRESS IN STANDARDIZING ACCIDENT STATISTI

Dr. Lucien W. Chaney, United States Bureau of Labor Statistics, Washington, D. C.

In no respect has the World War made a deeper impression on the dustrial life of the world than the impulse it has given to standardi tion. Secretary Hoover states the possible savings as measurable hundreds of millions and billions of dollars."

In no field is there greater need of standard proceedure, for purpo of aggressive accident prevention, than in the field of accident statist

For nearly 15 years, the Bureau of Labor Statistics has been collect the facts regarding accidents in the iron and steel industry. New m ods of treatment have been devised and applied on a fairly large sc so that, for this industry, the information available is as extensive accurate as that for any industry anywhere.

Various sections of the National Safety Council have been, for s years, assembling and publishing in the *National Safety News* their perience treated by standard methods.

It is now possible to inquire whether such statistical complications really useful. Have they contributed to the progress of the Safety M ment and can they be made to contribute still more effectively if de oped and extended?

It is the purpose of this paper to urge that standardized statistics h been an important factor in the Safety Movement and may become m more important.

It is very easy to regard statistics with disfavor because vast ma of figures have been produced claiming a statistical standing but th from their unstandardized character and lack of informative value, s only to bring all statistical efforts into dispute.

When, however, all that can be urged in condemnation of statis wastefulness has been offered, it still remains true that the sim transaction in the business world cannot be carried out except by re

The National Safety Council and its various sections have no other purpose than to reduce to the minimum the human damage which has accompanied the development of modern industry.

What are the necessities of an effective accident prevention program?

The answer may be broadly stated in two propositions. First, to know the problem. How big is it? How does it compare with the problem in other industries? It is increasing or decreasing? How do the various departments of the business compare with each other?

Second, to apply recognized principles of engineering revision and safety education which the Safety Movement has developed.

The theme of this paper is the first of those propositions. The only possible approach to answers for the questions involved in this proposition is through statistics. The facts must be recorded in mathematical terms and interpretation worked out by mathematical processes. The great fault with much statistical effort is that it terminates with recording and makes no adequate and clear cut interpretation.

An illustration may be drawn from a field somewhat more familiar than that of accident statistics and will indicate the difference between a mere record and an interpretative presentation.

Suppose that in given cities in a given year it is found that one has 5,000 deaths, while the other has 8,000. This statement is a record of facts but sheds no light upon the relative conditions of the two cities. It will naturally be inferred that the second is the larger but that might be incorrect. It is necessary to know the population of the two cities and establish a relation between the population and the deaths. When it is found that in the first city there were 13.5 deaths per 1,000 inhabitants, while in the second there were 12.0, a step has been taken toward an understanding of the mortality situation in these two cities.

Rates similar to these can be established for all sorts of industrial relationships and serve, when found, an interpretative purpose.

Establishing a Base

In the application of the rate system of record and interpretation to the problem of accident prevention there arises at once a question regarding a proper base to which the accident occurrence may be referred.

There are two possibilities. First, the amount of the pay roll may be considered the base, and to this the cost of various types of accidents may be related and the result recorded in terms of cost per $100.00 of pay roll.

This is very common procedure among insurance companies and compensation organizations.

There are several objections to this procedure but one of them should be decisive against it as an aid to accident prevention. The pay roll may be modified by increase or decrease of wage rates. Suppose wages increase 20 per cent, employment and aceidents remaining unchanged.

The cost per $100.00 of pay roll will go down, giving a wholly untruthfu indication of improvement in the accident situation. Of course, a equally misleading appearance of a worse condition would arise in cas wages were reduced.

The second method of procedure is to use as a base the amount o exposure to hazard and relate the items of accident occurence or loss c time to this base.

For some time in this country the usage of European countries, whic had preceded us in statistical study of accidents, was followed. Th actual time at work was transformed into an equivalent in terms c workers employed 3,000 hours or 300 days of 10 hours each in a year.

Two objections to this theoretical 300 day worker have all along inte fered with the usefulness of this statistical device. First, it is not eas to make clear the precise significance of the unit. Second, its use ha been interpreted as giving official sanction to the 10-hour day as th proper working time.

After consideration of all these possibilities by a widely representativ committee, the various state jurisdictions agreed that the most satisfa tory base for accident rates was man hours of exposure. For exampl in a given interval, 1,000 men may be on duty for a varying number hours each, aggregating 250,000 hours. This figure will be used as base to which accident occurrence and accident loss for the period ma be referred. It was also agreed that this base should be used in multipl of 1,000. This is advantageous because for bases of different size th rates have the same significant figures, the only difference being th position of the decimal point.

A standard base having been chosen, the next step must be to dete mine a standard definition for an accident which may be used for st tistical purposes.

The old rule of the insurance companies to include "every bodily da age however trivial" was not a good one because of the difficulties securing a complete record. Under this rule, the variations between d ferent establishments and in the same establishment at different tim were so great as to render the record nearly useless as a basis for ac dent prevention effort.

To meet this difficulty, the definition of a "tabulatable accident" h been formulated as follows: "All accidents resulting in death, permane disability or temporary disability beyond the day, shift or turn in whi the accident occurred."

Having determined man hours of exposure and accumulated records accidents as defined above, it is possible to bring these two factors gether in the form of frequency rates. A line from a standard accide rate table would read as follows:

"Blast furnaces, 1920; man hours of exposure, 106,410,000; equivale number of full year workers, 35,470; Number of cases: Death, 47; Perm nent disability, 58; Temporary disability, 3,214; Total cases, 3,319. Ac

dent frequency rates, (per 1,000,000 hours exposure). Death, 4; permanent disability, 5; temporary disability, 302; total frequency, 31.1. Accident severity rates (per 1,000 hours exposure). Death, 2.7; permanent disability, 9; temporary disability, .4; total severity, 4.0."

Frequency and Severity Rates

It will be observed that beside the frequency rates which have been so far considered, the above quotation contains so-called severity rates.

The development of these rates is one of the most important contributions to accident study which the Bureau of Labor Statistics has been able to make.

The frequency rate treats each accident as a unit, taking no account of the great difference between an injury causing death and one causing simply a day of absence from work.

In some way these diverse items must be converted into common terms if an expression of hazard is to be secured which will be to a reasonable degree accurate.

This conversion is accomplished by the use of a schedule of standard time allowances by which death and permanent disabilities are rendered into terms of days lost and so made comparable with temporary disabilities which are already measured, in respect of their severity, by the days of disablement.

The allowance for death is 6,000 days and for permanent disabilities some percentage of the death allowance agreed upon as equitable.

It may be pointed out that the exact accuracy of these allowances is much less important than uniformity in the use of them. When properly related to the man hours of exposure they give a series of rates which differ from each other because of the difference in severity of the accidents involved and differ by amounts sufficiently accurate for all practical purposes.

The above necessarily summary statement of what has been attempted in the way of standardizing certain elements of accident statistics says nothing of the very illuminating results obtained by the study of rates for causes, the nature of the injury and the part of the body injured. Of these the study of causes is the most directly conceived with the accident prevention program. It involves of course the treatment of a large number of items and so cannot be carried out except by the expenditure of a very considerable amount of time.

To illustrate what may be accomplished by a combination of careful statistical study and vigorous accident prevention effort a table of the main items of accident cause is presented.

This table represents the experience of about 50 per cent of the iron and steel industry in which the most prolonged and determined effort at accident prevention has been made.

ACCIDENT FREQUENCY RATES (PER 1,000,000 MAN HOURS OF EXPOSURE) IN A SECTION OF THE IRON AND STEEL INDUSTRY, 1913 TO 1923.

Causes	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Machinery	7.3	5.0	4.9	5.4	4.5	4.0	3.3	3.4	1.8	2.2	2.3
Vehicles	2.3	1.9	1.6	1.7	1.7	1.3	1.2	.1	.5	.4	.6
Hot Substances	5.4	3.6	3.7	4.5	3.6	3.0	2.8	2.5	1.2	1.1	1.2
Falls of persons	4.5	4.1	3.5	3.7	3.2	2.8	2.8	2.5	1.7	1.5	1.4
Falling objects: N.O.S.	1.2	.7	.7	.6	.4	.3	.4	..	.1	.1	.1
Handling	26.7	19.4	20.6	21.5	15.7	12.8	11.7	10.4	6.5	5.8	5.5
Miscellaneous	12.9	8.8	6.5	7.0	5.4	4.6	4.1	3.1	1.3	1.9	1.8
Total	60.3	43.5	41.5	44.4	34.5	28.8	26.3	22.0	13.3	13.0	12.8

The original table is much more detailed and presents practically a con densed history of the experience of this section of the iron and steel in dustry in the frequency of accident occurrence due to the specified causes

The present situation is this, namely, that it is not possible to mak satisfactory comparisons outside a very limited range and without com parisons it is entirely impossible to judge of the worth of accident pre vention activities.

The Bureau of Labor Statistics is accordingly making an earnest effor to secure cooperation of this and other sections of the National Safet Council and the state jurisdictions in building up a body of standar statistics which will be of real significance in further efforts toward th reduction of accidents.

DISCUSSION

MR. R. B. MORLEY (Industrial Accident Prevention Associatio Toronto, Canada): I would like to ask Dr. Chaney this: He give us figures showing reduction of accidents from 1913 to 1923. Wa the year 1913 outstanding as a year in which there were a grea many accidents, or shall we take it as a reasonable basis on whic to work?

DR. L. W. CHANEY (U. S. Bureau of Labor Statistics, Washingto D. C.): The method of getting at it is to get at the man. It hasn years. That is, 1913 was a very active year and 1923 was also very active year, but if you noticed the figures in between you woul readily see that the situation has grown very steadily from year t year. That I didn't show because I didn't want to put in so mar figures.

MR. R. B. MORLEY (Industrial Accident Prevention Associatio Toronto, Canada): It is reasonable to suppose then, Dr. Chane taking the period from 1913 to 1923 and the figures that you ha

showing the gradual decline, that the problem of dealing with accidents caused by the handling of material means that we are getting somewhere.

DR. L. W. CHANEY (U. S. Bureau of Labor Statistics, Washington, D. C.): The method of geting at it is to get at the man. It hasn't anything to do with machinery or working conditions or anything of that sort.

ADJOURNMENT

Paper and Pulp Sectic

September 30 and October 1, 1924

G. W. PHILLIPS, Chairman
Champion Fibre Company, Canton, N. C.

F. H. ROSEBUSH, Vice-Chairman
Nekoosa Edwards Paper Company, Port Edwards, Wis.

S. L. BUSH, Secretary
Crocker-McElwain Company, Holyoke, Mass.

TUESDAY MORNING SESSION

CHAIRMAN PHILLIPS: I will ask you to give your names to reporter, so that we may insert the list in the record.

The Following Members Registered Present

J. R. Dwyer, Louisville Paper Co., Louisville, Ky.; W. H. Jennir Safety Engineer, Great Southern Lumber Co. and Bogalusa Paper (Bogalusa, La.; W. J. Peacock, Northern Paper Mills, Green Bay, W F. A. Johnson, Kimberly-Clark Co., Niagara, Wis.; F. A. Robins Kimberly-Clark Co., Niagara Falls, Wis.; W. A. Gleason, Hammerı Paper Co., Erie, Pa.; T. F. Sullivan, Eddy Paper Corp., Three Riv Mich.; T. E. Vaughter, Kimberly-Clark Co., Niagara, Wis.; J. T. Doerı Kimberly-Clark Co., Kimberly, Wis.; A. Scott Dowd, Editor, The Pa Industry, Chicago, Ill.; J. B. Delbridge, Thilmany Pulp & Paper Kaukauna, Wis.; M. G. Hoyman, Kimberly-Clark Co., Neenah, W R. H. Jenning, Eastman Kodak Co., Rochester, N. Y.; Geo. T. Coo York Haven Paper Co., York Haven, Pa.; E. D. Chapman, R. R. I nelly & Sons Co, Chicago; J. A. Dickinson, U. S. Bureau of Standa Washington, D. C.; Thos. C. Eipper, N. Y. State Department of La New York; L. O. Bonner, Mead Pulp & Paper Co., Chillicothe, O Earnest Augustus, Mead Pulp & Paper Company, Chillicothe, O John G. Wheatly, Ocean Accident & Guaranty Company, Detroit, Mi W. H. McDonald, Sears, Roebuck & Company, Chicago, Ill.; A Umberham, Fort Howard Paper Co., Green Bay, Wis.; P. A. Rus Deputy Industrial Commissioner, Madison, Wis.; Wm. Battison, Su intendent, Champion Fibre Company, Canton, N. C.; Dr. Louis

Frechtling, Champion Coated Paper Company, Hamilton, Ohio; F. H. Rosebush, Nekoosa-Edwards Paper Company, Port Edwards, Wis.; G. W. Phillips, The Champion Fibre Company, Canton, N. C.; R. H. Cochran, The Champion Coated Paper Company, Hamilton, Ohio.

The following additional members registered at the second session: Seth L. Bush, Crocker-McElwain Co., Holyoke, Mass.; Carl A. Schumacker, Robert Gaylord, Inc., St. Louis, Missouri; R. W. Ross, The Beveridge Paper Co., Indianapolis, Indiana; O. E. Blauford, The Beveridge Paper Co., Indianapolis, Indiana.

REPORT OF CHAIRMAN

CHAIRMAN PHILLIPS: We have come to the close of the eighth year of the Paper and Pulp Section of the National Safety Council.

The Paper and Pulp Section was born at the Philadelphia Congress in 1915. Representatives from 36 companies had caught a vision of the star of safety, believed in the great possibilities it offered to the Pulp and Paper Industry, and were anxious to help others who were engaged in the paper business to see the light and join the great army of safety workers in their crusade against man's great enemy—carelessness.

During the eight years of the life of the section there has been no phenominal growth, although the membership has increased steadily and accident prevention has now become a part of the policy of nearly all of the large manufacturers of pulp and paper, which is an evidence of the real interest the leaders of the pulp and paper industry have in the welfare of their employees.

It is our desire, however, to see the section at the head of the trade groups doing real safety work. The paper industry is not only one of the oldest, but also one of the largest employers of labor, therefore it should be among the leaders in accident prevention.

During the past year, we believe that some progress has been made. The various comimttees have been active. They have done a good work, and we want to express our appreciation of them and to the National Safety Council for the splendid spirit of cooperation manifested, and the work done during the past year.

From October 1, 1923, to September 1, 1924, thirty-six new member companies have been added to the membership of the section. Sixteen bulletins were prepared, 12 distributed to members; a splendid program arranged for this meeting of the congress and a large number of letters and bulletins of various kinds prepared and sent out in the interest of Safety.

As chairman of the section, I want to express my appreciation to Mr. S. F. Shattuck, Kimberly-Clark Company, chairman of the membership committee, Mr. R. H. Cochran, the Champion Coated Paper, chairman of the bulletin committee, Mr. W. A. Gleason, Hammermill

Paper Company, chairman of the program committee; Mr. S. L. Bu Crocker-McElwain Company, secretary; Mr. F. H. Rosebush, Nekoo Edwards Paper Company, vice-chairman, and the National Safety Co cil, for the work they have done during the year in the interest of section.

We regret to report a loss of a few old member companies dur the year. However, we are glad to report an increase of 23 over year previous.

On September 1, 1924, the total membership of the Section was 50 per cent less than it should be, or would be perhaps, if non-mem companies realized the benefit derived from safety. No doubt all the pulp and paper manufacturers who are not members of the Sect are interested in the welfare of their employees, but are not so s that a safety program in an industrial plant pays in a financial w They do not know that it will reduce accident, promote team w and help to develop a better spirit among their employees and cl cooperation between employer and employee.

Those who have tried it are convinced that a substantial savin effected, aside from the humanitarian standpoint. In other words pays in dollars and cents. Therefore, we need not hesitate to rec mend it to others.

APPOINTMENT OF NOMINATING COMMITTEE

I will appoint on the committee the following: Mr. R. H. Coch chairman; Mr. W. J. Peacock and Mr. F. A. Robinson.

DIGEST OF ANNUAL CONGRESS PROCEEDINGS OF PULP AND PAPER SECTION

F. H. Rosebush, Nekoosa-Edwards Paper Company, Port Edwards,

At the National Safety meeting, held in the Auditorium, Mil kee, September 27 to October 1, 1920, a set of papers was prese by employees of the Kimberly-Clark Company setting forth how safety game was played in that plant. The safety story starte the employment office and Miss Mary Baker who was in charg that work under S. F. Shattuck told how they handled their s work there. In her paper she stated that the applicant, on ent the employment office, found himself in a safety atmosphere.

Reading material on safety was available and the fact that it taken by applicants led her to believe that some safety seeds sown even to those not employed.

To quote Miss Baker in that paper, "Our object is not to bar p who are subject to accidents from our industry, but to have for the industry and place them so wisely that their employment

not be to the detriment of themselves or the plant. If we have to quarantine a person from the industry, we let them know why and they are reasonable about it. Unless you can make that person interviewed feel that you are not trying to bar him, but to safeguard him, he will give you little information. The more friendly and informal an interview can be, the more likely you are to get revelations that will help you to make your decisions."

Miss Baker then pointed out how, by watching a candidate, one could determine practically the job best suited to the applicant and locate him to the best advantage.

Here is the first step in putting across safety, in the employment office, where the first lesson of instilling the idea of working safely is preached. After the applicant has been hired, Miss Baker pointed out that the next important step was to put the foreman wise to her estimate of the man, his strong points and his shortcomings. The safety chain lengthens; before the man has worked a minute his foreman, if he is the right kind, is already shaping his niche for him and adjusting him to his surroundings and his fellow-workmen. Miss Baker's talk was followed by one given by a foreman in their plant, Mike Corcoran. Mr. Corcoran told his experience in applying for a job and of a sign which read, "If you are a safety man we want you. If not, just keep on traveling." He related his impressions of the insistence with which the employment manager searched out his safety record and his ideas on safety. To quote Mr. Corcoran, "He didn't seem to want to know whether I was worth a dollar a week as a workman, or not, but he had to know my safety record. The mill was far from being dangerous, yet it was far from being safe. I could then see the point of view. They were putting in a safety guard."

Watch the New Man

Mr. Corcoran told of how that first safety lesson so stuck to him that he acquired the habit of pointing out unsafe places to the management. To sum up his own experience he said, "Watch the new man, help him along, show him his mistakes and if he thinks there is some one with him, he is always sure to keep safe." He also pointed out that one must have satisfied men on the job, men who respect the foreman and are willing to work with him and for him and that to have such a situation the foreman must be a real fellow himself. In summing up he said, "When your accidents start dropping off, you will find that it is due to the cooperation of the foreman, the safety director and the man on the job. They have brought about something that mere spending millions could not accomplish."

The part that the foreman played in this safety game was told by Henry Bongers, a foreman of an unloading crew. He told of the measures he employed in teaching his men safety; how they watched out for upturned nails, secured their runways for unloading, loaded

trucks safely and piled pulp. He went into details on the handlin of caustics, pointing out the dangers and how to overcome them.

Mr. Bongers said that special care was used in placing men t their and the company's advantage, thus carrying out the wor already begun in the employment department. To quote Mr. Bongers "This works as a sort of training camp for these men. They com in and learn the safety way of working and are now ready to b shifted and transferred to some other department. I am only too gla when I can transfer a man and put him in the mill and say he is safe and honest workman, although I don't like the idea of pickin out our best men for other departments, but as I say, it would b an injustice to hold him down. My department was once known a the worst department in the mill. Workmen were coming and goin by the dozens. There were sometimes as high as twenty in on day. But today it is different. The men have a department pric so you see the foreman can do a whole lot towards the happiness an safety movement by cautioning the men and it will not take lon before he will have a lot of fellows only too anxious to help cooperat and boost safety."

The part taken by the superintendent was touched upon by F. (Wheeler. Among other things he said, "When the safety movemer first came in and we were told that it was safety first, it led me t believe that safety was ahead of production and cost. In oth words that it was more important. After considering this and i application with regard to the machines in the mill I was sold the idea to the extent that everything which came up and everythir which was done should be considered first from the safety stan point. With this in mind I started first deliberately to create in tl minds of the foremen who were under me the idea that safety w really ahead of production."

Speed of Work

Mr. Wright spoke of the necessity of guarding the proper amou of speed for men to work without danger. He emphasized the poi that workmen must be made to feel their responsibility toward the companions in helping to prevent them from getting hurt. The la speaker of this group was M. G. Hoyman, safety director of the Ki berly-Clark Company. He pointed out the importance of the forem in putting across safety work and laid the blame for accidents on t foreman and asked of him the explanation of the accidents. Sor means adopted by him in getting safety in the minds of the men we as follows: First posters showing non-accident runs of differe departments. These posters gave name of foreman, departmer number of men, accident record for the week and frequency.

Conferences were held with the foreman in which the safety wo of his department was discussed. Talks were given to the montl foremen's meetings by Mr. Hoyman and in every way possible it w

impressed upon the foreman the part he played in the safety game and what the management expected of him. The safety records of the different departments found their way to the desks of the management and the foremen knew this. Mr. Hoyman stated that he made inspections as often as possible around the mills and that it became a common thing for workmen to report to him places that needed guarding or unsafe conditions. He emphasized the necessity of taking action on safety suggestions made by the men.

Not only was the safety department interested in safety, but they became acquainted with the homes, troubles, children, sports and whatever was vital to their men. One important point mentioned by this speaker was the way safety suggestions were made, signed by the superintendent, one went to the manager's desk, one to Mr. Hoyman and one retained by the superintendent. It is well to note here how all the safety work was reported to the management and their interest and backing in this work. In cases of difference of opinion between the superintendent and the safety director as to suggestions, the latter referred the matter to a director for settlement.

Another important point touched upon by Mr. Hoyman was the problem of handling the new man. He was not turned over to the old man who was going to quit, but taken in hand either by the foreman or the best man in the department for instruction. The speaker stated that the instructor should have four essential characteristics, namely, patience, skill, safety and loyalty. Is it any wonder, I ask, that under such a system a new man would attack his new problem with enthusiasm, pep and understanding?

Here I would emphasize again the main primary steps in putting safety into your plant. First, men hired with understanding, judgment, tact and a point of view. Second, the new employee properly introduced to the foreman and made acquainted with his job and his surroundings. Third, a highly efficient method of training that man after he had been placed on a job.

Follow-Ups

Now let us see the methods by which this work can be followed up. Miss Baker in her talk said, "We like to get criticisms in the line of safety from the people entering the plant and from the visitors and from people quitting us. Those who quit are likely to be very critical and we get valuable suggestions from them. We try to act as safety inspectors when we go down to the mill to visit the men. We watch out for safety slogans and pictures so that we can send them into our plant or put them on the bulletin board."

We feel that a great part that can be played by the employment department is to keep a full pay roll eliminating over-fatigue, double shifts—sources of fatigue.

Miss Baker stated that accidents of same nature were treated as subjects for bulletin boards and also hand bulletins pointing out the particular hazard of that accident. Slogans were constantly used. By thus keeping in close contact with the men and having them contented and safe workers their turnover was cut down 50 per cent. The same year the accidents were cut 50 per cent. Here you will agree safety work paid.

Another means of pushing safety tried by Mr. Hoyman was in safety campaigns between the mills. For one such contest lasting for 24 days Mr. Hoyman used a race horse to indicate the progress of the two contesting mills. Another feature was a large monthly safety board 4x17 feet placed near the entrance to the mill. Upon this the record of each department for or four was shown for the entire month. The plant publication "Cooperation" was also used as a means of disseminating safety. Each fall a stag meeting was held to which were invited the men and all their families. Many meetings were held for children, at which the chief of the fire department spoke on fire hazards around the home. There was also a little demonstration how accidents happen, a movie was shown. In connection with the safety work a first aid department under two nurses was maintained. In summing up Mr. Hoyman said, "To get safety across we must keep everlastingly at it, presenting it new each day, new stunts, but always keeping it before the men 365 days a year."

In a paper presented in September 1921 at a meeting held in Boston by Mr. Roy T. Marbach, he pointed out that in the growth of great industries of today management and men were drifting farther apart and that to bridge this gap the job of foreman had widened to fill its place. In dealing with this subject Mr. Marbach said in part, "A good foreman possesses a pleasing personality, and is no a grouch. He should be a leader of men and not a driver for the days of driving are past." It used to take a husky man for a foreman. Now it takes a quick witted man who can understand human nature, who treats every man as an individual and does not regard human labor as something which can be bought and sold as are machines and raw material. Other qualities necessary for foreman ship pointed out by his paper are respect for carelessness, responsibility, skill in training new men, and a sense of proprietorship over his men to afford them proper protection. He should encourage suggestions from his men and allow them to solve problems for themselves.

The Foreman

At a meeting in Detroit, August 28, 1922, Mr. Adam Wilkinson, of the American Writing Mills, Holyoke, Mass., presented a paper "The Foreman and His Responsibility for Employees." Mr. Wilkinson pointed out in his paper that when the safety idea was presented to the paper industry, it was regarded by the foremen, especially the older ones, as propaganda, and that the foreman's duty ceased when

a uniform output of standard quality was produced. The problem was, he stated, to warp the safety idea into the foreman's conception of his duties. He must be educated to the belief that the responsibility for the welfare of his men was not a side line, but one of his chief duties. The foreman's safety creed as outlined by Mr. Wilkinson is, first, proper instruction of the new man by the foreman to do work in a safe way. Second, the foreman must maintain discipline in his department and prevent horseplay. Third, the foreman should be as interested in safety as in getting out the product. This speaker rather blamed the management as to attitude toward safety, rather than the foreman, and thought that the treating of safety as a sideline was due more to their treatment of it than the foreman's.

The problem then is to get the foreman to handle safety on the same basis as he does his production. One of the drawbacks as Mr. Wilkinson saw it was the lack of proper instruction of the new employee by the foreman. Care must be exercised to see that in placing new help with old ones, the old ones do not shirk their duties and place an overload on the new men before they get acquainted with the work. The foreman must keep in close supervisional contact with his men in the manufacture of paper to eliminate preventable accidents. In closing his article Mr. Wilkinson said, "We all agree that it can be carried through the foreman, and I say this without criticism of the foreman. The foreman has done in the past what he has been expected to do, but we can concentrate our efforts to advantage and get better results in the prevention of accidents if we pay more attention to him in the future."

The discussion which followed this paper brought out the following points. Publicity must be given to all matters of safety, such as discussion of accidents, both from the standpoint of review and with the idea of prevention of the recurrence of that kind of an accident. Meetings of those naturally interested in the safety of particular departments, such as management, safety departments and foremen, at which meetings safety is discussed along with production and on an equal basis with it. Putting the work of having safety a definite working proposition squarely up to the foreman and ranking it equally important with his other duties, and last but not least, training foremen and men that safety and production go hand in hand; more safety means more production, more production can be had if more safety is practiced.

Bulletins

The next step which naturally comes in putting safety across is the use of bulletins, plant magazines, safety contests, posters, etc.

In the paper presented at the St. Louis meeting, September, 1918, Mr. Harry Ballau treated the subject of increasing the efficiency of the bulletin board. He gave credit to the National Safety Council for the excellent work it was, and is still, doing in putting out safety

bulletins for bulletin boards, but in addition to these Mr. Ballau stated, "We must carry the work along by numerous methods, not by one continuous arrangement, but by devising ways and means of continually varying the systems, because the average workman must be continually enthused and kept constantly interested in safety first work. It is a big problem to get them interested, and another to keep them interested; you cannot succeed without the help of an efficient bulletin service."

Mr. Ballou made the following points in connection with the use of bulletin boards: "Monotony of bulletin board use must be broken up, first, by inserting mill news, jokes on men or foremen or officers; second, commend men or departments on good work; third, do not use too much reading material. Use bulletins which convey their message quickly and with an appeal." This speaker pointed out the advantage of home-made original bulletins presenting local items of interest such as accidents, etc.

Have a few bulletins posted. Do not post bulletins over one another or in haphazard fashion. He suggested that the bulletin board be located where the men congregate to eat lunch. Special made bulletins could be sent to the National Safety Council and be used in other mills.

Mr. Hoyman in his talk, already mentioned in this paper, said they used many bulletins from other plants such as the Employers Mutual of Wausau, the Travelers Insurance Company, and others. He alsc stated that he did not favor bulletins with such reading on them, bul favored those with plenty of illustrations. One word with regard tc used bulletins by Mr. Ballou: "Often these bulletins can be made use of in schools, in the homes, in the offices and other places after they have served their purpose in the mill or factory. Right here it migh be well to add if you haven't anything definite or special to pos clean up the bulletin board and leave it blank until you have occasion to post it again."

In connection with this subject, I would like to review the pape presented in Boston, September, 1921, by A. E. Frampton, editor o the Hammermill Bond, Erie, Pennsylvania, on "Using a Camera t Promote Safety". Mr. Frampton pointed out the many ways in whicl the camera could catch the stories of the men, places objects of interes and put them into such shape to be profitable. It would add greatl to the discussion of putting the safety idea across if we could includ in this paper a review of the paper, "Getting Across the Safety Mes sage," by Fred A. Robinson, of the Kimberly-Clark Company, Niagar Falls, presented at the Detroit meeting in 1922, in the Plant Publica tions Section and others, but time will not permit.

The material given here does not cover all the points made by variou speakers in their papers, but as this was to be a review, the mai topics have been touched upon.

Safety Talk By Al Kroes

I cannot close without reading just a little bit from a talk given by Mr. Al. Kroes, director of safety educational work, Employers Mutual Liability Company, because, in a way, that talk sums up what I have been trying to say to you in a way about putting safety across. Mr. Kroes in that talk said:

"Direct hits are the thing. You all remember the experiments by the U. S. Navy when they bombed the ex-German battleships. Almost a hundred packages of TNT fell around the erstwhile prides of the German Navy. They made a lot of fuss in the briny deep, but it was left for the direct hits to do the business. We all have memories of the aimless safety campaigns in the average factories; hundreds, yes, thousands of safety packages were dropped from up high, only to fall into the water clear from the real object.

"How can we make a direct hit with the worker on the job? In the first place, get on the level with him. Cut out all bombastic, flowery language. Get down to the grade level with your listener, so he can get you. Use barnyard language, a bit of slang if you must. It will appeal to him. Of course, this will shock Boston, but it works. When you talk to a body of safety engineers, go ahead and use technical phrases to your heart's content. They like it and grow fat on them, but when you face a group of workers whose educational clock stopped with the eighth grade, don't talk to them on the relativity of the accident percentage between one shop as against another, or perhaps one industrial group as against their brothers. Don't try to make them like it. It can't be done.

"Don't be afraid of being too commonplace. Hit right from the shoulder and be cheerful. Keep in mind that you are talking to John Kolinsky, not to the President of the United States. You keep them on the alert and their minds are receptive every minute. Be a "peptomist". What is a "peptomist"? He is the last word in getting things done. He belongs to the triple aggregation of the optimist and the pessimist. The pessimist will say, "No, I don't think it can be done." The optimist says, "Oh, yes, I really think there is a chance." But the peptomist says, "Oh, boy! Gangway, fellows, I will do it."

"Run in a story. Don't try to set your face into wrinkles of dignity like Professor Einstein before a group of scientists. When they laugh at your story, laugh along with them. After a session of seriousness, laughter is a good shock absorber, a drop of oil on the hot journals of life. Laughter, my friends, jiggles the diaphragm, it tickles the liver, it lessons sorrow, it accelerates the circulation, it promotes digestion and lubricates the serious human machine.

"In conclusion, whatever else a man may be, whatever his thoughts and ideas on safety, you may be sure that you can get very close to him on the home question. You have, and I have, met a lot of fellows who run amuck with the hammer, knocking the safety movement. No

ideas first, so that, when the job is finished, you will have had a chance to give us all the suggestions you can in advance.

As arranged now the code is divided into nine parts, each part representing some department in a paper mill.

Part 1—The Yard.
Part 2—Preparing pulpwood; This includes the wood room.
Part 3—Rag and Old Paper Preparation.
Part 4—Acid Making.
Part 5—Chemical Processes of Making Pulp.
Part 6—Preparing Pulp for Paper Machine; This includes the ground wood process, the pulp shredders and presses, and the beaters and washers.
Part 7—Machine Room.
Part 8—Finishing Department.

Up to the present time it seems to be the consensus of opinion by those who have reviewed the code that the sulphite department and the yard are pretty well taken care of. The finishing and machine end need more work and more consideration. The people at Kalamazoo, however, had agreed pretty well with everything that had been presented at Buffalo.

(A discussion of the detailed provisions of the code concluded the morning's session.)

WEDNESDAY MORNING SESSION

HEALTH SERVICE WORK IN PAPER AND PULP MILLS

Louis Frechtling, Director, Department of Industrial Relations, Champion Coated Paper Company, Hamilton, Ohio

Health service work in paper mills does not vary from that in other industrial fields. The underlying principles are the same. They are based upon the fact that health denotes mental, moral and physical well being and that it therefore is the basis of efficiency. Health service has a part in selecting the worker for a certain job, based upon his physical and mental fitness to do the work expected of him, and, often, when he has been placed on the job, health service has a part in maintaining his health by removing or safe guarding such hazards as may jeopardize health or limb. For the purpose of this study we may subdivide health service work into medical service, surgical service, dental service, nursing service, sanitation.

Medical Service

Medical service may be made to include physical examinations of all new employees with periodic re-examination for all employees, clearance of all employees who have been absent from work, medical attention to all employees who care to avail themselves of the opportunity medical advice and instruction.

The introduction of the majority of workers in a plant to health service comes at the time of their physical examination. If "first impressions are lasting impressions," it behooves the physician who makes the examination to make that impression favorable to not only the health service of the plant but to the entire organization as well. A few minutes taken at this time will often accomplish much more than one can hope to accomplish later. The new employee has a right to know why you are making an examination. If he is rejected he has a right to know why he is rejected. If he has a defect of such magnitude that he should protect himself, he should know of that defect, and what he should or should not do. He should know that physical examinations are made only as an adjunct to placement. He should know that when you hire him and place him on a job you are considering not only your duty to him but also your duty to your other employees, the management, your customers and to society as a whole. A man requires work in order that he may discharge his economic and social debts to society. But, in accepting work, he should not be asked to accept employment which will aggravate existing defects or cause new ones or which is beyond his mental and physical power to accomplish. Those whom he will work with have a right to expect that the new employee be free of any infectious or contagious disease, which they might contract. They also have a right to expect that the new employee be physically fit to do the work expected of him lest a portion of it fall to the lot of those who are employed with him. The employer has a right to expect that the new employee will, by physical and mental make-up, be able to perform the task assigned to him and so remain a contented and safe worker at the work which is his to do.

Physical examination as an aid to placement is a great factor in stabilizing plant turnover. Fear is a great deterrent in industry. Place an employee at work which he is physically and mentally unable to do and at least one of two things is likely to happen: either your employee will leave or he will get hurt. Fear will be the cause in either case. In our own organization we have had several experiences which have sold us the value of the physical examination. For a long time we had the experience that most paper mills have had with super calenders. There was scarcely a month that we did not have one or more men off because of crushing injuries to their fingers. When we began our work in industrial relations more than five years ago, the employment, production and medical service got together and determined upon the ideal type of man for calender work, as well as other work. That type of man is now employed if it is possible to get him, and our experience so far as mashed fingers from calenders are concerned is a thing of past history. It has now been more than year since we have had a calender injury.

Typical Procedure

During the time we have been operating, our medical department has made 8395 physical examinations. We have had but few who have objected to the examinations. It is our procedure to classify all of our

men and women in one of four classes. Class (A) are those who hav no physical defects which we can discover. Class (B) are those wh have slight defects but none which would make them a hazard on an job in our mills. Class (C) are those who have defects which are sufficient magnitude to require that they be placed on certain defini limited work. In this class we place hernias, defective vision up a certain degree, heart lesions which are compensating and the lik Class (D) is our rejection class. Making up this latter class are thos with infectious or contagious diseases, those with heart and kidne diseases in the advanced stages, those with defective vision beyor a certain degree and finally those afflicted with venereal infection In our own experience this latter class runs about 2.5 per cent per ye of all applicants examined. If however one considers that those wl have infectious and contagious diseases, venereal diseases and the lik may again return for examination when free of their disqualifying defe it will be seen that this class may contain potential employees and t percentage above given reduced at least 50 per cent.

In making the examinations, the examiner and the prospective e ployee should be alone. The examiner should have before him t experience record of the employee. This will give him information as the previous industries in which the candidate has worked and advi him as to certain industrial diseases for which he should be particular on the lookout. A complete examination can be made in from 15 to minutes in most cases. Re-examinations can be made in a shorter leng of time. It is our practice to require all employees in Class C to retu for periodic re-examination, the frequency depending upon the defe All other employees are not required to return for examination but a encouraged to do so. We have been recommending at least one examination each year. The ideal procedure is to have a woman phy cian for the women employees and a male physician for the men. present, our own examination of the women in our employ, outside o careful examination of special faculties and the chest, is merely inspection.

The medical department should issue clearance to all employees w have been absent from work because of sickness. This will do much keep down the possibility of epidemics within the plant or in cert departments. If this can be done it means much to the other employe to the industry and the community as can be readily seen.

In our organization, we render medical service gratis to those v wish to accept the same. The service is offered. The employee acce or leaves it as he or she sees fit. We find that more and more of workers are coming in for medical service and advice. This advice d not always pertain to themselves but to their families as well. A v functioning medical department may be of excellent service to medical profession in the community in just this way. There is occasion for any clashes such as are heard of between medical serv in industry and medical service in the community.

Preventive medicine, a term so new as to be still unknown by many informed persons, should be a part of the duties of every well functioning medical department in the paper industry. We must recognize that we have certain processes which may lead to diseased conditions. These processes are such as mixing and making chemicals, sorting of paper and rags, cutting of rags, grinding, beating and shaking of rags and papers. Anything that can be done to make these processes safer—so far as life, limb and general comfort of the employees, should be carried out. Of this I shall have more to say later. A medical department or any other that does not have a plan of education in its program is only functioning about one half. Teach by precept and by word. Organize classes, if you can, to instruct your men and women how best to take care of themselves and their health. Use bulletins carefully selected for use on your bulletin boards. Change them regularly. Have your employee thinking: "Well today is Tuesday—we will have a new health bulletin." You can never tell how far this influence may carry. Our organization is in possession of a letter from the health commissioner of our city stating that he is certain that the health work carried on in our mills has had an influence upon the entire community.

Surgical Service

Surgical service usually has to do with such surgical attention as is required by those who have been injured while in the course of their employment. The surgical and medical services are conducted as a unit. Their location should be as central as possible and the establishment of first aid stations throughout departments are to be considered as unsatisfactory. What little time is gained by rendering service which is often well intentioned but poorly rendered is entirely lost in subsequent developments in many cases.

Early and competent diagnosis will have a pronounced influence upon the final results in the case. It should always be the one aim in this service to return the injured workman to industry in as nearly a normal condition as possible.

More and more are we appreciating that we have a duty to perform in reclaiming our industrially maimed for industry. There is known to most of us some who because of injury have been lost to industry and who through some operative work, exercise or physical therapy might be remade into useful and contented employees. Much can be done along this line and unless the problem is openly met, surgical service in industry is not fulfilling its obligations.

Dental Service

Dental service as a part of health service should deal entirely with two phases of dentistry, dental prophylaxis and dental first aid. But few organizations in the paper industry have full time doctors of dentistry. Most service of this kind is offered on a part time basis. The work of the dentist is limited to prophylactic work, the cleaning

of teeth and the rendering of first aid in cases of aching teeth. It is the practice to, if at all possible, clean the teeth of the employees at intervals of not more than six months and at that time to recommmend such further treatment as may be required. That this does bring returns to the organization offering the same may be appreciated when one reviews the ills that may come from infected teeth and poorly masticated food.

Nursing Service

Nursing service as a branch of health service may be considered under two headings, the intra mural nurse and the visiting nurse. The intra mural nurse might be also designated as the first aid room nurse She is the right arm of the plant physician. Her duties are to assist in all first dressings, to make the subsequent dressings in the minor cases, to make and properly sterilize such dressings as are used in the work, to keep records and to assist in the educational work of the department, by giving talks to the female employees at various times I need not advise that the employment of any nurse to work in industry is to be given more than passing consideration. Personally, I consider a good nurse of the highest importance. The industrial nurse must have more than a good technical education and training. She must be democratic; that is, she must be willing to remember that she is fellow worker—a neighbor and friend. She must be willing to work not so much *for* industry as *in* industry. She must be able to understand that she is to work not so much for the worker or her employer as with and through them. She must understand something of sociology and economics. She must be sympathetic, not with a maudlin sympathy but with understanding. She must be willing to listen to the gossip of the workers which often grows familiar, and so in this way understand the wishes of those with whom she is in contact.

The visiting nurse represents the company, in many cases, to the employee's family and acts as the connecting link between the health service of industry and the home. She must be a woman with all these attributes which I have named above. She is to be considered more of a social worker than as a nurse. It is true that many large industries do have their nurses do the actual nursing. However, the ideal way seems to be to turn over that phase of the work to the local nursing organization if there be one.

As the scope of the visiting nurse's work is so broad, it can only be outlined. She is limited only by her time and her initiative. Upon her visit to an absent employee she may find the employee sick and without a doctor. The case may be more serious than the family considers it to be. The nurse can make the patient comfortable and advise him to call a physician. If he is a stranger and without knowledge of a capable doctor, she may advise him of several who would render him proper service. If, after the doctor's call, it seems advisable to remove the patient to the hospital, she can make arrangements to have him taken there, and often accompany him on the trip.

If as so often occurs, the wife is sick and the husband unable to go to work because there is no one to do the housework and to take care of the children, the nurse will arrange to have someone to do this work and to have the regular nursing organization render the proper nursing service. So, at the time when the employee may be most in need of his income, he is able to be on the job and earn it.

Sanitation

Sanitation is preventative medicine. It has an important place in health service in any industry. It has been defined as the service "which deals with the control of the external factors of environment which affect the health of the workers." These factors are ventilation, temperature, lighting, drinking water, humidity, sanitary appliances and dust.

The planning of proper appliances to meet these various factors will be a joint duty for the medical and engineering departments. The erection and maintenance in good operating condition will fall upon the engineering department. The study of its efficiency, the maintenance of cleanliness and the checking of its effect upon the health of the worker, are sanitary duties which fall to the lot of the health service and rightly so.

In carrying out this work in most organizations, the regular routine work connected with sanitation is delegated by the chief medical officer to one of his staff. This employee will be directly responsible to the physician in charge and should have control over the sanitary corps which may be organized as the conditions in the individual plant may require. These men will have as their duties, the cleaning of the plant and the various offices, toilet, locker and bath rooms, the care of cuspidors if such a service is maintained.

At this point I want to say something about plant cleaning as so often carried out. It is done in a rather perfunctory way and then a large amount of some coal tar disinfectant mixed with water is thrown about in a hit-and-miss fashion. As a result of the smell, the employees for the most part get a false sense of security and often ill results follow. It must be borne in mind that no destruction of bacterial life will result unless the agent used for the purpose come into actual contact with the bacteria. There is no better germicidal agents than fresh air and sunlight. It is our own plan in caring for toilets to clear up all of the paper and litter which might be upon the floor, then to thoroughly wash down the floors with a hose, being particularly careful to get into the corners. This, in turn, is followed by the thorough mopping of the floor with hot water. We give each toilet one such treatment a day and are able to keep them in a condition free of disagreeable odors which result from the decomposition of bodily excreta.

The problem of promiscuous spitting is always one of the health problems which requires attention. Most of you are acquainted with the various makeshifts which will appear about the plant for use as

cuspidors. Nail kegs, boxes of all descriptions, any kind of a container that is handy or meets the fancy of the employee. We have adopted a renewable cuspidor which has a container board cone which sets in a metal frame. This cone is partially filled with moistened sawdust. These cuspidors are scattered throughout the entire plant and are renewed each day. The man who has this duty to perform has a wagon which he can move from place to place. In one compartment he has the sawdust and new cones in the other compartment—space in which to throw the used cones. At the completion of his rounds these used cuspidors are destroyed by burning.

Particularly should we give attention to the ventilation of our plants. If a number of persons breathe air which is not renewed regularly, chemical changes take place in the atmosphere which lead to an increased amount of carbon dioxide and a lessened amount of oxygen. Physically, the air increases in humidity and in temperature. As a result, those breathing it become dull, have a sensation of "stuffiness," notice an unpleasant odor and sooner or later have an increasing headache due to the toxicity of the atmosphere. As a result, lowered efficiency and a condition prejudicial to health exist. Ventilation corrects this condition as it reduces abnormal heat and humidity, brings in the requisite oxygen and acts as a stimulant and thus makes for better working conditions and better and more product.

Light

Light will receive considerable attention from the physician working in the paper industry. The fact that paper making is a continuous process necessitates that proper lighting be furnished in order that the interest of all parties to the making of the product may be safeguarded Most states have worked out codes for proper lighting. The National Safety Council has recommended a code. We should remember three principles in artificial lighting. These are: absence of glare, distribution and intensity. Intensity can be measured and partially controlled by seeing that the lights are properly maintained: new lamps to replace those which have burned out, cleaning lights and reflectors painting the walls in some light color in order that the light rays be not absorbed from a dark, dingy wall. Distribution means proper placement and a proper number of lamps. Glare can best be controlled by the proper hanging of the fixture, proper placing of the shades and the use of the proper type of reflector.

The importance of a sufficient supply of cool, clear clean drinking water is self-evident. As most mills have their own water supplies the physician in charge should make or have made regular test of the water. Bacteriologic examinations are sufficient. If there is any question as to the purity of the water, chlorination should be immediately resorted to.

The type of drinking fountain is important. The modern fountain with the side jet outlet so placed that it is impossible for the drinker to place his lips over it and also that no water from his mouth may fa

into it to contaminate it, is the desirable type. Water should be of a temperature of 50° when possible. Warm water nauseates, while water that is too cold will cause stomach and bowel troubles. Outside of the dust which one finds in the rag and paper sorting departments in varying amounts, the dust hazard does not exist in most mills.

DISCUSSION

A MEMBER: I would like to ask a question, if in your plant the hiring of men is under your department, or do you work in conjunction with the department that does the hiring?

DR. FRECHTLING. I have charge of the entire department and the employment of men comes as one of the services that we render.

CHAIRMAN PHILLIPS: One of the questions often asked which it seems to bother a great many people who start to operate under the safety plan, is how many are rejected, what percentage of applicants are rejected. I notice Dr. Frechtling said about two and one-half per cent, which is very small.

DR. FRECHTLING: You will note, Mr. Chairman, that I qualified that later by stating that many of these rejected employees had diseases which were of an acute nature, and, upon the correction of this acute condition, for instance, of venereal disease, or men with trachoma, scabies, or itch, and the like, when those diseases are corrected, they could come back into the plant and seek employment, a position was open for them. So that the percentage would be cut down to one or one-half, at the most. That is our experience.

MR. S. L. BUSH (Crocker-McElwain Company, Holyoke, Mass.): We are a small mill and we have been doing this work for some time past. We are still doing it successfully. We have a part time physician who comes to our plant one hour each day, four days out of the week. He makes four visits of an hour each. We have a full time nurse on the job at each plant, and she, with the supervising physician, is able to cover our needs. The physician examines all of the new employees. Our percentage of rejections is smaller than the percentage Dr. Frechtling spoke of. We have found ways to use practically all of the men who have applied, and we have been of very great assistance to them. Just this past year we have gone a step further by incorporating a new scheme of insurance which we have just got started, along with the physical examinations. The examinations are being conducted at the present time and are very successful. The employees like it very much. They are paying for 50 per cent of the examination cost, and every one who has come in on the insurance is taking the examination. If they take the privilege of the group insurance, they also take with it a privilege of the physical examination. Approximately 80 per cent of our employees have taken the insurance.

We have two plants. In one of them we have approximately 275 men, and in the other, approximately 325 men, with a full time nurse

in each plant, and a supervising physician who covers both plants in the same city, about a mile apart.

MR. ROSEBUSH: In the scope of the work such as in a mill community, do you consider it wise that the work should include the wives and children of the families outside of the mill? Would the doctor be expected to give medical assistance to them free of charge?

Advisory Capacity

DR. FRECHTLING: No, I would not. I think it is well to confine your services to your employees more in an advisory capacity, and not in the capacity of giving them drugs or treatments. That is the thing we try to do for them. We do go a step further in some cases; where men can come to the department, they are treated to a limited extent. Take an acute case, something that comes out of a clear sky, something like an acute cold, an accident case that happens where another physician is not available; those are the kinds of things we take care of right off. We do take care of the employees themselves as long as they care to come to us and as long as they can. We do not go to the men's homes and make visits for sickness. We do give them care for accidents that occur in our plants but not for sickness. We feel we are getting just as much out of the man's coming to us as he is getting from us. That is the basis that we try to put this whole thing on—a mutual return basis.

I just want to say one thing about this bugaboo that is so often raised about what your men are going to do in the health service work. You will be surprised to learn how soon the foreman who is on the job appreciates that you are sending him the right kind of men for the work he has to do, and how quickly he begins to cooperate with you. He doesn't say that we need six men for unloading cars right off. He knows it two days ahead of the time, and he is going to make his arrangements to meet the requirements of your employment and your medical service, when he can get the kind of men that he needs and the men who can do the work they are asked to do.

MR. PEACOCK (Northern Paper Mills, Green Bay, Wis.): What ought we to pay a doctor for that service, four times a week?

MR. BUSH: We are paying our doctor on the basis of five dollars a visit. We have been contemplating a little change in the arrangement, and I think very likely we will pay him on the basis of a salary say twenty-five dollars a week, and expect him to make special calls such as are required in cases of accidents, and things of that kind when we send for him in a hurry, and to make those calls without charge have him supervise our work entirely and come as often as is really necessary, at least four hours every week for twenty-five dollars.

MR. W. H. JENNINGS (Bogalusa Paper Company): In reference to examinations, in addition to our paper mill, we have a large lumbe

mill in the same town, employing about 1,500 hands; we have about 2,100 men working in the paper mill and in the lumber mill. Our men are all examined through the employment bureau. We have a magnificent hospital with a staff of about seven physicians; and we also have in connection with the hospital a training school for nurses. Our single men pay 90 cents a month and the married men pay two dollars a month. This takes care of the entire physicians for the family, and it includes operations to the members of the family, the wives and the children.

In our logging operations we have a doctor in each camp, and for a small fee medicine is furnished in the camp, aspirin and things of that kind.

We have some of the best doctors in the South and they take care of the families and the men trust them, and they are doing splendidly.

THE BEST SAFETY STUNT IN OUR MILL

ROUND TABLE DISCUSSION

MR. M. G. HOYMAN (Kimberly-Clark Company, Neenah, Wis.): What I came to this Congress for was to get what the other fellow has found out. I am well aware of what we are doing in our own plants; but I am sure that we are always desirous of knowing what is going on in other plants in the way of progress, and for that reason, I suggested that we have a round table of the Best Stunt in our plant. Now, you may have had a number of things (there isn't any doubt about it) but each one of you has had something that is in your system that would be beneficial to me and to the others, and perhaps I may have something that would be helpful to you. The only way is to exchange them, and we will all increase our knowledge thereby.

MR. ROBINSON (Kimberly-Clark Company, Niagara Falls, N. Y.): I want to say in connection with any safety work or stunt that you may put on, you probably all realize that it is absolutely necessary that your company be back of the movement 100 per cent, and that you have a safety director who carries the work at the bottom of his heart, such as, I am glad to say, we have. Then, you must have your foreman with you 100 per cent. You can't do very much of anything without these three cooperating with you.

In 1923 a series of safety contests was started between the various mills of the Kimberly-Clark Company which are located in Wisconsin, New York and Ontario, Canada. Previous to the starting of the contests the Niagara Falls mill was what might be called the company's "sore spot", as far as safety was concerned.

The Falls mill started in 1921, and for the year 1921 we had 27 accidents. For the year 1922 we had 31 accidents, but for the year 1923, in which we had all the contests, our accidents were cut to nine for the whole year. You can see from this that contests are profitable.

The bulk of the men in our mill were absolute strangers to the men of the other mills, the other mills were strange, the villages and towns were strange and the great majority never saw any of the other mills. Yet with all this strangeness and the handicaps of our men they fought hard, co-operated and did everything possible to win these safety fights and outdo our Falls mill in the lead in safety. We didn't get the lead, but we are next to it.

In studying the matter over, I came to the conclusion that when men would fight like they did against people and mills they didn't know, they surely would do even better if fighting against people they knew or had worked with, or mills they were acquainted with and worked in. So I put my thought to the industrial relations group of the chamber of commerce to have a safety contest between all the plants in the city. It was accepted. All plants did not enter but 19 did.

This contest ran 90 days. A prize of a suitably engraved banner was to be given to the winner or winners in case of a tie, and their names to be inscribed on a prize cup to be exhibited at the chamber of commerce. Three plants out of the 19 came out a tie, coming through the entire contest without a lost time accident. About 12,000 men were involved in the contest. Interest was kept up by the scores of every plant being published in each plant; also by various inter department contests within the mills and other stunts gotten up by the members of the various factories, also by the general meetings held at which a review was made of the plant standings and work being done to promote interest.

Results of Contest

Did all this pay? For 90 days of last year they had 198 accident as against 47 during the 90 days contest of this year, a reduction o 151 accidents or an improvement of 76¼ per cent and every plan entered made an improvement over its last year's record.

After the contest I had the pleasure of interviewing some of th officers of the winning companies. They acknowledged that they di not believe such a wonderful thing could be accomplished, especiall at their own plants.

As a result, it is planned to hold a city wide contest each year.

MR. JENNINGS (Bogalusa Paper Company): We had a little stunt tha we used this year, a no-accident week, and the prize given at the en of the week was a gold star board about 18x20 inches with a larg gold star, and in letters "Safety First—no accident in this departmer last week". And from that time to this it has been the pride to kee it there. If another department had no accident, they moved the boar We have another system whereby another star is added for each wee that the department has no accident.

MR. JENNINGS: As safety engineer, I interview every man who hurt. I follow him to the hospital or go to his home, and then I s

to the foreman and see what can be done to prevent any one else being hurt. I have the foreman look into the matter and take steps to prevent a repetition of the accident.

MR. ROSEBUSH: If you are just starting in safety work, may I add in addition to the last gentleman's point, that you get your superintendent in the meeting, because if you start in your safety work and you have your superintendent investigate with you all the accidents, you are going to have him with you and will make your safety work a success.

MR. R. H. JENNING (Eastman Kodak Company, Rochester, N. Y.): You all know that we employ several thousand men. It is our custom that when a man comes in to work to call him to the committee room after he has been there a day or two and give him one of these little guide books, and in that little guide book it tells him what we expect of him. If he does not want to live up to what is in the book, we do not care to have him work for us. Now in our place we try to educate our employees, and tell them what we want them to do, and if they meet us half way, we are always willing to meet them half way.

Ten years ago in the plant which I represent, we used to have about 110 accidents a year. Last year we had 23. Gentlemen, I want you to take into consideration that we have 225 punch presses in our factory, and those men have to go in there, 20, 30, and 35 times every minute in the day, running 1,600 pieces an hour, and you will all agree with me that there is more danger in a punch press than almost anything else. We have got those men so educated that they won't take any chances. Whenever there is anything wrong they go at once and report it to the foreman. I tell the new employees whenever they find a condition that is wrong in the factory to report it to me, and I report it back to the foreman and have action taken at once. Do you know I get more reports every day in making my investigations in talking with employees than I can handle? I tell you that it goes a long ways. I tell the men whenever they see a condition that is not safe to report it at once. No man going through a factory can see everything, but if your men are working with you and they call your attention to everything that is not right, you are going to get somewhere. I have gotten some wonderful suggestions in this way in carrying on our safety work. I must say that there isn't a thing that I ask of our foremen or superintendents but what I get their fullest cooperation. We always work together.

Wax Figure Stunt

MR. GLEASON (Hammermill Paper Company, Erie, Pa.): We have a special department working directly under the safety director, composed of a foreman and three men who do the safety work. When an employee brings in a report, for instance, that a board is loose in the floor and needs nailing down, the safety director immediately gets in touch with the foreman. He doesn't take it up with the superintendent

and wait for a week, but he gets results the same day. The employe who makes the report in the morning knows that it will be give immediate attention.

Another stunt put on in connection with the safety campaign w had in our plant in March was to have a wax figure dressed up an placed in a cage in the time office where the employees could see when they came in. Inside of this cage we put a sign, "No accide in thirty days," which was the length of the campaign. We had a accident in about 10 days caused by an employee who did not thir a slight injury was enough to fill out a report, and an infection d veloped over Saturday and he didn't come to work on Monday. W took the wax figure out of this cage and placed it in the departme where the man worked. It had a wonderful effect on the rest of t employees. One of the men in that department came to me and sa "You get that damned thing out of this department and don't let come back." That is the way they all felt. They didn't want to s that wax figure in their department.

MR. WM. BATTISON (Champion Fibre Company, Canton, N. C.): W have been talking about employees here. We have a budget that passed at the beginning of the year for the attention of the sup intendent and management and they are trying hard to live with that budget, they are giving special attention to safety, more so th they used to.

MR. BUSH: We had for some time inspections among our workm and we made some improvement in accident reduction. We finally f that we could keep up the interest among our workmen, but we were getting along as fast as we wanted to and so we put the matter safety inspection directly under the supervision of each foreman his own department. Regularly, I thing it is every two weeks, he g a questionnaire which covers many of the points of safety protect in his department, and it is his duty to fill it out and he cannot fill out honestly without really inspecting his department. If our saf engineer finds anything in his department that he has missed th is trouble. He is supposed to take full responsibility for his own saf inspection. This has worked to eliminate accidents and to keep matt straight in our plant more than the inspection work by the employ themselves. We got the employees first, and then the foremen tak hold has put on the finishing touch. Of course, there are many thi that enter into it. We cannot tell exactly who should have the cr for all of it, but our accidents have dropped off more than fifty cent this year since we have adopted this scheme.

Kimberly-Clark Stunts

MR. J. T. DOERFLER (Kimberly-Clark Company, Kimberly, Wis.): keep 870 people working carefully is a difficult task and must be combined effort of every individual in the organization from the down. Do not expect any safety director to put the safety first

into the workers unless the management and department heads back him up 100 per cent. When the men see that the management and department heads are with them for safety, it becomes a movement from the inside out, that is the men will propose instead of the management. I do not mean to say that the management and department heads are not interested, but they must give 15 minutes or half an hour per week to safety first.

In the Kimberly-Clark organization two of the vice-presidents, Mr. Kimberly and Mr. Mahler, have taken sides with the workers in the Kimberly mill, and we all know they are back of the movement 100 per cent, and yet the pep ideas come from the workers, foremen, and down the line.

There must be more than one or two yearly safety first programs as a general rule. There must be more than the usual department heads and foremen meetings. We believe we have received the best results where the employees have participated in these meetings.

The big problem seems to be to keep safety always in the average individual's mind. The same method soon becomes stale and it must be presented in different ways to attract and appeal.

We have tried many ways, and while each had its results they have not been what they should have been. The one that produced good results was the inter-mill contests which are conducted by the three major plants of the Kimberly-Clark Company. One of these plants, the Kimberly, Wisconsin, mill, while making a showing, was not in line with the others. Somebody then suggested, why not a contest within the mill itself and determine which part of the mill has the most safe workers. This was tried, and the results while not perfect were remarkable. I will give you a few figures to show the progress which has been made in the past few years:

Year	Number of accidents	Days lost	Deaths
1916	143	2608	
1917	160	2061	
1918	115	1898	
1919	76	1096	1
1920	71	1100	1
1921	54	1357	1
1922	47	1155	1
1923	34	1150	
1924	6	156	

Commencing January 1 of this year, the Kimberly mill was divided into two sections of about 435 persons in each. Each section elected a chairman through its foreman and each side took a section color, namely, green and yellow. During contests, of which the third is now in progress, there takes place once each week in the club house near the mill a one-half noonday safety program. One week the greens stage a program, and the next week the yellows.

These programs are nearly always staged by members of the green or yellow groups themselves and consist of musical numbers, singing, dancing, acrobatic stunts, etc., but each program has a safety idea interlaced, being a three minute safety talk by a member of the group

or a demonstration of first aid work such as the Schaeffer or Pro pressure method of artificial resuscitation, carrying of injured person bandaging injuries, etc. In this way safety is constantly being place before the men in a new way, and the attendance at these program is such that it is an indication that they like it. These programs a also largely attended by the workers' families and residents of t village who do not work in the mill. We have gone outside of the m and have staged programs for the school children and had them p on the programs. We gave prizes for school children's safety poste of which we received about 150.

Talent of Workers

Another remarkable thing which came out at these programs w the amount of talent which could be found among a group of worke The music, singing, speaking, etc., which we had, we never would ha known existed in these men. We always found the men and girls gl to appear on programs and give their best, as the greens believe th are staging the best programs and so do the yellows.

Group spirit is strong. It is not personal, and all are for the Ki berly mill, but within the mill they swear by either the greens or t yellows. This spirit might be likened to the spirit existing in a colleg they try to outdo each other within but stand solid against any outsi

Everybody is supplied with pins of the mascots of their respect sides and all publicity possible is given. In addition, each Friday three-quarters of an hour there is a meeting for foremen and depa ment heads, at which time conditions in the mill in connection w safety are discussed and action taken to rectify any unsafe conditi

This being a local tryout and being so successful, we believe t for the Kimberly mill we have found the solution as to how to pres safety first to the workers, but, as stated before, it keeps the prese tion novel and interesting, short and often.

We have tried many schemes before and may have to find n schemes in the future, but we do know that the problem can be hand successfully and that there are means of handling it, but over-confide and discouragement cannot enter the transaction.

Sometimes the idea prevails that if a man is continuously concent ing on safety, production suffers. We have found the reverse to the case, for, with the bettering of our safety record there has b an increase in production and better quality with less men. Work under satisfactory, safe conditions cannot help but make more satis employees and with better morale.

We have great backing from Mr. Shattuck, head of the departm under which safety comes. His optimism is always an inspirat also the untiring efforts of our safety director Mr. Hoyman.

Hundred Year Old Safety Man

MR. F. W. JOHNSON (Kimberly-Clark Company, Niagara, Wis.): have a plan in the Kimberly-Clark Company's organization whic

believe was responsible to a certain extent for the safety record of the Niagara Mill located at Niagara, Wisconsin.

The plan is known as the 100 year old safety man (a sort of mythical term) and is explained as follows: Every man in a department whose safety man reaches the age of 100 years, receives five dollars and a safety watch fob. In determining the age of your safety man, you multiply the number of men in the department by the number of days the department has gone without a lost time accident, which gives you the man day record. Then divide this result by 310 (which constitutes a working year) and you will have the age of your safety man. The 100 year old safety man is equivalent to one man working 100 years without an accident or 100 men working one year.

Our lost time accident is one where the man injured is unable to return to work on his next shift and do his regular work.

The progress in the age of the safety man is given to the men weekly on a bulletin called the Weekly Safety Bulletin. This bulletin is also posted in all the other large mills of the organization, thus stimuating the men in each mill to make a better record than the other fellow. I will show you a sample of the bulletin later on.

When you have a department of 30 to 80 men and the age of your safety man has reached around the 60 year mark, the men start to figure the number of days before they will receive the five dollars and in this way safety first is constantly before them. Each man is doubly careful that he is not going to be the man that gets hurt and spoils the record and deprives the rest of his fellow workers from receiving the five dollars. The main advantage of this plan is this, the men soon take a personal pride in their record and they make sure that they are not in for a razzing, so to speak, from their fellow workers in case they should get injured through their own carelessness, because they certainly would get one.

Another attractive point in this five-dollar plan is that every one from the superintendent down to the sweeper shares alike.

To give you a concrete example of this I will refer to the record of my own department and at the same time explain the Weekly Safety Bulletin and some other Niagara mill records.

With a crew of from 65 to 100 men, we went 999 days without a lost time accident to reach the 200 year old safety man and the second five dollars, and up to the date we have gone 1026 days without an accident. We were the second department in the whole Kimberly-Clark organization to reach the 200 year mark, but nevertheless we are proud of our record because of the hazardous work we are constantly doing. We work in all parts of the plant, into all breakdowns which you know are hurry up jobs, build dams, cofferdams, do blasting and rock excavation, move and set up heavy machinery, and all such kinds of work. Our safety director says, as far as he knows, we are the safest maintenance and construction crew in the country. and I hope he is right.

Some companies have tried this plan and say it cannot be don as the goal is too high. Maybe so, but I think if they would sta the way we did, it would be a success. We had practically this sam bulletin in our plants two years previous to the time our safet director conceived the idea of the mythical 100 year safety man. The the original idea was to present to every man in a department whos safety man reached the age of 100 years, a safety fob, but when th first department reached this record, which, by the way, was th finishing room at the Niagara Mill with a record of 530 days wit out an accident, and they had assembled for a little safety spee and their fobs were also presented to them with a brand new fiv dollar bill, from then on the other departments were informed that the could start with their present records or age of their safety man ar work for the five dollar award.

I do not think the men have the money value in mind in this pla but more the record they are making. and I know of several men my own department who have their first five-dollar bill they receiv over a year ago and their second bill which they received Augu 27th of this year, and are keeping them as souvenirs.

Questionnaires

In keeping safety constantly before the men, we have many litt side lines. One stunt we did just a month ago had a wonderful effe with the men. We thought we had the mill and machinery well guard and all dangerous places taken care of, so we wanted to find o what the men thought about it. We sent a questionnaire to eve man in the mill requesting him to fill it out, stating any unsafe pla he had mind and what he recommended. We had 127 questionnair returned which were reviewed by a safety committee composed superintendents and foremen. If the questionnaire was found practic a letter was sent to the man thanking him for the suggestion a stating approximately when it would be done. In the others, if found it impractical, a letter was sent to him thanking him for suggestion and stating that the maintenance superintendent or own superintendent would interview him and go over the suggesti The millwrights were immediately put on this work and it was cleaned up. This is the point: you must cover every questionna thoroughly and see that it is taken care of as soon as possible, a show the men that you are sincere.

In closing I wish to sum up some of the records at the Niagara m since the five dollar award went into effect and which as I stated the beginning, this plan was responsible for.

1. Had the first department in the whole Kimberly-Clark organ tion to reach the 100 year mark.

2. Had the first and second departments in the whole Kimbe Clark Company to reach the 200 year mark.

3. Have had seven departments reach the 100 year mark.

4. Have had two departments reach the 200 year mark.

5. Had only five accidents in the whole plant in 1923.

6. Had only 11 accidents up to the present time this year and have gone 62 days without an accident and the men are all set to beat our best previous record.

7. With the crew of an average of 650 employees we ran from July 14, 1923 until January 8, 1924, without a lost time accident, or exactly 150 working days.

From the above record we have claimed and published the early part of this year in all safety and paper trade journals that we are the safest paper mill crew in the world, and no one has challenged our right to the same to date.

Safety Suggestions

MR. L. C. BONNER (Mead Pulp & Paper Company, Chillicothe, O.): We have a regular form posted at the various departments in the mill that the men can use to turn in a suggestion on, either on safety or improvement; and, if the suggestion turned in is of any benefit, either for safety or improvement in the production, the men are paid for such suggestions. We have a minimum, I believe of four dollars on safety suggestions, up to $10, according to how hazardous the condition seems to be, to the operating committee. We also make regular inspections every two weeks by a special committee, and at that they go over the entire mill and turn in suggestions to the management.

MR. JOHNSON: I have another one that we are trying out. Our employment manager has started what we call the "red spot game." We are going to paint on the places where we had our last year's accidents a red spot. Of course, when the new men come in, they will ask what it is, and the other workers will explain what it is, how the accident happened, and how it could have been prevented. In this campaign we haven't yet gotten to the point where we are telling the men anything. When we began to put the red spots down, the men were wondering and commenced to watch, and in a few days we put down a few more red circles. We have got them guessing. There isn't a man that is not guessing something; somebody calls it an "unsafe place," and they have other things they are guessing. We have got the men interested, and we think it is going to be successful.

MR. BATTISON: We have a similar plan where we put up letters, to be careful of dangerous places, and the men wondered for awhile, but now they are familiar with it, and it is staring them in the face all the time.

REPORT OF NOMINATING COMMITTEE

MR. COCKRAN: We met this morning and nominated Mr. F. H. Rosebush of the Nekoosa-Edwards Paper Company, for chairman; Mr. Norman S. Stone, of the Wausau Sulphate Company, Mosinee, Wis., for vice-chairman, and Mr. W. J. Peacock, Northern Paper Mills, for secretary.

MR. ROSENBUSH: Gentlemen, I wish you would substitute some one else for me. My main reason for asking this is that I have accepted the presidency of the alumni association of the university of which I am a graduate, and I feel that I cannot do justice to both jobs. (On motion duly made and seconded, Mr. M. G. Hoyman was nominated for the office of chairman in lieu of Mr. Rosenbush. The above named persons were unanimously elected to the position for which they were nominated.)

ADJOURNMENT

Petroleum Section

September 30, October 1 and 2, 1924

D. J. WALLACE, Chairman
Humble Oil and Refining Company, Houston, Texas

V. R. CURRIE, Vice-Chairman Producing Division
Texas Company, Houston, Texas

E. D. MURPHEY, Vice-Chairman Pipe Lines Division
Cosden & Company, Tulsa, Okla.

E. A. TIMM, Vice-Chairman Manufacturing Division
Standard Oil Co., New Jersey, Bayonne, N. J.

ROY S. BONSIB, Vice-Chairman Marketing Division
Standard Oil Company, New Jersey, New York City

E. J. SENNE, Secretary
Vacuum Oil Company, New York City

TUESDAY MORNING SESSION

CHAIRMAN WALLACE: The first thing that our program calls for a report from divisional chairmen.

REPORT OF MANUFACTURING DIVISION

E. A. Timm

Your vice-chairman feels that there is a lack of co-operation betwe the officers and members of the Petroleum Section, especially on t part of the members who have, in the past year, failed to take adv tage of the experience and information in accident prevention t could have been had for the asking from the officers of the secti Needless to say that the officers were ready at all times to give best they had.

Personally, I feel that there should be a closer relationship betw the officers and members of this section, and I would suggest t during the coming year every member let his light shine and contrib his mite of information to help decrease the accidents and fatalities, the petroleum industry.

A further suggestion would be to have the secretary of the sect forward a list of those who are members to the various officers v can communicate and keep in touch with them during the year.

Numerous instances arise during the course of year's work in which serious accidents have been prevented, by perhaps a new device or other methods of coping with hazardous work. Vapor lines have been protected, by means of hoods, from a heavy down-pour of rain that otherwise would have caused them to contract and leak, thus preventing a fire and perhaps saving a life, or certain rules and regulations may have been compiled in regards to the hazards of gauging certain oils and crudes such as Mexican and San Pedro crudes and gas oils when made from crudes other than Mid-Continent or Penn. Perhaps the prone pressure method of resuscitation may have been the means of saving a life where it had been taught the men.

Every one of us, I am sure, come in contact with numerous instances of prevention during our yearly work and my sense is that letters and articles advising the officers and members about what we are doing and what our difficulties are will be of interest and a benefit to all, therefore, let each one present today make it a part of his routine duty to forward all such information to the secretary of the section. The secretary then can prepare this data in bulletin form and submit same to the various members of the section for their information and constructive criticism.

In this way we can be of a greater service to the Petroleum Section and also to each other. Without this co-operation between the members and officers of this section I feel that the section will fail to grow, therefore let each one of us do his part to foster and promote a closer relationship between each other.

REPORT OF SECRETARY

E. J. Senne

The last regular session of the Petroleum Section of the National Safety Council was held in the Hotel Statler, Buffalo, N. Y., October 2 to 5, 1923. The meeting was conducted by Chairman Roy S. Bonsib of the Standard Oil Company, N. J., who later was succeeded by Chairman D. J. Wallace of the Humble Oil and Refining Company, the latter having been elected for the 1924 term. The attendance at the several conferences was very gratifying, capacity audiences appearing at each session. Many interesting papers were read and discussions of many subjects pertaining to safety in the oil industry were carried on, and much valuable information and many useful ideas were exchanged. The regular minutes of the meeting were quite fully detailed in the official proceedings, which were published by the National Safety Council and members are kindly referred to the record for further information.

Special mention is made at this time to the matter of membership, and to the very creditable work of the 1924 membership committee, presided over by Mr. J. D. Bright of the Texhoma Oil and Refining Company. Others on his committee included Mr. R. H. Ivory of the

Standard Oil Company, San Francisco; Mr. E. C. Esterley of the At lantic Refining Company, Philadelphia; Mr. G. A. Smith of the Standar Oil Company, Whiting, Ind., and Mr. H. A. Hartzell of the Standar Oil Company, Caspar, Wyoming, through whose efforts the Petroleun Section has increased its membership during the past year over 4 per cent. The present membership indicates 65 member companies of whom 20 subscribed to membership during the past year. We ver recently received a notice from the national headquarters at Chicag commenting on the activities of the Petroleum Section, and the direc tor of the industrial safety division comments that this record o membership is one of which the officers and members of the Petroleu section can well feel proud. It is with much pleasure that we at thi time welcome the new members, and we trust that their associatio with us will prove of mutual interest.

Your secretary wishes to acknowledge with appreciation and thank the cordial spirit of co-operation shown by all officers and membe during the past year, and recognizes the advice and assistance of M Frank A. Epps of the Tidewater Oil Company, who kindly allied himse with the work of the secretary during the past term.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN WALLACE: The nominating committee will consist of M L. W. Evans, Mr. Ray Miller, and Mr. V. R. Currie.

FIRE PREVENTION IN OIL PROPERTIES

Frank A. Epps, Tide Water Oil Company, New York City

Statistical evidence tells us that lightning is the cause of great fire loss to the oil industry than all other fire causes put together. it is my purpose today to tell you how to prevent fires, it is obvio that I must first contend with lightning.

To understand the whys and wherefores of lightning fire preventic it is first necessary to consider the fundamental conditions which most invariably arise in lightning fires. I believe that if each of makes a mental analysis of the tank fires he is familiar with, you w appreciate my statement to the effect that a wooden, or non-gas tig tank roof is almost invariably a preliminary condition to oil tank nition by lightning.

There are several theories regarding the ignition of wooden roof tanks. Undoubtedly there are a number of "direct hits". Expe ments made by the General Electric Company indicate that a tall obj will only draw the direct hits that would otherwise fall within a zc whose radius would be four times the height of the object.

Thus, a tank 30 feet high will probably receive discharges tl would otherwise strike the earth within a circle concentric with t tank but 120 feet greater in radius. With an understanding of t

point you will see that the tank, of itself, even though highly conductive to electricity, does not draw direct hits from lightning to any appreciable extent.

The evidence at hand indicates that a large proportion of tank fires attributed to lightning are caused in an indirect manner. It is commonly accepted that a column of gas vapor ascends from such tanks at least several hundred feet into the atmosphere. Lightning when flashing through this vapor zone is presumed to cause a flash-back to the tank.

If you will consider with me the facts of the case, I think you will agree that it is highly improbable that a tank would be ignited in this manner. In the first place, the vapors from crude oil and gasoline are largely pentane and hexane, with perhaps smaller portions of propane and butane. All of those gases are from one and one-half to three times heavier than air, and in consequence thereof it is not probable that they would rise to any extent. Secondly, a thunder storm not accompanied by more or less wind is unusual. In fact the production of wind is part of the storm itself. Any wind or breeze would very rapidly dissipate the column of gases which might be hovering above the tank. Thirdly, even assuming the gases would rise, it is not probable that a mixture rich enough to propagate flame would extend several hundred feet into the atmosphere. But even so, the thunder cloud is usually from 2,000 to 5,000 feet above the earth, and this being true of what account would be a column of vapor a few hundred feet high.

It is much more likely that the lightning strikes the ground in the vicinity of the tank, and the heavy vapors trailing along the ground in a rich enough mixture, flash-back to the tank itself. But here again the wind and breeze serve to dissipate and diffuse the vapors quickly.

We have all been around such tanks. Do we usually detect odors of hydro carbon gases in the vicinity? No, we do not. While this is not conclusive evidence of the non-existence of an inflammable mixture, still it is a very fair indication that any vapor air mixture which is present, is too lean to propagate flame. To my mind this refutes the theory of flash-back from the ground—except in exceptional cases where distinct gas pockets are known to exist.

"Induced Charges"

In all probability ignition takes place through what is known as an "induced charge". You have often heard of a man being knocked unconscious, or being shocked by lightning as he stood under a tree which was struck.

You can hardly fail to appreciate that not the faintest part of the bolt of lightning which struck that tree touched the man. He was shocked by an "induced charge". We know that positive electricity attracts negative and vice versa. A cloud overhead, charged with

negative will destroy the electrical equilibrium on the earth beneath by attracting charges of positive electricity to the tops of promontories on the earth. The man standing under the tree had a heavy positive charge drawn to the top of his head. When the cloud discharged to the tree the attraction upward for the electricity in the man's head no longer existed, and it immediately rushed back to earth to restore equilibrium. The man was thereby shocked by the current passing through his body. On a woden roofed tank covered with sheet iron the respective sheets of same not being well bounded together, the same thing happens only the electrcity in rushing back to the ground jumps over a joint between two sheets not bound together, and produces a spark. This spark is produced right where a rich mixture of gas exists and it need only be a few hundredths of an inch long to fire the contents of the tank. This is, I believe, the true explanation for the ignition of so many wooden roofed tanks.

At first thought, it is remarkable how few steel roofed tanks are ignited by lightning. Occasionally, we hear of one. Certainly the steel roofed tank is not less subject to being struck by a direct hit than wooden roofed tank. Undoubtedly lightning actually strikes a great many steel roofed tanks and we hear nothing about it. The discharge is immediately conducted to the ground by the great conductivity of the steel roof and the shell of the tank. If the tank has no holes in it that is, if the different hatches are closed and the vent is properly protected with a fire screen, an all steel tank is really a very safe porposition. Experimentally demonstrated it is impossible for a spark to be produced within such a container by any external electric manifestation. I am confident that every steel roofed tank fire caused by lightning can be traced directly back to an open gauge hatch, open manhole, defective vent screen or other non-gas-tight condition which vapor was ignited outside and flashed back to the interior of the tank. I do not believe it is possible to set fire to an all steel gas-tight tank by lightning and I actually know of one case where lightning was seen to strike such a tank and no ignition resulted therefrom. To prevent tank fires from lightning I am satisfied that it is only necessary to provide gas-tight all-steel construction and supply reasonable maintenance. Specifically then, we safety engineers can urge our companies to make their tanks gas tight, and then our inspectors can aid in maintaining them so.

Another cause of tank fires is exposure to other fires, but again let me point out that here also the wooden roof is the primary evil. The gas-tight, steel roofed tank will withstand very severe conditions of prolonged exposure. Instances can be cited where such tanks have been surrounded for hours by blazing seas of oil, and except for the loss of paint and distillation of some oil, there has been no damage. Under such conditions a gas-tight tank will act like a large still, and the vapors produced will burn from the vents like huge torches.

Tank Exposure

The subject of tank exposure, both to adjacent tanks and adjoining property has been the source of much difference of opinion between certain of the fire insurance interests and the oil companies. The whole story is too long to relate as it had its beginning as far back as 1913. In substance, however, most of the discussion has arisen since 1920 when the regulations of the National Board of Fire Underwriters applying to oil containers came up for revision. It is still unsettled. The American Petroleum Institute has performed yeoman service in collecting information, opinions and experiences from the oil industry from coast to coast. Branch advisory committees of oil men were formed in every section of the United States to study the situation. As the result of this very extensive investigation the American Petroleum Institute submitted on behalf of the oil industry their findings—to the effect that gas-tight steel tanks need not be spaced further apart than one tank diameter shell to shell to provide every reasonable and safe precaution against the exposure hazard. This conclusion was substantiated by numerous cases of actual fires.

The fire insurance interests, however, could not agree to that proposition; at least as far as adjoining property was concerned. A compromise was reached which divided oils into three general grades according to volatility and provided distances to adjoining property equal to 2, 1½ and 1¼ tank diameter depending upon grade of oil, with maximum requirement of 175 ft., 150 ft. and 125 ft. distance respectively for each of the three grades. Tank to tank spacing was permitted to remain substantially as recommended.

When this compromise was presented to the convention of the National Fire Protection Association a serious debate was raised by other fire insurance interests with still more conservative views, with the result that the matter has now been referred to a special arbitration committe for decision.

Unfortunately the numerous cases of non-gas-tight tanks being ignited, and the crude oil boil-overs following certain of such fires have produced vivid impressions in the minds of many people of the ease with which an oil tank is ignited and the consequences following such ignition. An oil tank is regarded as a veritable bomb and a menace to the entire community. As a matter of fact, the gas-tight steel roofed tank is an entirely different breed of cats, and the few scattered instances of fires in such tanks indicate that oil so stored is a far less fire hazard to adjoining property, than almost any other kind of structural exposure that can be erected. In view of this the extreme penalties of isolation imposed upon oil tanks, certainly should not be made to apply to this safe type of tank construction, which is to the non-gas-tight tank, as the most modern reinforced concrete fire resistive building is to the frame shack.

At our meeting in Buffalo last year Messrs. Naylor and Ramsey of the Atlantic Refining Company presented us with a paper on static

electricity. They gave us some very interesting information on the production of static charges caused by streams of oil falling into a tank. It was demonstrated that a spray of falling oil under certain conditions, could produce extra-ordinary electrical discharges—sparks several feet long. I have found this to be a rare source of fire. It is a hazard, however, which may be removed by merely submerging all connections which discharge oil into the tank. The over-shot connection is a serious offender as regards evaporation loss besides being a fire hazard. There is no particular reason for its existence and all connections of this type should be corrected.

Static

A very unusual case of static was called to my attention last winter. A certain large oil company was engaging in the process of steaming out a tank. It was a steel-roofed 55,000 barrel tank with steel supporting members. A 1½ inch steam line had been discharging into the tank for about three-quarters of an hour when an explosion occurred, blowing off the roof of the tank and igniting the non-gas-tight tank next to it. about 10 feet away. It is of interest to know that sufficient gas remained in the 55,000 barrel tank after it had been steamed for three-quarters of an hour to permit the fire to burn for a period of three minutes. The adjoining tank contained gasoline and was extinguished with the foam system. What is of great interest, however, is the cause of the fire. Subsequent experiments in an empty tank proved that the steam jet unquestionably generated a great deal of electricity. A corona discharge was observed all around a similar jet in a darkened tank. Luminescence appeared at tips of fingers of individuals approaching near the jet and from objects pushed within the zone of the steam discharge. It is of interest to know that Lord Armstrong many years ago, developed an electro-static machine which consisted merely of a row of spikes which acted as a collector, and a steam jet. With this device Lord Armstrong was able to draw electric sparks from 5 to 6 feet long. This subject of steam as a static producer was also brought to our attention last year by Messrs. Naylor and Ramsey, much to our interest at the time. Just what condition obtained which caused the ignition of the 55,000 barrel tank referred to, is not known. It is possible that the steam jet discharged against an insulated upright roof support, or it is also possible that a miniature thunderstorm was caused within the tank by the steam jet, the rapid condensation of the steam and formation of drops of water being analogous to conditions which develop in a thunder shower. The extreme rarity of such fires is proof positive that the hazard is very small. Of course, it is evident that the steam hose should be properly grounded and that the steam should not be blown directly against any supporting members of the tank roof.

It is remarkable how few tank fires are caused directly by carelessness. Only once in a great while do we hear of a tank fire being caused by the match or smoking hazard. Occasionally, gross carelessness with welding torches is the fire cause. In one instance, that I am

familiar with, an employee cut into an overhead run-down line with a welding torch about 200 feet away from the run-down tank. Fire flashed back through the pipe and that ended the career of that tank. One classification of tank fires in particular has been of considerable interest to me during the past year. Because of lack of evidence it seems proper to classify these fires as of unknown cause. It is possible that some manifestation of static may be the cause in certain cases, but in most of these cases nothing that we know about static and the conditions under which it is produced, would apply. I believe that spontaneous ignition is the answer, at least occasionally. We all know that in tanks containing cracked distillates, or crudes of high sulphur content, there is a considerable formation of sulphur deposit on the under side of the tank roofs. I have had some samples of this material analyzed and have found it to contain free sulphur, organic sulphides, iron sulphide and iron oxide. It is definitely known that iron sulphide when freshly formed is pyrophoric, that is, it will greedily absorb oxygen until it becomes heated to the point of incandescence. We know that the gases given off from cracked distillates and high sulphur crudes contain hydrogen sulphide and organic sulphides. It is probable that these gases react with the bare iron, or iron rust incrustation on the inside of the tank to the extent of producing under certain conditions a considerable amount of iron sulphide. It is then supposed that this material absorbs oxygen and reaches a glowing temperature, at which temperature it may burst into flame and ignite the explosive vapors in the tank. The fact remains that tanks are set afire now and then for no reason whatever except that which might be explained by the information just presented.

Naturally, you are interested in knowing what can be done to prevent the occurrence of this spontaneous ignition. In reply to that question I will honestly say that I do not know that it can be effectively prevented. It appears to be one of the hazards of the oil business. Fortunately it does not happen often. The only remedy I know of is regular cleaning, scraping, and painting of the interior of tank roofs and structural members inside of tanks where this formation occurs.

Tank Construction

There is one detail of tank construction that has a close bearing on fire prevention, and to this I desire to make allustion. I wonder how many of us realize that vent screens, as usually installed and maintained, are quite ineffective as flame arrestors. Unless a systematic method of inspection of vent screens is pursued, it is probable that a large percentage of the vent screens at any location will be found to be defective, that is clogged or corroded through. In some locations, particularly on tanks containing sour distillates, I have found that it is necessary to renew the vent screens as often as once a month. A monthly inspection should be maintained on the vent screens in every tank and where the gases coming from certain grades of oil are particu-

larly corrosive, this inspection should be made at least once every two weeks.

Metal vent screens will arrest flame only by reason of their ability to conduct the heat away very rapidly to adjacent solid metal parts thereby preventing the formation of ignition temperature in the other side of the wire screening. If the distance from the central part of the wire screen to solid metal is too great, a single thickness of gauze will not serve, but a double or triple thickness is required. Beyond certain dimensions even a triple thickness of wire screening is unsatisfactory. All of this was demonstrated by the Underwriters Laboratories of Chicago, Ill., in a far reaching investigation made by them in 191 in conjunction with the E. I. du Pont de Nemours Company. According to my interpretation of their results, in order to provide enough venting area and still have the screen dimensions suitable, it is necessary that a number of small 2" diameter screens be provided or that the wire gauze screen be clamped between a grill work of heavy metal and that the ports in the grill work should not exceed the area of a 2" pipe. Single sheets of wire gauze 6" to 18" in diameter as will be found on many old tanks today are inadequate as flame arrestors.

Now, I wish to say a few words about extinguishing fires.

After a tank fire starts there are two methods of fighting it, the first is with steam and the second with foam. Steam as it is normally applied is not effective unless the roof remains on the tank which it usually does not. Tank fires usually start with an explosion, and then off come the roof. In such cases if steam is applied through one or several pipes at the shell of the tank it is absolutely ineffective. Steam is of value however, in preventing the ignition of exposed tanks nearby.

To extinguish the average oil tank fire there is noly one agent which is tried and proven. That is foam. I do not intend to dwell on the essentials of the successful application of foam. I do not know of a single instance where a foam system, designed in accordance with accepted standard, maintained in proper condition, and operated with fair judgment has failed to extinguish a tank fire.

Other Methods of Handling Tank Fires

Other methods of handling oil tank fires have been and are being developed. I refer to the use of water, carbon dioxide, and carbon tetrachloride. These methods as yet in my opinion are in the development stage. They do not have any record of actual fires to prove their merit. They work alright under test conditions but may I say that a "test" tank fire is a very unsatisfactory way of proving what will happen in a real fire under the conditions imposed by an initial explosion or a driving storm.

Next to tank fires, the most frequent and expensive fires are those which occur in stills. It is not realized that of all the fires which occur in oil properties, perhaps 50 per cent of the total number occur in the distillation process. Most frequently these are small fires

and are caused by small oil or vapor leaks. They are extinguished with hand extinguishers, steam jets, water hose, or by "pumping out" the still, with negligible loss. Occasionally, however, something lets go, a still cracks open, a high pressure drum explodes, or an oil line breaks and a conflagration is started. The wonder of it is that such fires are so few. The least leak, defect or wearing out of any part is almost certain to cause a fire. Only continual inspection and expert operation will prevent still fires. However, a great deal can be accomplished in providing facilities to prevent the spread of such fires, and means for controlling them rapidly under the severest of conditions. Feeling that this phase of my subject is of considerable interest to most of us, I will outline some of the more important features of this problem.

In the first place fire walls 24" to 30" high should be provided around every battery of stills as far as practical. It is usually possible to use the near wall supporting the condenser boxes as part of this surrounding fire wall. This has the double advantage of economy, and subdivision of values as it places the condensers outside of the fire wall. To protect the condensers further, and to protect any towers which may be mounted over them, a fire barrier of brick, tile, asbestos board, or sheet steel, (the latter equipped with water sprays), may be erected from the ground up, adjacent to the condensers, all openings in it being protected with standard fire doors. This forms a splendid fire barrier, protects the condensers and towers and gives advantageous position to those who may subsequently have to fight a fire there.

As far as practical by means of fire walls, it is further desirable to break up the fire areas in and among the units of any battery of stills so that a flood of hot oil pouring from a break will endanger as few adjoining stills as possible.

Particular attention should be paid to the method of supporting vapor lines, flow lines, charging lines, in fact all oil and vapor lines. Most frequently these pipe lines are carried overhead on unprotected structural steel work. Any severe fire will bring them down in short order, often even before effective fire fighting can be commenced. These oil lines may drain other stills, and the additional fuel added to the blaze may cause it to become uncontrollable. All supports for such lines should be protected with material known to have at least a three hour fire resistance period.

Handling Serious Still Fires

One of the simplest and most effective ways of handling a serious still fire is quickly to pump out the burning still and those which are menaced. Therefore, the importance as a fire protection measure of having large pumps for this purpose and large pumping-out lines is apparent. But it is essential that the pumping-out valves shall be equipped with remote controls that so they can be operated safely and surely—usually from in back of the condensers. Likewise, to pump out a still

the tar plug, if there is one, must be up. As tar plugs habitually stic it is desirable that the still be run with these plugs in open positior reliance for closure of the pumping out line being placed on the pum ing-out valves, which may be in duplicate. Remote control and frequer inspection of the tar plugs should likewise be provided so that they ma be operated surely and quickly from a safe position in case of eme gency.

Glass guage columns are serious offenders. It is most often impossib to use the custmary safety ball-check valve for these gauge glasse The ball checks corrode or coke up and will not operate. Where gauge column is necessary, a pipe column fitted with closely spaced p cocks is safe, if in addition, the gauge connections to the still are fitte with well designed lever operated globe valves, the levers being he in open position by a chain and fusible link.

A great many still fires are the result of carelessness and are caus by pumping over when charging, or permitting water to get into t charging stock thereby causing the still to froth over. Improper inspe tion or testing of safety and vacuum valves, clogging of traps and r back lines are all hazards, which may be relieved by proper inspectic In high pressure stills, particularly, the importance of inspection doubly significant. I do not believe it is generally realized how hi temperatures affect the tensile strength and physical properties of t metals used. I have investigated this problem and believe a few of t findings may be of interest. Ordinary steel plate becomes very brit in the two temperature zones—200° F.-400° F., and 800° F.-1,000° The ultimate strength of steel increases up to about 400° F., at wh temperature certain grades of steel actually become 40 per cent strong than at ordinary temperatures. At 700° F. the steel has about the sa ultimate strength as at 70° F. At 1,000° F. it has lost one-half of initial ultimate strength. The elastic limit, however, which sho determine the design and strength of parts rather than ultimate ten strength does not increase materially above its initial value. At 600° the elastic limit is only one-half of its vaule at 70° F. At 900° F. has fallen to one-third.

It is usual to measure the thickness of the steel in different p of a high pressure still at regular intervals because the hot oil ap ently erodes the steel until it becomes quite thin. Naturally, si steel is much weaker at the working temperatures of high pressure s than at ordinary temperatures this matter must be watched very c fully and worn parts must be replaced before they become dangero thin, due consideration being taken of the elastic limit of the stee the working temperatures of the still.

As with tank fires, the most effective medium for handling a ser still fire is foam—applied this time through hose streams. At one large plant that has had a very successful record in handling still fi the superintendent told me he would not permit a drop of water t used on such a fire. Unless water is used very carefully around a

it may very easily crack a hot fitting. We all know that water is not effective in extinguishing burning oil—that it acts as a vehicle for spreading an oil fire. However, it is of advantage in keeping structural steel work nearby cool. For this reason I feel the cautious use of water in keeping things cool until the foam system can be brought into action is advisable. Then, it is my opinion that the use of water should be discontinued and that the foam hose streams should be used. As the simultaneous application of water and foam will result in the water breaking down the foam it is apparent why this course should be pursued.

Plant Fire Brigades

An obviously important factor in dealing with any fire, is the plant fire brigade. No matter how small the plant or station, the men who may be called upon to fight fires should be trained in what to do and how to do it in the emergency of fire. Where the plant is of sufficient size a definite military type of organization should be formed headed by a fire chief who has good judgment and is a quick thinker, who knows the plant intimately from one end to the other, whose strong personality enables him to dominate such a situation and secure action and cooperation from his men. Each man on his force should be drilled regularly and instructed in everything he may be called upon to do. His assistant and battalion chiefs should be of the same general calibre and be fully able to assume charge if necessary.

The brigade should be organized, drilled and maintained with the idea that fires shall be controlled immediately at their start, so far as possible. The nearest man belonging to the fire brigade should give the alarm immediately. The local captain in the area should take immediate charge. He should proceed to get the other men to work on the fire using local first aid apparatus, make sure that an alarm has been turned in, and delegate men previously selected to attend to the salvage work such as saving stock.

Certain men should be delegated to remain in their several departments, closing fire doors, shutting down power, closing fire shutters, skylight, and taking other necessary precautions to guard their particular departments in case the fire should spread. This is a fire drill item that is most frequently lost sight of.

Drills should be held once a month during paid time. The location of drills should be changed each time so that the men will become familiar with all conditions and parts of the plant. The handling of apparatus should be thorough in every respect and approximate actual fire conditions. The drill should embrace the operation of portable apparatus, the making of hose connections with hydrants, unreeling and stretching hose without kinks, coupling and uncoupling, carrying hose up ladders, over roofs and through the interior of buildings, reaching inaccessible and out-of-the-way places, including basements, attics, etc. It is important that the men should become proficient in holding play pipes, also carrying hose lines while under pressure. As a general rule, water

should be turned on for all practice work, except during freezing weather. Certain men should be assigned to the definite duties of shutting off fuel oil and gas mains in case of emergency. Others should be instructed in methods of resuscitation.

The crews selected to operate fire pumps, foam systems and other special apparatus likewise should be drilled regularly in their duties by the fire chief. The watchmen and night forces should also be organized and drilled. And so, a great deal of invaluable time can be saved having these men fully trained for this emergency work.

It is impossible for me within the brief period allotted to this paper to discuss the many common fire causes, and the proper means for safeguarding them. Construction of buildings, subdivision of fire areas within buildings, external exposures and their reduction, installation of electrical equipment, heating equipment and power equipment, fire protection equipment from extinguishers to sprinkler systems and fire prevention education, are all matters of vital importance to the fire prevention man. Most of these items are well covered in publications issued by the National Fire Protection Association, and the National Board of Fire Underwriters. I strongly recommend that you secure these publications if you do not have them already. I am sure you will gain many helpful hints from them.

Three Lines of Fire Defense

If there is any thought above all others that I want to leave with you, it is that fire prevention is principally a process of checking up

Fires can be prevented. To do it we only have to form and continually check up three lines of fire defense, which are:

First—Not allowing fires to start.

Second—Minimizing combustible material and making construction such, that if fire does start it cannot spread.

Third—Extinguishing fires that do start and spread in spite of our best efforts.

It is dangerous to rely solely on the third and last line, but that is what most of us are doing. Fire cannot be driven back of our front trenches and kept back unless we strengthen and maintain these three lines of defense.

Fire prevention, unfortunately, is not an issue which earns money. It may prevent money from being lost, but it does not bring money in; it is negative rather than positive. Work done and money spent toward fire prevention do not aid in paying dividends, except in a negative sense. Consequently, the operating forces of many properties to which this important matter is delegated, while admitting its importance, very frequently do little in that direction. Production claims their attention all other matters are secondary—and in this list falls fire prevention

Fire is no respector of persons or organizations. It recognizes only a high standard of property maintenance and due care in the elemination or safe-guarding of hazards. We all know that some properties maintain high standards of upkeep whereas others are slip-shod and indifferent in this respect. Since it is evident that a uniformly high standard is necessary, it follows that for any large organization it is needful for someone to make it his business to set such standards of fire prevention and maintain them. Furthermore, in the oil business where there are so many fire hazards not to be found in other industries, the importance of continual study of operating conditions, of actual fires and their lessons and of new equipments and methods for controlling fires is of paramount importance.

It is a peculiar fact that of all industries, the oil business has been the last to recognize what can be accomplished by a uniform, systemmatic attack of the fire problem and of the advantages to be derived by centrallized and continuous effort in this direction. In this connection I am informed that 22 years ago the United States Steel Corporation was having fire losses which averaged $800,000 per year. Today by systemmatic continual effort these average annual fire losses have been reduced to about $300,000 per year. A 62 per cent reduction amounting to an annual saving of half a million dollars. In the meanwhile the properties of the Steel Corporation have multiplied several times in value and extent. A large public service corporation in New York has reduced its average annual fire loss to about 5 per cent of its original magnitude in a period of approximately 20 years of systematic fire prevention. So after all fire prevention does assist materially in paying dividends. In the oil business today comparatively few companies have undertaken a direct plan of attack against the fire problem. This problem still remains in the hands of the operating forces of individual properties, who are fundamentally oil men and not fire protection men. Uniform and accepted methods for handling this or that matter, which methods have been developed by our country's foremost fire prevention engineers are frequently unknown to these oil men. Consequently the fire prevention practices followed are often inferior to standard practics recommended by such institutions as the National Board of Fire Underwriters and the National Fire Protection Association. Standard methods and equipment could have been provided for practically the same initial expenditure. Most companies provide for the maintenance of their fire equipment, but the most important items of fire prevention maintenance such as are found in our first and second lines of defense are not studied or safe guarded as they would be by a fire prevention specialist. Fire prevention, in its true sense must begin and is confined largely to these items. Maintenance and provision of fire protection equipment alone only provide that this equipment will be ready to fight a fire when the fire occurs. They do not prevent the fire, nor do they structurally prevent the fire from spreading.

A few years ago the company with which I am connected, organized a Fire Protection Department. To obtain an accurate understanding of

the conditions existing at each property, an original survey was mad of every building, tank, still, agitator, loading rack, etc. All the detai of construction, occupancy, internal and external exposures, fire hazar and fire protection were considered. As a result of these surveys, d tailed recommendations for the improvement of unsatisfactory cond tions were made and submitted to the Operating Managements, a followed through to a "yes or no" decision. Since that time, re-inspectio have been made of each structure covered in the original survey periods varying from three to twelve months for the purpose of detecti new hazards, and checking up on the former ones. This departme further has collaborated with the engineering and purchasing depa ments in the development of proper designs and specifications for fi protection materials and installations, thereby making use of the be materials and practices available. Reports of fires, no matter h small, occuring on our own properties are collected and analyz Information and lessons obtained therefrom, which are of value, a distributed to those interested. Educational work is carried on by mea of bulletin boards, direct contact, and through the mails. Outside fi are investigated when they appear to possess items of special inter and the lessons learned are likewise made use of in our own conditio

It is too soon to forecast what will be the ultimate saving to t company through this work. A severe fire may occur tomorrow spite of our precautions. It may be said, however, that with the remo of many fire causes, with the improvement of structural fire-resist conditions and fire fighting facilities, and with a keen interest in fire p vention on the part of the operating personnel aroused and kept arou our chances of severe loss have been considerably reduced and sho continue to grow less as the work further advances, until the limit improvement is reached—at which time, as with accident prevent the problem becomes one of maintaining the headway accomplished preventing retrogression.

In its final analysis, fire protection is a problem of administration organization. This important work must be properly organized, t oughly studied, conscientiously executed, and last but not least, insp by attention from the Management if it is to achieve its deser success.

THE RESPONSIBILITY OF THE PETROLEUM INDUST FOR SAFETY

W. R. Boyd, Jr., Assistant General Secretary, American Petorleun Institute, New York City

When we are sick and send for a doctor we usually expect to get that has, at least, been taught medicine. There is no need for m tell you that you will not now hear from a safety "doctor." You soon discover it. Perhaps the only excuse the makers of this pro can offer for asking a layman like me to talk about safety is bec

the nurse's chart does not indicate that the petroleum industry is really very sick or, in other words, that there is not a great deal of fault to be found with us. Certainly we do have, relatively speaking, a remarkably low percentage of accidents as the result of the handling and use of crude petroleum and its refined products.

In 1923, 24,437 wells were drilled in the United States in the search for oil. 16,279 wells found the oil, 8,158 did not. A total of 290,000 wells operated and produced, in 1923, 732,407,000 barrels of crude oil of 42 gallons each. This oil either went to refiners for manufacture or into storage tanks. No accident figures for the country are available, so far as I know, but it is common gossip within the industry that consequential accidents in the production of crude oil are comparatively few and far between.

In 1923 there were in the United States 564 refineries capable of running through their combined stills a maximum of 2,930,000 barrels of crude oil per day. Actually 581,000,000 barrels were run to stills out of which the refineries manufactured 7,556,000,000 gallons of gasoline, 2,349,000,000 gallons of kerosene, 12,074,000,000 gallons of gas and fuel oil, and 1,097,000,000 gallons of lubricating oil. The rest went into miscellaneous manufactured products such as distillates, wax, coke, asphalt, etc. My information is that the oil refineries of the country are alive to the safety problem, that they have provided modern and approved safeguards and protective devices in their plant, storage and loading operations and that in many of the plants safety organizations of one kind or another function for educational purposes.

Perhaps the greatest number of accidents incident to handling petroleum products might be expected to arise in the transportation from refineries to distribution points. Gasoline and the other inflammable products move freely in bulk about the country in tank cars. These cars are subjected to rough railroad usage and necessarily are handled in transit by train and switching crews more or less inexperienced in the handling of these products. The industry feels its responsibility. Roundly 130,000 of these especially designed and adapted tank cars are engaged in moving petroleum and its products over the railroads of America. These tank cars are not railroad property. They are owned and operated by oil companies or by tank car companies serving the oil industry. The construction of the cars and the loading, unloading and safe operation of this traffic in transit is done in accordance with rules for safety made by the Interstate Commerce Commission in pursuance of a special Act of Congress.

In 1923 there originated on Class I railroads a total freight revenue traffic of 1,277,318,731 tons. Of this tonnage crude and refined petroleum products amounted to 44,736,958 tons or 89,473,916,000 pounds. In point of accidents within the year the carriers experienced train and train service accidents numbering 81,967 which killed 6,922 and injured 54,464 persons. Only 327 of these accidents in any way involved petroleum products.

For the three-year period, 1919-20-21, petroleum products was 3.53 per cent of all the traffic but the percentage of accidents in any way involving our product,—whether due to collisions, wrecks, carelessness, defective equipment or what not,—of all train and train service accidents was only 33/100 of one per cent, the percentage of killed 17/100 of one per cent, the percentage of injured 46/1000 of one per cent.

When one considers the extremely low ration of these accidents to volufe of traffic and the fact that these tank cars traveled loaded with inflammable products under all kinds and character of railroad transportation conditions, between six and seven million miles within a year, surely the industry can be permitted to point with pride to its record for safety in the transportation of its products.

Recently, I looked over an interesting book entitled "Symbol of Safety." It was the story of the evolution of the Underwriters' Laboratories. In Chapter One, the author reminds us that man was not man until he began to meddle, to seek to change the conditions that he found about him, but that out of this meddling or experimentation with nature grew science and civilization.

Dangers are Involved in Progress

Through the forces of invention and discovery the world moves forward, makes what we call progress. But there are times when the two are in conflict. Men have meddled with nature to improve human living conditions but in doing so they have exchanged the few natural hazards of our early ancestors for a bewildering number of man-made, artifically created dangers.

Science manufactures her products to serve the human race but in the process she also turns out destructive by-products which endange and imperil the limb, life and property of those in whose service she is engaged. The by-products annually take their formidable toll of life and property. Unfortunate as it may be, in truth this seems to be but another way of saying that the marked increase in loss of life and in bodily injury through accident is but one of the inevitable result of the world's material progress.

We cannot be discouraged at the result of effort, organized or otherwise, to promote and secure the observance of safety, but frequently it seems that whatever man does today to make warfare upon hazar that he, with his new development and its resultant by-products, counte acts tomorrow. The rising tide of inovation and of material progres makes it next to impossible to reduce safety to any mathematical formul We can state principles but it is an immortal cinch that no man ca make or standardize the specifications.

A man's judgment is no better than his knowledge. Some one h observed that, theoretically, no man should ever be allowed to hold job beyond his mental capacity. There are certain kinds of hazar than can be met by men possessing the knowledge which comes throug

education and experience but there are also certain kinds of men who do not readily assimilate information and there is also the kind of men whose experience and familiarity with hazard and risk merely seem to breed contempt for it.

I must not pose as a "safety doctor" but in my judgment the foundamental answer to the whole safety problem in a nutshell is the adaption of safety education and regulation to human nature as it is and as it always will be. The enormous number of known accidents in the United States in a given year is substantial proof of the age-old expression "you can lead a horse to water but you cannot make him drink."

In the development of the thought I am giving you today I have been thinking in terms of an industry's economic responsibility for safety. We may assume that modern management is both human and humane and that as such it is concerned about safety for employees and for public equally with its employees and with its public.

The basis of trade, commerce and industry is strictly economic. Competition is the essence of business. It is that inexorable force which promotes material growth and progress, invention, development, efficiency. It is that vital factor which imposes standards and forces their observance. Men seek, competitively, the best possible return upon their investment no matter whether that investment be in the form of ability to work, of money, of machinery or of materials.

Economically speaking, every man produces something for human consumption or to supply some human want and he must meet competitive standards in efficiency and in economy in his use of effort or of capital in whatever form it exists. Therefore it is elemental that the higher the degree of industrial safety, physical and economic, the greater the ratio of efficiency, economy and returns. It obviously follows that the converse of the proposition is also true.

Safety is an Important Factor in Petroleum Industry

The risk of physical injury, of the loss of life and property is an ever-present element in all business enterprise. Due to the inherent nature of our product this risk is magnified in the petroleum industry. Under given conditions there is danger in the handling and in the using of any volatile and inflammable liquid. Under all ordinary circumstances and with the exercise of proper care and common sense petroleum products are handled and are used with perfect safety. Some of our risks are calculable and therefore it is proper that safeguards should be erected to minimize them, some are inherent and some are ineradicable.

The petroleum industry expects and plans to assume the responsibility for those risks which regularly occur and are calculable. No industry should be penalized for risks which are irregular and which cannot be reduced to any law of recurrence. If it is proved, statistically, that

when a large body of losses are taken together, the per cent of los is not unreasonably high and is relatively and fairly regular, then th risk is calculable. This is the principle upon which insurance i founded. The economic point of view allows a maximum calculabl tolerance as distinguished from the theoretical point of view whic expects one hundred per cent perfection.

In theory everything ought to be safe. In fact nothing is safe. Huma kind wants to enjoy the fruits of material progress. The great loss o life, limb and property is part of the price we pay. Each year th world spends some two hundred million dollars for matches. This mean four trillions, six hundred and seventy-five billion, six hundred and fift million matches to go up in smoke every year, according to the Pres dent of the American Tree Association. What a tremendous toll in los of life, personal injury and through fire is charged to the humble match What potential power to injure mankind and its property exists in th annual production of this necessity! Yet no man would destroy th match industry, because it is an economic necessity and the service renders far outweighs the evil.

Lightning killed 425 persons in the United States last year. Ma made electricity takes its annual toll. Hundreds are drowned. Hu dreds stub their toes, fall and are killed or injured. Locomotive engin and trains take their enormous pound of flesh. The automobile is prolific instrumentality for killing and crippling men. Yet the vehic itself is harmless. This reminds me that some wit has suggested th in a few years states will be paving their streets and highways wi banana peels. This would make travel reasonably safe. The traveler tourist could slide wherever he went. One could slip over fro Louisville to Cincinnati in a few minutes. Of course he would be bruis and black and blue but the wit suggests that he would save money spending the nights in emergency hospitals instead of in hotels. Th would be a good idea because one could carry along his own banan and where roads are unpaved he could quickly do the surfacing. T moral is, of course, that a banana peel is not dangerous until man h meddled with or in other words until he has emptied it.

Hazard, peril, danger besets, encompasses, hems in the human ra Someway, somehow the most of us live. Some of us manage to esca serious bodily injury. At most we can but do our best to minimize t risks and trust to Providence to do the rest.

The National Safety Council is to be congratulated upon the creati of a Petroleum Section, and I am certain that it may depend upon t cooperation and support of the great industry which I am trying speak for today. Self-preservation is the first law of nature. Serv to mankind follows a close second. Our industry wants to live and serve. The warfare against hazard marks milestones on the road progress and you may be certain that the men engaged in the petrole industry will not be among those who cast stumbling blocks in pathway.

WEDNESDAY MORNING SESSION

CHAIRMAN WALLACE: Suppose everybody tell who you are and who you are with:

J. I. Banash, consulting engineer, International Acetylene Association, Chicago, Ill.; Carl Barker, superintendent insurance tax & claims, Roxana Petroleum Corp., St. Louis, Mo.; H. W. Boggess, manager, liability department, Sinclair Companies, Tulsa Division, Tulsa, Okla.; R. S. Bonsib, chief safety inspector, Standard Oil Co.(N. J.), New York City; W. R. Boyd, Jr., assistant general secretary and counsel, American Petroleum Institute, 15 West 44th St., New York City; J. D. Bright, assistant secretary, Texahoma Oil & Refining Company, Wichita Falls, Texas; Glenn Byers, manager, employment & safety department, Roxana Petroleum Corp., St. Louis, Mo.; A. W. Cleaveland, insurance manager, The Pure Oil Company, Columbus, Ohio; C. L. Colburn, mining engineer, U. S. Bureau of Mines, Pittsburgh, Pa.; Joseph A. Holmes Safety Association; Geo. B. Cooke, safety engineer, Standard Oil Company of Louisiana, Baton Rouge, La.; V. R. Currie, general supervisor, employment and service division, The Texas Company, Houston, Texas; Frank A. Epps, manager, fire protection department, Tide Water Oil Company, New York City; L. W. Evans, superintendent, automotive department, Atlantic Refining Company,—Eclipse Works,—Franklin, Pa.; J. O. Ferguson, assistant commissioner, The Prairie Oil & Gas Company and Producers and Refiners Corporation, Independence, Kans.; Harry C. Fowler, associate petroleum engineer, U. S. Bureau of Mines, Bartlesville, Okla.; J. S. Gibson, safety engineer, The Prairie Pipe Line Co., Independence, Kans.; Wm. A. Gotschall, mechanical superintendent, Standard Oil Co. of Louisiana, Baton Rouge, La.; V. H. Hayslip, safety engineer, Humble Oil & Refining Co., Houston, Texas; C. F. Howard, engineer, Independence Bureau, Philadelphia, Pa.; A. D. Jack, employment supervisor, The Texas Company, Norfolk, Va., J. B. Joyce, superintendent of refineries, Texahoma Oil & Refining Co., Wichita Falls, Texas; Roy W. Kelly, manager, industrial relations, Associated Oil Co., San Francisco, Calif.; R. J. Lauder, safety engineer, Roxana Petroleum Corp., St. Louis, Mo.; J. A. McDevitt, safety director, Bayway Refinery (Standard Oil Co. of N. J.) Elizabeth, N. J.; S. H. McKenty, manager, plant personnel & employment, Atlantic Refining Co., Philadelphia, Pa.; Ray E. Miller, safety engineer, Marland Oil Companies, Ponca City, Okla.; S. R. Millman, Aetna Life Insurance Co., St. Louis, Mo.; E. D. Murphey, safety engineer, Cosden & Co., Tulsa, Okla.; W. A. Murphy, assistant commissioner of Labor, State of Oklahoma, Oklahoma City, Okla.; Franklin L. Newcomb, safety inspection division of general engineering department, Standard Oil Co. of N. J., Elizabeth, N. J.; Capt. A. A. Nichoson, personnel department, The Texas Company, Port Arthur Works, Port Arthur, Tex.; Arthur A. Odell, Barnsdall Corp., Tulsa, Okla.; C. R. Roberts, Roxana Petroleum Company; Robert C. Roberts, assistant superintendent, Roxana Petroleum Corp.,

Arkansas City, Kansas; Joseph F. Searle, (formerly sales mgr., Sinclair Refining Company), safety department—Missouri, Kansas & Texas R. R. Co., Kansas City, Mo.; E. J. Senne, safety supervisor, Vacuum Oil Company, New York City; T. N. Shaw, manager safety, Midwest Refining Company, Casper, Wyo.; F. C. Singleton, safety director, Standard Oil Co., (Indiana), Chicago, Ill.; F. T. Sloan, inspector, Tidewater Oil Co., New York City; R. C. Snyder, vice president and manager, Wood Oil Company, Louisville, Ky.; R. B. Stafford National Petroleum News, Cleveland, Ohio; Chas. J. Strobel, engineer Wagner-Taylor Company, Philadelphia, Pa.; J. L. Tanner, The Texas Company; J. L. Tete, chief clerk, emp. & sec. div., The Texas Company, Houston, Texas; E. A. Timm, safety inspector, Standard Oil Co., Bayonne, N. J.; Thos. W. Waddington, mechanical supt. & chairman of general safety committee, Bayway Refinery, Standard Oil Co of N. J., Elizabeth, N. J.; J. A. Wellington, manager, Independence Bureau (Consulting Engineers), Philadelphia, Pa.; D. J. Wallace Humble Oil & Refining Co., Houston, Texas; R. B. Whann, foreman o distillation, Atlantic Refining Co., Franklin, Pa.; Vern T. Whitney correspondent, Oil & Gas Journal, Bowling Green, Ky.; Wm. V. Winslow, The Texas Company, New York City; John S. Worden, 2d asst supt. West Tulsa Works, The Texas Company, Tulsa, Okla.; H. A Zachari, safety worker, HyVogt Machine Co., Louisville, Ky.

REPORT OF NOMINATING COMMITTEE

MR. V. R. CURRIE (The Texas Company, Houston, Texas): Mr Chairman and gentlemen, in behalf of the chairman of that committee who is Mr. Evans, I wish to present the report of the committee a follows:

First, with reference to the election or appointment of the vice chairmen. At the present time, as was explained yesterday, four vice chairmen have been elected each year in charge of different division the Producing, Pipe Line, Marketing, and Manufacturing Division We would like to change that and recommend to this section that th chairman elected each year be empowered to appoint such territori vice-chairmen as may be necessary, possibly one from each of th Northern, Southern, Eastern, and Western territories, and if necessar additional vice-chairmen; that vice-chairmen, in turn, to automa ically act as chairman of the territory in which he happens to l placed. In other words, that is going to depend largely upon the mer bership of the section. We don't feel at this time that we can recor mend any particular division of the territory, and also, as was e plained yesterday, the Engineering Section is working out a plan no for a similar organization and the chairman may be able to benefit l the report of the Engineering Section, once it is organized alo these lines.

We place in nomination:

For chairman, Mr. E. J. Senne, of the Vacuum Oil Company, New York City.

For secretary, Dr. R. P. Anderson, of the American Petroleum Institute, New York City.

(The report of the nominating committee was accepted by unanimous vote).

REPORT ON CHANGE OF NAME

MR. V. R. CURRIE (The Texas Company, Houston, Texas): The nominating committee was also asked to report on the possibility of a change in the name of the section to take in the natural gas companies, and after discussing the matter at considerable length, we felt that in most cases the natural gas companies were only subsidiaries or a part of the producing companies that would automatically come into this section, so we hesitated to make any change in the name as used at the present time.

EFFECTIVE METHODS OF SAFETY ORGANIZATION—PRODUCING DIVISION

CHAIRMAN WALLACE: The outstanding feature of the year's work to me was a movement started in the Pacific Coast Conference by Mr. Kelly—the compilation of handbooks for the various departments of the industry with a safety thought in mind. This movement, if carried through to its logical conclusion, will mean a standardization of safe practices and safeguards for the whole industry and more intelligent cooperation as far as safeguards go. I trust that each individual member will give Mr. Kelly all the cooperation possible in the development of these books. They are nothing that we will use today and throw away tomorrow.

I don't know whether you gentlemen know Mr. Kelly as well as I do, but he is the outstanding man in safety work on the Pacific Coast and we look to that place as the real high light in safety work in the industry, and I am sure that the books which will be developed under Mr. Kelly's supervision will be used for years to come and he deserves all the cooperation we can give him.

Aside from the handbooks, there has been no outstanding feature, I think, in the year's work that could be credited as a new departure in the history of the year, although Mr. Donovan, of the Standard Oil Company of California, has designed a break-drum flange guard, to guard against the hazard of breaking flanges on the drums.

The Petroleum Section has seen very consistent development, and I am sure that we all feel that we are quite a little bit ahead of ourselves, as compared with this time last year.

We in the mid-continent territory feel that the safety thought is becoming more and more dominant all the time with the workers and

the executives as well, and they are giving us support, and I feel th every prominent man here will bear me out in this statement. Indiana, Oklahoma, Kansas, and Texas we feel that there is no safe man not familiar with the fundamentals of safety, and that is a bro statement because we are scattered all over that part of the counti in small groups in many instances, but we feel that we have reach them all in a manner by which the safety thought has sunk in. O work there has been the same this year as last, through motion p tures. They have been the vehicle with which we have reached o lying districts, and we are showing now every night with the excepti of Sunday, to production and pipe line workers, these pictures whi we have made with the cooperation of the Bureau of Mines. So we have made two films and a third is in process. These are of thi reels each and apply to the petroleum industry, and we feel that are getting very desirable results from them. I am very enthusias about them, even more so than last year.

Standard Oil Company

MR. THOMAS W. WADDINGTON (Standard Oil Company of N. J.; E abeth, N. J.): The Standard Oil Company entered the safety mo ment at the formation of this Council in 1912. We had a gene safety committee organized, composed of three members, represe ative men in three of our largest refineries, of which three I had honor of being one. I was made secretary of the group at that ti and safety was a new gospel being preached in commercial intere and one that had to be carried home. It was too early to carry home; it was in its infancy and its significance was hardly yet realiz I am not going into details of what we went through. We had h work while the idea was becoming recognized by the higher branc of the management. You all know the difficulty we had selling all the way down the line to the men.

As to the method of organization, the Standard Oil Company of N Jersey has a general committee and now includes most of our lar refineries. Mr. Timm and I have been very hard workers and we together with our committee, fighting the battle of getting represe tion from every branch in the interest, and when we speak of tha connection with the Standard Oil Company of New Jersey, it me a lot. There are a number of refineries, which while they have t local safety committee are not represented on the General Commit

Now that the safety movement is recognized so universally, chief executives, board of directors and manufacturing boards b up every movement of our general safety committee, and it is not much to say that there is a not a safety recommendation that not become a law with the Standard Oil Company. Ninety-five cent of the recommendations are adopted. With that power in

years, and if it is good for a half-dozen big refineries, it certainly ought to be good for every other branch of the industry.

We can prove by our records that it is good, in compensation, in preventing human suffering, in everything that means economy in life, health, and finance, and if these economies can be effected, they should in the same proportionate degree be effective in the smaller plants and thereby affect three or four thousand as well as twenty thousand in the larger refineries.

MR. ROY S. BONSIB (Standard Oil Company of N. J., New York City): One of the principal factors to be established in the safety producing field is that safety is not welfare work, but a part of production. I have been trying to hammer that point in our producing fields and I think that from the time our field superintendents and district men realize that, our safety work will have started. Producing is such widely scattered operation, that the type of personnel you have doesn't amend itself to real organization as we understand it. In the refineries and in the sales departments, the organization of safety committees is very difficult, especially where the work is scattered so that any work in a producing field has got to be general; however, there is such a thing as getting the pushers, the head roustabouts, interested. They should realize that that is part of their job. If you do that, you get results. In the larger centers you can have organizations. In the producing companies with which we are affiliated that is the procedure we follow.

In some parts we have a well developed field established. We can get the people then for regular meetings. Those are conducted by the district men and the principal overseers in that division, but to try to effect safety committees among the type of men whom you find in a newly developed field is sort of difficult and it is going to lead those fellows to believe that this is just an excuse to put something over on them, but if you can make it an individual matter, that this is something that helps them; if you can get your people to realize that safety is a part of production and in large centers organize your small groups, you get farther in the producing field than by any other method I know of, based on several years experience in the fields.

Safety Committees

MR. T. N. SHAW (Midwest Refining Company, Casper, Wyoming): We have in our organization our joint general committee and also our safety committees. On the safety work it is our intention ultimately to make any man employee a member of the safety committee, also to make every man a first aid man. These men are appointed on the active teams for a period of six months at a time. When they are appointed, they are given a badge denoting that they are members of the safety committee and they have been told that that is a life membership. That badge will be left with them after their term as active members of the safety committee expires. In that way, we hope ulti-

mately that every man who is an old employee of the company wi have at some time served on the active committee and will have bee inoculated with the spirit of safety and will always be an expone of it.

In first aid work they do not receive their badges as members the first aid team until they have reached a point where they ca really be called first aid men. The plan has been in operation f some little time and we think it is successful. We don't think it co ers the situation a hundred per cent; I don't know that any plan y devised will, but we believe it is a step in the right direction and w finally produce good results.

The questions that I have to ask are regarding publicity of safe and first aid matters, the various methods of trying to reach each a every employee with the message and create in his mind a desire work carefully. The slogan we have adopted you have no doubt se in a great many places (we don't claim it to be original; we took from a sign company), but we realize that in the field it is classed extra hazardous employment and we are trying to put that messa over, that employment at best is extra hazardous and it behoo every worker not to take any chances. The best safety device is t careful workman, but we feel that our work is in its infancy, that have lots to learn. We are in an isolated location, we don't belo to the mid-continent group, nor the Pacific group, although we do n have a pipe line which connects us up even with Bayonne, N. J.

Is it possible diplomatically to capitalize accidents that occur?

As an illustration of the point I make, we had two fellows l their lives in a $55,000 tank accident. They went in there contr to the instructions of their foreman—that came out in the corone inquest which followed. Not only did the foreman say that, but other members of the gang substantiated the statement. Why t went in no man knows. The story died with them. I would like know what you fellows think of the value of safety propaganda our employees' magazine. I think nearly every company has one I should like some ideas on the kind of propaganda that should put in there. Should we capitalize on the accidents that have h pened and publish them as propaganda? Should we use it from lips as one of our members suggested to me last night, because can tell a story and make it sound entirely different than it doe black and white, and if bulletins are good propaganda, should post those accidents? Should we have bulletin boards devoted safety bulletins only? Should we put up one or two or three time? How long should they be left up? How often should be changed in order to get the greatest effect, or should we bulletins in connection with such things as Elliott Service, cur events, pictures which attract their attention and any phases of ting the message to the men in such a way that it will create

Our experience is that most accidents occur with men who have not been employed with us a very long time. We have in Wyoming what we call boomers. A large percentage of our accidents occur with those men and they are the ones it is hardest to get in touch with the safety idea.

Bulletins

MR. W. V. WINSLOW (The Texas Company, New York City): To answer briefly, my own personal opinion is that bulletins are very efficient and in fact essential to the educational campaign that you are starting. I think in answering your second question that you should by all means capitalize the accidents which occur in your plant, as effectively as possible by the methods of written bulletins, set up as briefly and as readable as possible. In answer to your third question, I think it is very advantageous that safety matters should appear in your house organs, preferably written up in story form if possible, of course trying to get human interest with them.

MR. J. A. MCDEVITT (Standard Oil Company of N. J.): While my part of the work has been connected with safety investigations, I probably have been a little more fortunate than some of you in having some of my other duties connected very intimately with publication.

In answering Mr. Shaw's questions, I don't think that there is anything more defacing to a plant than to see a make-shift bulletin board with a dirty bulletin on it. I think it has simply the opposite effect. The only value of a bulletin and a bulletin board is to keep it freshly painted and keep the changes very regular; by that I mean that a bulletin should be posted just as regularly and just as religiously as you would get out a plant publication.

In the very clever posters that have been sent out by the National Safety Council, I have felt that it was part of my job to go over these personally, not to delegate or relegate this duty to another. For instance, it would be ridiculous to place in a carpenter's shop an accident which was staged in a boiler shop, or vice versa. In other words, you must get something in your subject on the bulletin that will appeal directly to the men. I admit that this is not always possible, but you can get it very close.

While bulletins have an educational value, the same as rudiments in our educational system, it is only the start. It simply puts an idea in a man's mind. I believe that those ideas have to be followed up. At our refinery when new employees are taken on, I have followed another one of my duties (probably I am a little ticklish on this subject, but I have felt that I am partly responsible for their safety) and I group together five or six or eight, as the case may be, and show them the outstanding dangers that are present in the various occupations. If it is a carpenter, I talk carpenter shop; a boilermaker, I talk about the different machines in the boiler shop.

I have found that this looking over accidents (and by the way, n matter how slight an accident may be, we always make a report of in our medical department and these reports are sent to me with a explanation of the accident) produces many valuable germs of though where an accident which was slight had in it certain characteristi which might have proved very serious only for the element of luck.

In these accidents I have gone down to see the men. This is, course, another ticklish proposition. No man likes to be followed if he has a slight abrasion of the hands. It will discourage them fro reporting to the medical department, upon which rule we insist, b often this practice has shown us where we were very lax ourselve

I might cite an instance of what the medical department has call electric ophthalmia. It is a condition of the eye caused by being e posed to the ray of an arc in electric welding. I noticed somethi unusual and I felt it was my duty to see what it was. The cons quence was that I discovered that the glass that was used in some the shields was not up to specifications. Now it might be that th had slipped in there by accident, but it meant a lot to us and inquired of the electric welder and he said that there had been ma complaints.

As I said in the beginning, a great deal of my work has been connection with the publishing end. Another one of my manif duties is editing a little plant newspaper. We have found t printing of pictures, photographs of conditions, of picking out o standing accidents and then comparing these is very, very valuable.

One in point was two cases, one a boiler maker, had removed goggles temporarily because of the heat in the narrow space in wh he was working and in that short time (he had worn them two a one-half hours) two minutes after he removed them, a chip flew i his eye and he lost partial sight. The day following a man came to the medical department to have his eye looked at. He had b struck a blow by the backing out rivet, the glass was shattered the man's eye was uninjured. I thought that this was an opportun of making a contrast. The story got over. We used names and c ditions. Every man could check these things up. You have got play on the level with the men. You can't make a little story think it is going to get over.

NOTE: *Mr. Colburn's address on the Joseph A. Holmes Safety Associa may be found in full in the proceedings of the Mining Section elsewhere this volume.*

WEDNESDAY AFTERNOON SESSION

EFFECTIVE METHODS OF SAFETY ORGANIZATION—MANUFACTURING DIVISION

MR. WILLIAM V. WINSLOW, (Texas Company, New York City): manufacturing or refining division of the petroleum industry has un

taken very extensive work along safety lines. The plan which I will review is the result of years of effort on the part of the organization with which I am connected. It was in 1914 that the manager of our refining department appointed a central committee of safety to work on the problem of providing safe and sanitary working conditions at our various Refineries and Terminals.

A northern committee augmented the work of this central committee which is located in the South and it is as chairman and representative of this northern committee that I attend these congresses, and it is as chairman and representative of the central committee that Mr. V. R. Currie has for years taken an active part in the National Safety Council. I will not dwell on the organization or working of these two committees which determine our policies and see that they are carried out, but will explain at once the organization at our plants which brings our Safety work to the work force.

Naturally, varyilng conditions at different units affect each local safety organization but just as far as we possibly can, we organize the safety work uniformly.

For plants having between 500 and 5,000 employees, we find that the most effective method is to have a general plant safety committee consisting of the heads of the larger departments. The size of this general plant committee varies from about 10 to 15 members. It is headed by the assistant superintendent of the plant who attends central safety committee meetings in the South twice a year. Under this committee's direction are a number of standing sub-committees, arranged to inspect definite departments, although in some cases, they are assigned a very wide range of duties. As an illustration, the work assigned six sub-committees at one of our large refineries is as follows:

Laboratory or Chemical Department.
Mechanical—which takes in the various shops of the plant.
Shipping—which covers the safety of loading racks, barrel house, cooper shop, etc.
Pressure Stills.
Construction and Maintenance—which covers the safety of various crafts engaged in general construction and maintenance work.
Manufacturing—which takes in various plant operations on stills, agitators, wax plants, etc.

The personnel of the sub-committees is very important. At the larger points each sub-committee consists of six or seven members. At smaller points, from three to five members. These men, as a rule, are foremen or sub-foremen appointed by the local chairman. It will be seen that a large Refinery the total number of Committee members whose duty it is to carry out the Safety program is from 50 to 75 men.

Monthly Inspection

Each sub-committee makes a monthly inspection of the areas and departments assigned, and holds a meeting in which they discuss and report all of the unsafe conditions or practices which they have unearthed. Their suggestions and recommendations form the subject

matter of the general plant safety Committee which likewise meets e month. The sub-committee's recommendations or suggestions arranged in numerical order and are continued on future minutes meetings until properly disposed of. The general plant commit minutes are in turn sent to the sub-committee members that they n know the disposition of each item. Many items that are brought up the sub-committees are of such a nature that they can be immediat taken care of without the help of the General Plant Committee.

The chairman or secretary of the general plant committee keeps sub-committees functioning and attends as many of their monthly m ings as he can. One of the most important provisions of our plar that this chairman or secretary should see that action is taken on sub-committee's recommendations, and send out word as promptly possible as to the disposition of each recommendation. There is greater stimulus than for the sub-committee men to know that tl work is viewed as important and their recommendations acted promptly by the management.

The minutes of the sub-committee naturally reflect the work wl is required to advance safety, but in order that some record of i vidual work accomplished may be secured, each sub-committee r distributes among the various foremen a blank form on which e foreman's monhly accomplishments can be reported. It reads: "Du the past month I have personally corrected or had corrected un physical conditions and have cautioned employees against unsafe p tices as follows:"—After this sentence is left a space for the var items to be listed. The blank form continues "If you cannot person correct an unsafe condition or practice, please advise the commi either by letter or in person. When cautioning a fellow empl against an unsafe practice or condition, be sure to speak with cour and consideration."

The most effective method of safety organization in plants of betw 100 and 500 employees is practically the same as in larger plants. general plant committee is naturally smaller, but as in the cas larger plants the local superintendent and his staff officers are members. The assistant superintendent and the employment superv are chairman and secretary respectively. They attend the nort safety committee meeting semi-annually and help determine the pol and methods to pursue.

The standing sub-committees are three in number. Instead of li their work up by departments it is more specialized. For exan three sub-committees function in the following manner. One, a committee on plant inspection. Another, a sub-committee on sa equipment and the third a sub-committee on fire organization and e ment. As is the practice at the larger plants, each sub-comm meets separately and not with the general plant committee. The s method of numbering recommendations is followed and found very s factory.

Appointment of Workmen to Committees

One important matter of organization which we have been able to effect at the smaller points is the appointment of several workmen to each of the sub-committees. These workmen serve for three or six months, which makes it possible in the course of a year or two to have in the force a substantial number of workmen who have become familiar with many of the plants' safety problems and had intimate contact with that part of the supervisory force on whom falls the responsibility for safety. We feel that it brings the safety work directly to the workmen better than any other method. We are convinced that our continued reduction in accidents has been largely due to the conscientious work of the plant sub-committees.

At various times there are special sub-committees at work on special matters such as safety campaigns, standardization or investigation of safety equipment, first aid team, etc.

The secretary of the general plant safety committee is the one on whom falls the responsibility of keeping the safety work going. He is the key man of the safety organization and the effectiveness or success of our safety work depends upon his efforts. He arranges for the sub-committee meetings, instructs new employees in safety, investigates causes of accidents and arranges for the investigation and determination of action on those suggestions or recommendations which require executive approval. It is necessary for him to arrange special campaigns, gang meetings, etc., to keep the interest up. No matter how effective the safety organization may be, old subjects must be revived and given a new interesting turn and personal interest must be quickened wherever it may be found to lag.

MR. E. A. TIMM (Standard Oil Company of N. J.): Accident prevention was considered good business in 1916 when the local safety committee at the Bayonne Works was first organized with a membership of nine. In 1921 the membership was increased from nine to 30, each member being the assistant to or the head of their respective department.

The Bayonne Plant is divided into six zones and each month six sub-committees of the local safety committee make an inspection of these zones and the chairman of the Zone Inspection Committee presents his recommendations to the chairman of the local safety committee at the regular monthly meeting. These findings are thoroughly discussed and passed upon by the entire committee and the various recommendations are recorded in the minutes of the meeting and tabulated.

The safety department maintains a complete file of these various recommendations, indexed according to zones and numbers. The safety inspector checks these recommendations as he makes his rounds of the plant to ascertain the status of same.

The chairman of these inspection committees are changed each month and no two men make an inspection of the same zone in any one month.

This schedule has been carried out as far as practical and has prov very effective. Most all minor recommendations or small accid hazards are taken up immediately with the department foreman by special committee and are corrected on the day of the inspection. The minutes of the meeting show at a glance the status of the vari recommendations.

In addition to the members of the local safety committee, saf guards have been appointed, one guard for every 100 men working a department. To date, over 100 men are acting as Safety Gua throughout the plant. The duties of these guards are to check up unsafe conditions or practices and report same to their foremen. Num ous instances of unsafe conditions and practices have been repor by the safety guards to the safety department.

One of these guards was appointed as inspector of ropes, cab cranes and all hoisting tackle used in the plant. It is his duty to m tain in first class condition all ropes used on fire equipment, safety bo containing life rings at the piers and on top of condenser box platfor The gas masks used are also maintained in first class condition. face pieces of these masks are turned in to the safety department ev three months for sterilization and cleaning in hot water. This ke the rubber pliable and prevents hardening and cracking. It is a in regard to wearing of face pieces to have same turned in for steril tion and washing immediately after being used by an employee. prevents the promiscious use of the masks by different employees each person using a mask knows that it is clean.

Another safety guard was appointed as tool inspector. He covers entire yard once every three months checking the tools used by individual employee. The work of this inspector reduced our accid due to unsafe tools 90 per cent and the results from increased produc and satisfied employees is beyond computing.

The inspector of sanitation takes care of 75 toilets, wash and lo rooms throughout the plant. It is a part of his duty to post all bulle each week and also to collect from the various "Coin Your Idea" b the suggestions submitted by the employees, keeping a record of t received and turning them over to the "Coin Your Idea" Committee.

Safety Educational Work

The educational work in safety is carried out in conjunction with general educational work of the personnel and training departm The personnel and training department have various groups who on certain days of the week from 3 to 5 P. M. and the safety insp visits these groups, discussing the accident cases, their causes and ination. Excellent co-operation has been received from the for who have been very much interested in these discussions. In add to this, safety movies and lantern slides have been used to advan

Bayonne Works is fortunate in having a plant paper and some excellent cartoonists whose cartoons appear weekly in this paper. Editorials, poems and other articles on safety also appear frequently in the publication.

The new employee is a problem and in order to impress the safety ideas upon the new man, he is given a twenty minute talk on general topics pertaining to welfare program of the company. Accident hazards that exist in the department to which the new employee has been assigned are explained by the safety department and during these talks the safety inspector endeavors to impress upon the minds of the new employees the necessity of personal caution. The first day of employment is the most impressionable period of that employee's service because his mind is ever on the alert, what is coming next, therefore anything pertaining to accident prevention explained and told to him the first day will leave a lasting impression upon his mind.

Accident prevention work has been put across to the officials of the company down to and including the foremen. We must obtain the cooperation of the men themselves and in order to do this our next problem is to have the gang foremen become familiar with the safety work being done and learn something of the type and nature of the accidents that are causing most of our lost time cases. This can only be done by bringing the gang foremen together every week and discuss the various cases that have occurred in their departments with them.

In the discussion of these accidents it is absolutely necessary to dig down deep into the root causes and this can only be done by a complete analysis of the basic causes coming to a decision as to the primary and secondary causes. After the basic cause with the primary and secondary cause has been definitely established, the elimination of this cause must be determined upon and here again the primary and secondary methods of elimination must be taken into consideration. The conclusions arrived at must conform to safety, efficiency and warranted costs.

Making an analysis of accidents according to the above you will arrive at the correct solution and its prevention, providing that it is not an unavoidable accident, that is, where the cause is one beyond human control.

Seventy-five per cent of all accidents can be prevented by educational activities to promote observation and thoughtfulness of the employees.

MR. T. N. SHAW (Midwest Refining Company, Casper, Wyoming): Our turnover runs pretty high. We hire as many as 500 men in one month and have that many leave, and we have prepared for the printers two or three different books, but never had them printed because we didn't believe the men would read them unless they were checked up and forced to read them, and unless they are, I don't believe they will read them. Even if they are told that if they read them and the examination will be given, and if they don't pass the examination they are going to lose their jobs, I don't think they would read them even then.

We pay by check and we print the information on the slip the same size as the check and in the office it is pinned to the check. We don't try to put a whole lot of wording on there. We cover the subject as briefly as possible and cover the ground and put those out periodically, but not regularly. We put them out whenever we think information should go out, and on certain things like telling them why a dollar is being deducted from their pay to go into the mutual benefit association, we put that out every two or three months. It is new for those who have come in since the last distribution. I think this is rather effective.

MR. ROY A. KELLY (Associated Oil Company): We got out a manual for the training of service station attendants which it was absolutely necessary for them to read. We tried for a time giving them a book and talking to them about it and insisting that they read it. Now we hold three examinations before we are satisfied that a man knows all there is in that manual, but it is a different proposition because there you are teaching the men the job.

Those books which are good have the history of the company, the employees' benefits, and so forth.

MR. ROY S. BONSIB (Standard Oil Company, N. J., New York City): What is the penalty if the man doesn't pass?

MR. KELLY: He loses his job.

The Rotating Committee

MR. BONSIB: I am a great believer in the rotating committee, because if a man gets on a committee, after he has been there a while the novelty of the thing has worn off, and "familiarity breeds contempt", and he lays down on the job, whereas a new man brings in the vision and the enthusiasm of the beginner, and you get new ideas. You also give more people an opportunity of serving on a committee and the biggest value of the committee is that the large part of the accidents are not due to the failure of the company but to the fellow workman. I think this is one of the biggest benefits. I don't think any committee, unless a general committee, should serve longer than a year. I think six months is a very good period to be in power.

Going back to this committee idea, I also believe in having every member of that committee sign his name to the minutes. The reason for that is this: You are going to be pretty careful that your work is creditable and you are not going to make idiotic suggestions and fool suggestions if you sign your name, and it gives more a sense of ownership, and I think that that is a force which we should use in our committee work.

MR. C. L. COLBURN (Joseph A. Holmes Safety Association): There is another advantage about the rotating committee which I would like to mention; that is the educational advantage. When a man serves on a rotating committee he gets better education than on a permanent committee. Reports should be sent to the general man

ager of the committee and they should be acknowledged. Acknowledgment places that report so much higher.

MR. J. A. MCDEVITT (Standard Oil Company, N. J.): I think the best proof of the rotating committee is the fact that in our experience the men have asked to be changed from one committee to another. That has a two-fold benefit, not only does a man go over the ground several times and lose a lot of important things, but another thing is that he gets to all parts of the plant and becomes acquainted with the geography of the plant. We did appoint men for a second survey on the same zones and I certainly did hear of it. They came and asked me to be careful it didn't happen again.

MR. GEO. B. COOKE (Standard Oil Company of Louisiana): We have no workmen's committee at Baton Rouge. We have a committee composed of 23 men who assist the assistant superintendents or department foremen. We don't rotate because we have only 23 main departments and we couldn't rotate unless we brought in the workers, and I want to say that there has been no waning of interest. I have been associated with this committee for three years and that committee is even more enthusiastic than it was three years ago.

CHAIRMAN WALLACE: I want to call your attention to one thing which was said: "familiarity breeds contempt", and I would amend this to, "familiarity with proper education brings respect."

Medical Department

MR. J. A. MCDEVITT (Standard Oil Company, N. J.): The medical department with us has been probably one of the most valuable assets we have in keeping such an active finger on the pulse of accidents. Our doctors, whenever they find an accident in which there is the least suspicion of carelessness, in which there is some factor in which the safety department might be interested, let us know at once, and we come down and interview the man right there. Experience teaches that you get a truer tale from a man who is hurt right at the moment than after he has had 24 hours to think it over. It is remarkable what a different construction a man will put on an accident after a day or two has passed. They think "What I have done is a careless act and I will be blamed and have to suffer for it".

The medical department has been of very great help to us by taking such an active part in our work. The safety department comes directly under the personnel manager, and while he has the general supervision of it, he usually allows the safety department to work along its own lines. Everything goes through his hands, reports of accidents, and so forth, so that he will know exactly what is transpiring.

MR. FRANK A. EPPS (Tide Water Oil Company, New York City): Is the medical under the safety department or under the personal relations department?

MR. J. A. MCDEVITT (Standard Oil Co. of N. J.): Under the personnel department. Medical, safety, and educational all come under that head.

MR. ROY S. BONSIB (Standard Oil Co. of N. J., New York City): Those three are all on equal footing.

A REVIEW OF THE PETROLEUM ACCIDENT RECORD IN OKLAHOMA DURING 1923

H. C. Fowler, Associate Petroleum Engineer, U. S. Bureau of Mine Department of the Interior, Bartlesville, Okla.

A recurring preventable accident, or series of accidents, is an eco omic and social malady; and should be treated as such.

In undertaking the study of accidents to aid in eliminating hazar attendant upon the production, pipe line transportation and refini of oil, the United States Bureau of Mines recognized the need of working chart upon which to base its theory and practice. Therefo accidents were classified by causes in order to have definite recor that would help in diagnosing the case.

A classification of accidents by causes is a means to an end in pr venting accidents. However, it is not the purpose of this paper intimate that a "cure-all" for industrial accidents can ever be four Like the "Fountain of Youth" of Ponce de Leon, although greatly be desired, it is unattainable. On the other hand, by keeping "eve lastingly at it" a condition may be brought about, where worki hazards are reduced to a minimum, reflecting the highest efficien attainable in industry, and where the burden of human suffering less poignant to the individual.

As individuals we are all deeply concerned in specific cases. W react sympathetically at sight of a fellow worker in bandages but order to keep him out of bandages in the future we must think of h as a part of the composite picture, which represents accident e perience.

Every State has its own particular problems and each oil field h peculiar conditions pertinent to itself which call forth new metho or the revision and perfection of old ones. On the other hand, the is much that is common to all and a lesson learned in one field aplicable throughout the industry. Therefore an analysis of the ac dent experience of Oklahoma discloses important facts that have be ing on the problems of every State where the petroleum industry is economic factor.

The Oklahoma Workmen's Compensation Law

Before turning to the analyses of the Oklahoma petroleum accid records, which have been compiled from the 1923 files of the Ok homa Industrial Commission, it would be well to consider those pha of the Oklahoma Workmen's Compensation Law which have dir bearing on the subject at hand.

Prior to June 30, 1923, the Oklahoma Workmen's Compensat Law provided, in the case of temporary disability, for a waiting per of seven days from date of injury before compensation began. If disability continued for twenty-one or more days compensation w

The compensation paid for temporary disability was 50 per cent of the employee's average weekly wages. In the schedule used for computing weekly rates of compensation the average weekly wages are considered to be one fifty second part of three hundred times the employee's daily wage or salary. Effective June 30, 1923, the waiting period was shortened to five days but no compensation is paid for the first five days following the date of injury. The average weekly wages are now computed as under the old law, but the amount paid as compensation for temporary disability was increased from 50 to 66⅔ per cent. In both the former law, and the law as amended in 1923, it is provided that compensation payments per week shall not exceed $18.00 or be less than $8.00.

The law provides compensation for permanent disability by a schedule of awards in equivalent weeks lost time. The percentage of average weekly wages payable as compensation in cases of permanent disability was raised by the Act of June 30, 1923, from 50 per cent to 66⅔ per cent, as in the case of temporary disability.

For the first half of 1923, hernia was considered a temporary disability, but the amended law made hernia cases compensable for eight weeks plus the cost of operation.

Regarding accidents resulting in death the Oklahoma law states:

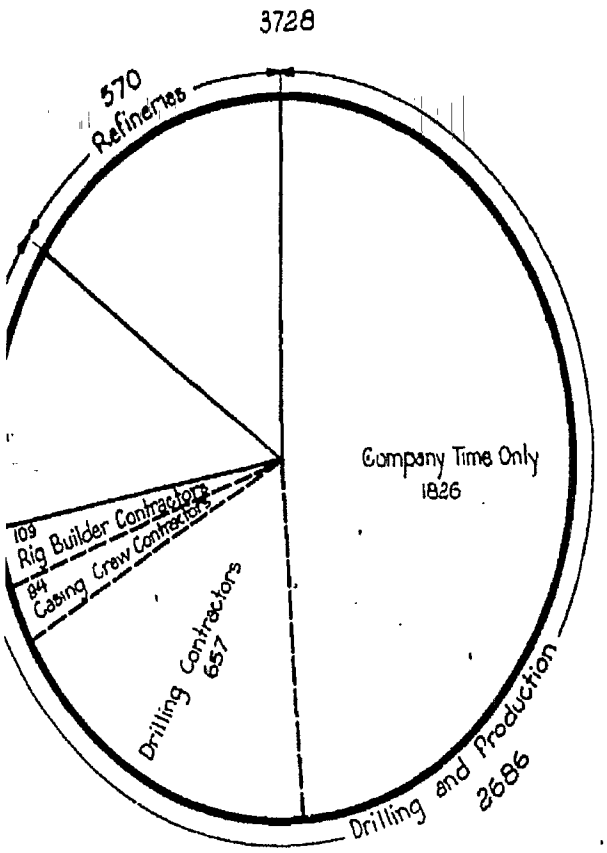
"It is not intended that any of the provisions of this Act shall apply . . . . . and no right of action for recovery of damages for injuries resulting in death is intended to be denied or affected".

Cases Considered in the Analyses

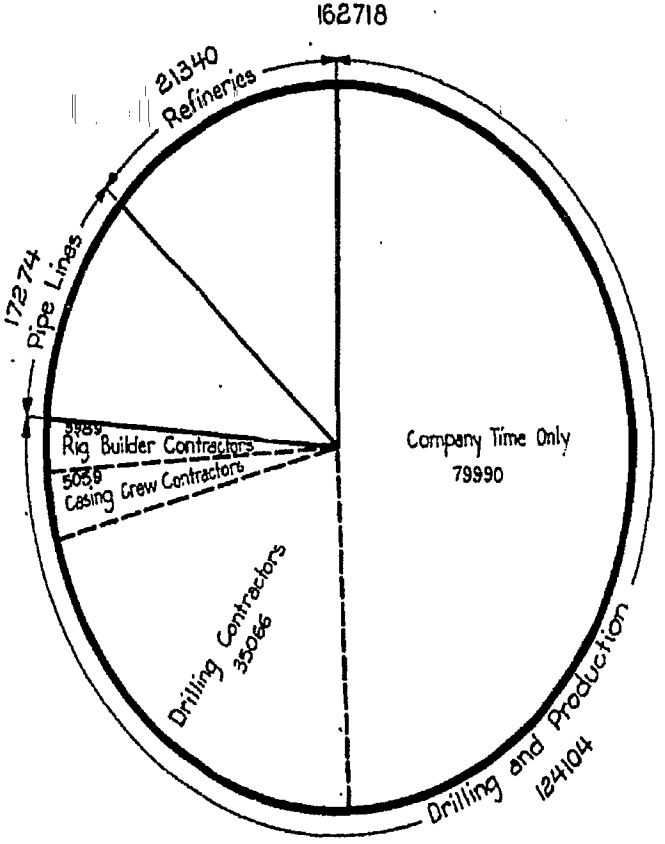
The analyses considered in this paper are of accidents which were subject to compensation under the Law of the State of Oklahoma. In other words, it is a review of compensable cases occurring during the calendar year 1923 in the departments of producing and drilling, pipe lining, and refining of petroleum. The tabulations do not include the accident records of refined oil distributors, such as filling stations, structural steel contracting companies engaged in the work of tank construction, or material supply companies.

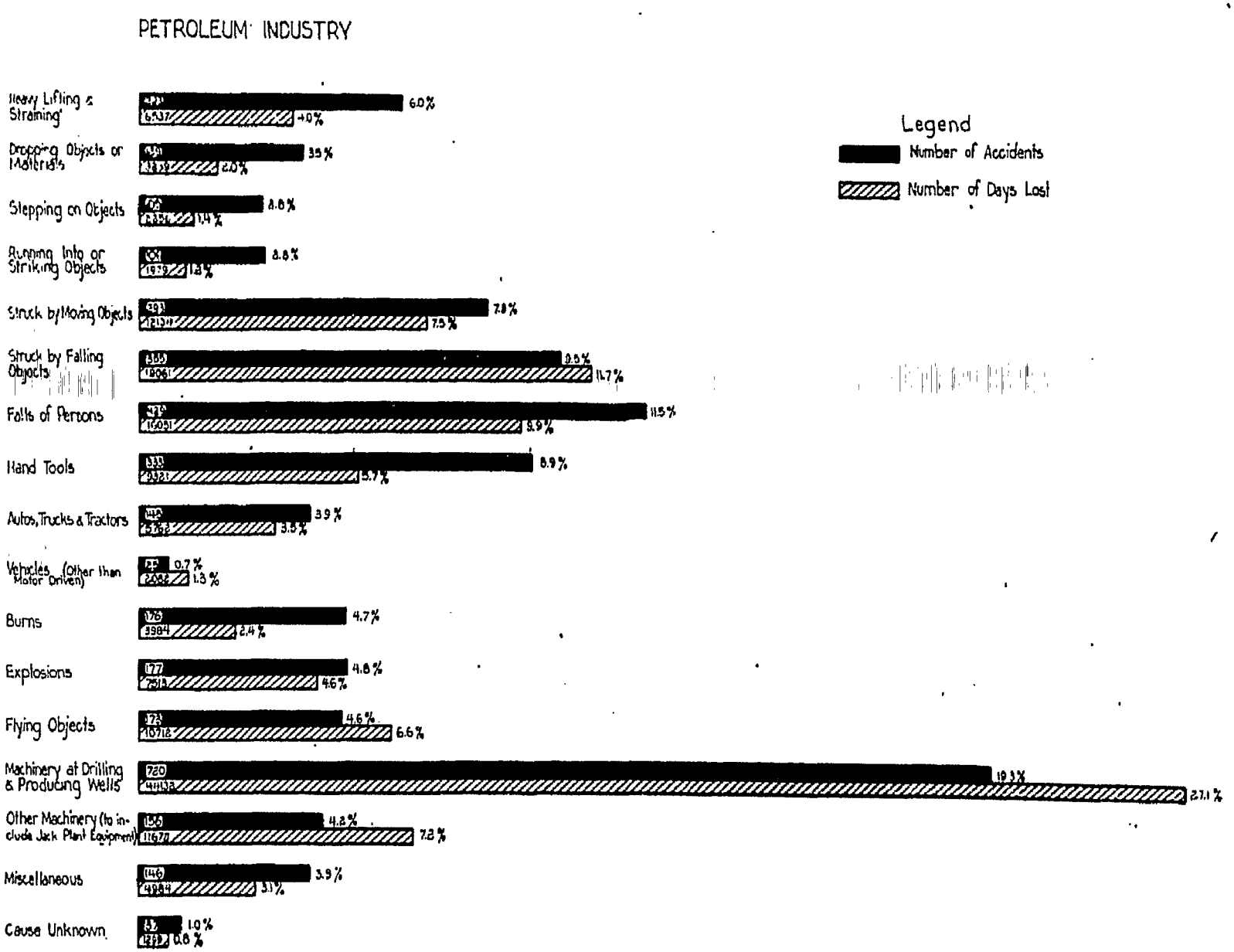
The chart which has ben prepared to accompany this paper shows several outstanding facts regarding the accident experiences of the State of Oklahoma. Three thousand seven hundred and twenty-eight compensable cases were compiled, clasified and analyzed. This number is represented by the full circle graph or "pie diagram" on the left of the chart. Of this number, 2686, or 72 per cent of the total, were found chargeable to drilling and production; 472, or 12.7 per cent, were pipe line accidents; and the remaining 570, or 15.3 per cent, occurred at refineries and gasoline extraction plants. The accidents listed under drilling and production include those occurring in the drilling and handling of natural gas wells. The 472 pipe line accidents include those occurring to employees engaged in laying natural gas mains from sources of supply to points of distribution.

TOTAL NUMBER OF ACCIDENTS

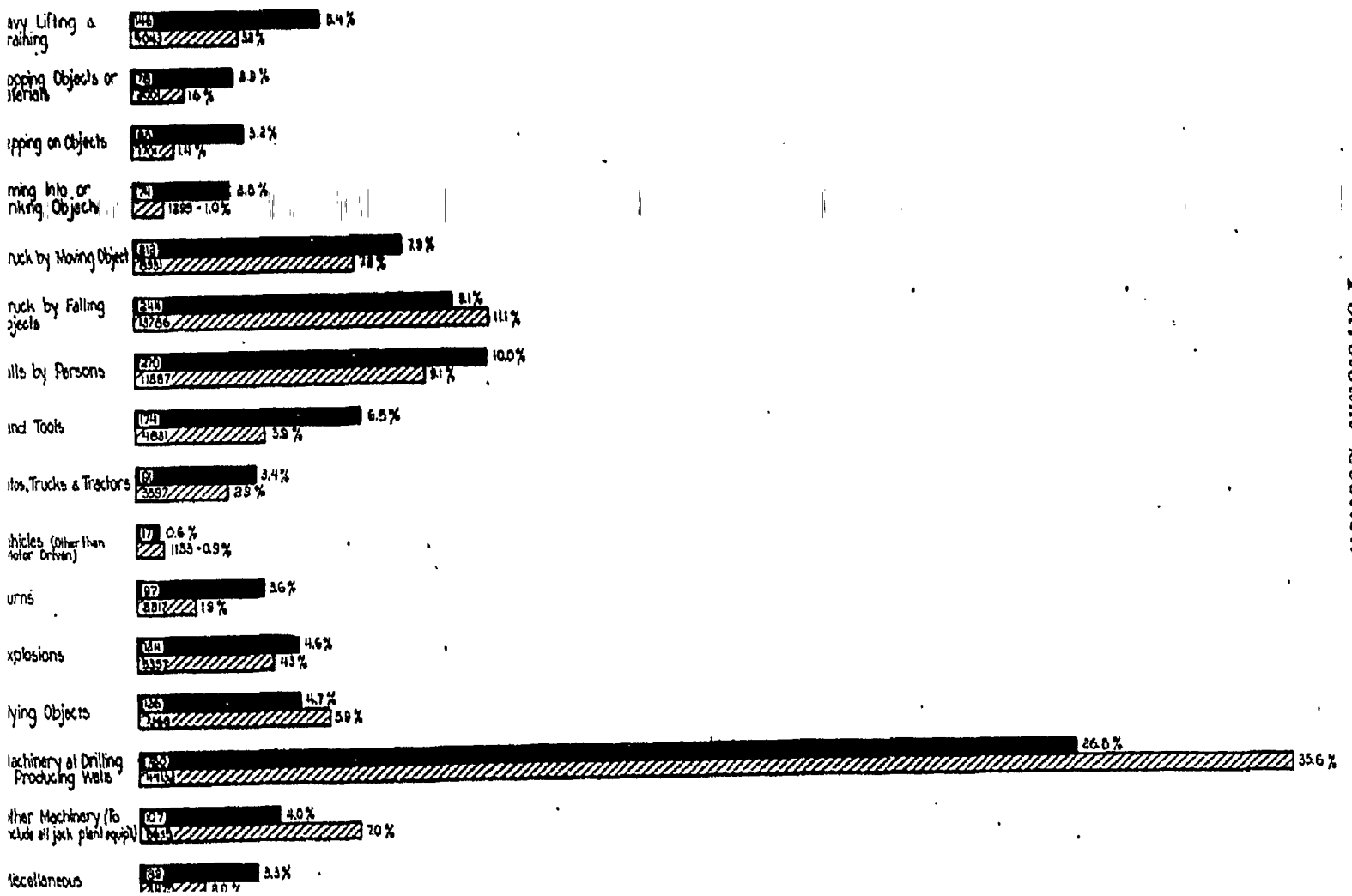


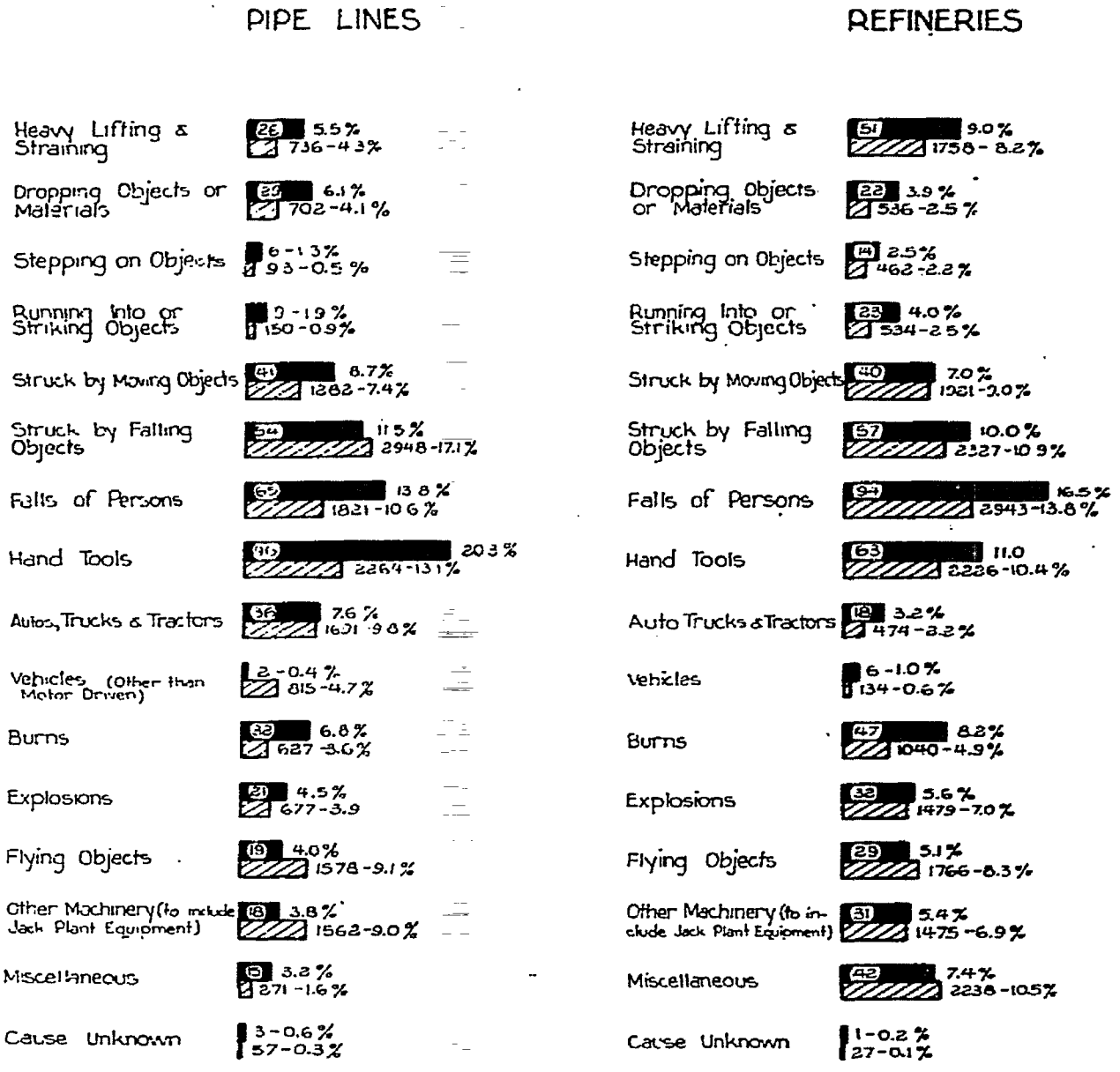
TOTAL NUMBER OF DAYS LOST




PETROLEUM INDUSTRY
Legend
Number of Accidents
Number of Days Lost
Heavy Lifting & Straining
6.0%
4.0%
Dropping Objects or Materials
3.5%
2.0%
Stepping on Objects
8.8%
1.4%
Running Into or Striking Objects
8.8%
1.8%
Struck by Moving Objects
7.8%
7.5%
Struck by Falling Objects
9.9%
11.7%
Falls of Persons
11.5%
9.9%
Hand Tools
8.9%
5.7%
Autos, Trucks & Tractors
3.9%
3.8%
Vehicles (other than Motor Driven)
0.7%
1.3%
Burns
4.7%
2.4%
Explosions
4.8%
4.6%
Flying Objects
4.6%
6.6%
Machinery at Drilling & Producing Wells
19.3%
27.1%
Other Machinery (to include Jack Plant Equipment)
4.2%
7.2%
Miscellaneous
3.9%
3.1%
Cause Unknown
1.0%
0.8%

DRILLING AND PRODUCTION





The relatively small number of pipe line and refinery accidents when compared with those in the department of drilling and production is to be expected, because a smaller number of men are engaged in pipe line and refinery work than in drilling and production. The Petroleum Experiment Station at Bartlesville, Oklahoma, has a list of 1,730 oil operators, drilling contractors, refineries, and pipe line companies now doing business in the State of Oklahoma. Some of these employ only a few men whereas others have a payroll of several thousand employees. The total number employed is variable and is not known, but a bulletin

issued November 1, 1921, by the Oklahoma Department of Labor shows that during the year 1921, 20,306 field and plant employees were reported by 228 of these concerns. Of this number of employees 63.2 per cent were engaged in drilling and production, 15 per cent in pipe lining, and 21.8 per cent in refining and gasoline extraction.

Classification of Accidents

The study of the Oklahoma accident records for 1923 shows that out of the 2,686 compensable cases occurring in the development and operation of oil properties, 68 per cent happened to employees working on company pay-roll, 24½ per cent to employees of drilling contractors 3½ per cent to men working in casing crews, and four per cent to contract rig builders. No data are at hand regarding the total number of men employed in each of these divisions.

In order to study accident severity it is necessary to adopt a scale of time losses by which weight may be given to each case of permanent disability. In view of the fact that this paper deals only with Oklahoma accidents the equivalent weights of the Oklahoma law have been used in their entirety, without sponsoring or rejecting any item of the schedule. They are the weights upon which compensation is paid in that State and have been used as such.

What a man's foot or his eye or his finger is worth to him and to the public in general is a mooted question, and a difficult one to answer. Only through the study of accident experience over a long period of time can an approximation be reached. A definite scale of time losses may not be the correct basis for an ultimate solution of this problem but it has helped to settle many questions and seems to be the best working principle thus far accepted by the majority. At some time in the future a standardized schedule should be adopted by all States.

The "pie diagram" on the right of the chart shows that 162,718 days time was lost because of the 3,728 accidents. The records of 1921 of these cases state specifically that infection was directly responsible for the loss of time or prolonged the period of convalescence. Two hundred and eighty-eight permanent partial disabilities gave the equivalent of 66,404 lost days or 40.8 per cent of the total lost time, although they represent only 7.7 per cent of the total number of accidents. The various industries of the country should be especially concerned about the cases of this kind because the effects of permanent disabilities are far reaching and lasting.

The percentage of total time lost is practically the same as the percentage of the total number of accidents in each of the three general divisions of the industry. This is shown clearly by the two "pie diagrams".

This completes a general outline of what happened during the year 1923 in Oklahoma, so far as frequency and severity of accidents are concerned, and is an indication of what may have occurred in the petr

Classification by Causes

A classification by causes was made to find out where and under what circumstances accidents have occurred. Primarily a classification should be as simple as the nature of the work will allow, but it must include not only all branches of the industry but the general phases of the hazards of each branch.

After reviewing the 3,728 cases they were grouped under 17 main heads, one of which is "Cause Unknown". The heading, "Cause Unknown" was necessary because about one per cent of the records did not give the circumstance of the accidents.

Accidents in Drilling and Production

The first bar diagram on the chart shows definitely where the majority of the accidents resulting from the drilling and production of oil occur. In this department of the industry there was a total of 2,686 accidents causing 124,104 days lost time. Machinery at drilling and producing wells was responsible for 720, or 26.8 per cent, of these accidents. However, these 720 accidents caused the loss of 44,132 days, which is 35.6 per cent of the time lost in this department.

Permanent partial disability cases, 121 in number, caused over one-half of the total days lost time due to machinery at drilling and producing wells. Pipe tools, including tongs and wrenches, circle jacks and casing poles, caused more accidents than any other machinery equipment at the wells. Eighteen and eight-tenths per cent of the 720 accidents were caused by such tools. Gas engines, where accidents were due mainly to cranking and being caught in fly wheels, come next in order for number of cases, but in point of time lost, traveling blocks ranked second. This is a logical result when one considers that out of 47 traveling block accidents, 25 were permanent partial disabilities. An unguarded traveling block shows no mercy and a man whose hand is caught in a wicker has all the odds against him. Pipe tools, traveling blocks, gas engines and elevators present definite hazards that will bear well the careful attention of the safety engineer, the field superintendent and the man on the job.

The chart shows both the number of cases and days lost time for each of the 17 classes of accidents. Their order according to days lost time is as follows:

List of Main Causes of Accidents in Drilling and Producing in the Order of Total Days Lost Time

	Cause of Accident	Percentage Of Total Time Lost
1	Machinery at Drilling and Producing Wells	35.6
2	Struck by Falling Objects	11.1
3	Falls of Persons	9.1
4	Struck by Moving Objects	7.2
5	Other Machinery(To include all Jack Plant Equipment)	7.0
6	Flying objects	5.9
7	Explosions	4.3
8	Hand Tools	3.9

9	Heavy Lifting and Straining	3.:
10	Autos, Trucks and Tractors	2.:
11	Miscellaneous	2.:
12	Burns	1.:
13	Dropping Objects or Materials	1.(
14	Stepping on Objects	1.
15	Running into or Striking Objects	1.
16	Vehicles (other than motor driven)	0.
17	Cause Unknown	1.
		100.

It is worth noting that more than half of the accidents due to "Ma chinery Other than at Wells", fall under the heading of Jack plant and 16 out of the 67 cases listed were permanent partial disabilitie occasioned by hooking on or off wells. Also, of the 124 explosions, 5 were due to ignition of gas and resulting fires at wells, where in man cases property loss far exceeded the actual cost of the injuries receive by the men working on the derrick floor.

Pipe Line Accidents

The bar diagram at the left center of the drawing shows graphicall the relative frequency and severity of pipe line accidents. "Struc by Falling Objects" comes first in the number of days lost time, bu "Hand Tools" were responsible for a greater number of recurring acc dents. "Falls of Persons" also ranks well up on the scale. There wer 29 permanent partial disability accidents listed under pipe lines for th year.

Accidents at Refineries

The bar diagram at the right shows the accidents at refineries. He they center around "Falls of Persons", "Struck by Falling Objects and "Hand Tools", as was the case under "Pipe Lines". In this depa ment, however, "Falls of Persons" leads the others both in number cases and days lost time. This indicates a need for better scaffoldi and greater care on the part of men working above the ground. Twent seven permanent partial disabilities were chargeable to the refini of oil.

Total Accidents

There is a close similarity between the graph at the bottom of t chart, which is based on the total of 3,728 cases causing 162,718 da lost time for the petroleum industry, and the one at the top whi represents accidents in drilling and production. This might well expected. The greater number of men engaged in drilling and p duction gives this department the greater weight in the totals a aside from machinery at drilling and producing wells, the hazards a much the same in the three branches of the industry. However, it well to consider the first three bar diagrams in connection with t fourth which is a cumulative graph of the others.

Total Time Lost

The Workmen's Compensation Law of Oklahoma makes no provision for accidens resulting in death and no weight has been given in the foregoing review to such accidents, but this does not mean that the industry is not paying for these cases.

Definite record of 19 fatalities which occurred during the first 6 months of 1923 are on file, but the record is not complete. Of the 19 cases, eight occurred to men working on Company time in oil fields, six were employees of drilling contractors, and one was a rig builder. Four of the men were killed at refineries.

In the case of death there is always a question as to what should be a fair charge against industry for a man's life. One man may represent 30 years useful potential service while another may have only 10 years of work yet to do. It is a question of probability, but some definite assumptions, almost criteria, have been determined through past experience. According to the rating recommended by the Committee on Statistics and Compensation Insurance Cost of the International Association of Industrial Accident Boards and Commissions, one fatality is equivalent to 6,000 days. Using this rating, the total number of days lost time to the petroleum industry in Oklahoma during 1923 should be increased from 162,718 days to 276,718 days on account of the 19 listed industrial deaths. This time loss is equivalent to 922 years. That is, the work of one man for 922 years would be required to offset the loss of time due to accidents in the petroleum industry of Oklahoma during the year 1923.

The Cost of Accidents

Another consideration is that of compensation. According to the records, these 3,728 cases cost in compensation $376,266. This figure is for compensation alone and includes no medical expense.

Against this is the sum of $960,000 lost to employees in wages not received on account of disabilities. This sum was computed on the basis of actual daily payroll against days lost time. If the equivalent of 19 fatalities were added, the sum would be in excess of $1,600,000. This is equal to the value of 1,430,000 barrels of oil at $1.12 per barrel. This quantity of oil would fill a tank farm of 26 tanks, each having a capacity of 55,000 barrels.

The foregoing discussion of the economic cost of accidents has been presented because it is good business to know their burden on industry, but it should always be remembered that there is a greater cost—that of human suffering—which can not be measured in dollars.

The study of petroleum safety is in its infancy but it is destined to play an important part in the development of a great natural resource. The goal for which all are striving is elimination of hazards and prevention of accidents. It can be attained only by education, watchfulness, care, and safe practice.

MR. SEAGRAVE (Mine Safety Appliance Company): Most of you probably have read about the fire in Pittsburgh where there were 10 deaths some employees and some children playing nearby. A few things were brought out and I was placed on the coroner's jury, and being interested in safety work and somewhat interested in the Petroleum Section among other sections of the Council, I thought you would be interested in hearing a few of those things.

It seemed that the gas company is absorbing gasoline from there. They started about last April and put in their first plant. They used this gasoline or part of it in their company wagons and trucks. It is now a regular district system with them from the absorption plant to the garage in question. The procedure was to take a driver of a touring car, any driver who happened to be around and available and tell him to go round to a neighboring garage and go out to this plant and get a load of gasoline, which he did, and drove back to the garage and the man in charge emptied the gasoline which is underground, under the garage.

On this occasion the records brought out that the temperature of the day was about 92° Fahrenheit, a thousand gallon, three-compartment tank was used and was driven nineteen miles over rough roads. The construction of the tank was such that it appeared to us on the jury that the vent was entirely inadequate. The only vent to the ousic was a five-eighths inch brass tube in which there was placed a seven sixteenths brass ball with a paper seat at the top and we could take the cover off that tank and put it in our mouths and by blowing fairly hard it would be blown up against the seat—a perfect seal, preventing any ventage of the tank whatever.

It was driven into the garage; the tail was sticking out about two or three feet. Evidently the foreman in the garage had gone up on the tank wagon and taken off the cover of the front compartment holding the 400 gallons. Some girls upstairs in the building where the accident occurred looked out of the window and saw this man run out behind the tail of the wagon and take his hat off and he said "I got all wet and make a motion which appeared to be that he was wringing out his hat. He didn't act as though he felt that he was in any danger whatsoever.

Two children playing nearby said they saw a spray appear to come from out of the door of the garage right behind the gasoline wagon. Possibly they saw the waves one often sees near a gasoline tank, but they said it looked like a spray of them. One remarked to the other "Doesn't that look funny". The other looked around and a second after that the ignition occurred. The driver of the tank was burned so badly that he died, but they got to him at the hospital before he died and asked him what he knew about it and he said that the truck had been left running. It was sometimes customary and sometimes not customary to leave it running. They questioned another driver and found that there was absolutely an entire lack of rules and regulation

These men didn't know the nature of the product they were handling; Didn't know the possibility of static occuring, in fact, the hose from this tank wagon didn't have any solid connection with the tank at all and they didn't know you had to make a good ground on that proposition. They thought that there were some rules about not smoking, although there were none posted.

They said that they didn't know any rules about autos not being allowed to remain running when gasoline was being discharged, and I feel that those men and children were sacrificed just due to lack of education. We recommended on the jury that education be brought about among employees handling gasoline, also some tests be made of these tanks. Gasoline of that volatility passing over those rough roads would probably make gas more quickly than the vent could get rid of it.

I think those are about the facts that were brought out, but it seemed very interesting from that point of view and a small company would look to the Petroleum Section for some data on that point. It would be important to get those points covered in the handbooks, and we recommended that the Bureau of Mines or Underwriters' Laboratory institute a schedule for the testing of these venting devices. I believe that there are tank cars for the I. C. C., but I don't believe there is anything in tank wagons. We couldn't find anything.

THURSDAY MORNING SESSION

EFFECTIVE SAFETY METHODS IN THE MARKETING DIVISION OF THE PETROLEUM INDUSTRY

F. C. Singleton, Safety Director, Sales Department Standard Oil Co. (Indiana), Chicago

In preparing this paper I have drawn from my actual experience as Safety Director of one of the largest oil producing and marketing companies in these United States; whose marketing facilities are spread over ten states and whose 27,000 employees come into actual contact with over 30,000,000 people.

The methods outlined are those that I have found to be the most practical in the marketing division of the company with which I am now associated. I believe that the same general principles and methods of application may be in whole or in part applied to the marketing divisions of other petroleum products companies.

An efficient safety organization starts at the top; the general manager must do his part, and his part is to "make safety a necessary part of the sales organization," get back of it and keep back of it so actively that every employee will know just what the company proposes to do to help make the organization safe. The manager must convince the entire organization by visible signs, in the form of mechanical safeguards,

improved machinery, modern fire-proof buildings, good lighting, goc ventilation, adequate fire-fighting apparatus, first-aid stations, etc., ar by showing his employees that he is doing his full part before he ca expect them to take safety seriously or give any genuine co-operatio It is especially important that the general manager bring his assistan to believe in safety as they believe in sales promotion, and to encoura them to give it their whole-hearted and intelligent cooperation. This ca be brought about by exacting from these men exactly the same degr of attention to safety as is required in the case of production, by freque conferences between this body and the safety director who will pla before them the combined record of the entire sales division on accide prevention.

What applies to these men will also apply to the district managers a their assistants: They must be the field marshals in the safety campaig and by their own faith and enthusiasm they must win for it the respe and support of every employee in their division.

Field safety engineers should be installed who will carry on the wo in the territory to which they are assigned. The safety director, who the "central authority" and who shoulders the entire responsibility f accident prevention should train them and determine their duties. T field safety engineers should work directly under the safety direct who formulates safety policies to be carried on by his assistants.

The safety engineer should be given opportunities to acquaint hims with the methods employed by other safety engineers who have do effective accident prevention work. He should read extensively, atte local, state and national conferences and congresses; in fact, do eve thing that will broaden his point of view.

Duties of the Field Safety Engineer

With knowledge thus gained, a safety engineer with qualities of lead ship can do much towards organizing and promoting effective educatio work.

The following will suggest a few of the duties required of the fi safety engineer:

(a) Check up unsafe practices, unsanitary conditions, the use a need of safeguards, etc.

(b) Keep in touch with station agents, foremen and other dep ment heads, and secure their cooperation by serving them.

(c) Recommend methods of safeguarding and follow-up installatio

(d) Check all specifications and drawings for new equipment, n installations, or repairs, to see that provision is made for saf

(e) Get acquainted with all new employees, check their physi reports, and advise them of the safety work and their part the program.

(f) Supervise bulletin board service, and other such service as l tains to safety.

(g) Supervise safety educational activities.

(h) Arrange program for safety meetings, (to include both plant and court meetings).

(i) Investigate all accidents.

(j) Keep records and prepare reports on accident experience.

Fellowship, system, education and discipline are four necessary elements in safety. In carrying on any educational course of safety, these elements must be considered separately and individually, as each element has a direct bearing on the ultimate desired result, viz.: to reduce accidents; to improve working conditions; and to increase efficiency through educational means.

Before outlining a suitable educational course in safety, it is necessary to study and systematize the accident data of the company. This data, when systematized, will not only be suggestive in laying out an educational scheme, but will also be useful in later years for comparative purposes.

A Central Safety Committee Essential

Having established an educational course in safety, the work should be carried on systematically as part of the company's educational work, centralized under the direct supervision of the safety department.

Safety education, to be effective, should be handled by a central safety committee through which the employees are informed in regard to safe and efficient methods of operation. This committee would work to secure the earnest and whole-hearted cooperation of all employees in preventing accidents. This central safety committee in our organization is called a "safety court" and it includes the district manager, assistant manager, certain classifications of station agents, equipment superintendents, construction engineers, garage and machine shop foremen, department heads, a selected number of workmen, and the field safety engineer. This committee or safety court should meet at a regular hour each week. If the sales organization is divided into a number of sales divisions, then a committee or court should be established in each division.

Engineering revision will be applied to the problem of preventing accidents only in proportion to the degree to which the construction engineer is convinced of its necessity. Maintenance of equipment will be considered in its true relation to safety only when the equipment department, garage foreman or chief mechanic realizes the importance of safety in plant organization. Station agents should be made to realize that hiring, placing and instruction of warehouse men, tank truck drivers, etc., have a distinct bearing on accident prevention.

The purchasing agent should understand the necessity for purchasing material according to definite specifications, and for requiring all manufacturers to incorporate in their machines every necessary provision for the safety of the operators. Department heads need conviction that supervision plays an important part in keeping down the number of accidents.

Give a workman some active part in safety work, some responsibility and you will secure his interest. The one indispensable thing is that h superior shall believe in the committee idea and constantly encoura the men in their safety work.

When the workmen are given full opportunity to ascertain just h men are being injured in their own and other departments, they find for themselves, what percentage of the accidents can be prevented the company and they will also learn what a large percentage of accide can be eliminated by banishing ignorance and carelessness on the p of the workmen.

Scope of Central Safety Committee

An effective central safety committee can handle many items of saf and by making thorough investigations of all accidents, near accide unsafe conditions and unsafe practices will enable the district mana to make quick decisions in promoting safety work.

This committee should have authority to:

(a) Establish standards for safeguards.

(b) Review reports and recommendations of safety engineers, other employees.

(c) See that tools and machines are kept in proper repair adjustment.

(d) Inspect their own and other departments and render full rep

(e) Investigate all accidents and recommend methods of prevent

(f) Keep closely in touch with other committees and their activi

Each accident, regardless of its seriousness, should be carefully inv gated by the central safety committee to determine the mental atti of the employee at the time of the accident and to secure the facts circumstances attendant to the incident. To secure this information, e employee should be instructed to report promptly any accident in w he becomes involved with to his immediate superior who, in turn, municates with the safety engineer.

To encourage the employee to report all accidents promptly accurately, two sets of standard forms should be prepared—one cove personal injury to the employee and the other covering property dan or personal injury to persons. On these forms questions are pri requesting general information covering the accident. Each forema supervisor should have these forms in his possession. By employing method, a close check can be kept on all accidents occurring among employees working at the various plants.

A somewhat different method can be employed in securing acc information from motor truck drivers. Our plan is to supply each a long tin tube in which the above mentioned forms are placed a with witness cards, pencils and tape measure. These tubes are k fastened in the cab of each motor truck

the event of an accident in which he is involved, the motor vehicle driver stops his vehicle as soon as possible; removes the accident tube from its holder; takes all necessary measurements with the tape measure; fills out his witness cards; then fills in the answers to the questions on the printed forms. He then reports the accident by telephone to his immediate superior, who then communicates with the safety engineer who then takes charge of the accident.

How a Safety Court Functions

A complete report of this accident should be compiled by the field safety engineer and presented to the safety court at its next meeting. The court informs itself from the report as to the general facts and then calls in the employee involved. He is questioned as to the details and informed as to what his conduct should have been under the circumstances. He is again asked to assist in preventing accidents. Repeated failure to observe rules and regulations may result in his discharge. Discipline, however, should not be exercised until all other means have failed; and then only with due allowance for unusual conditions, such as the newness of the employee, his unfamiliarity with rules, regulations and operations, his mental condition and the reasons therefor, etc.

These investigations should be carefully compiled by the safety engineer. In his study of safety devices, first aid work, and all methods of resuscitation and sanitary conditions, he should also systematize and classify all accidents which occur, with their causes. From this data it will be found that certain large groups of certain classes of accidents exist, differing however with each operation in the storing, handling and distributing of petroleum products, and those particular groups are the ones upon which concentrated effort should first be made. It will be found in the warehouses, for instance, that strains, ruptures, falls, and bruises form the most prevalent sources of accidents. While in the garages, repair shops, and construction departments, cuts, eye injuries and other injuries to repair-men are most prevalent.

How Fellowship Helps

In many corporations we find the element of fellowship highly developed. There is a close relationship in the idea contained in the words "co-operation" and "corporation." One is defined as the act of operating jointly with another to the same end. The other is defined as a body politic, organized to operate as a single person. Andrew Carnegie, in the early days of steel making, tied a broomstick to the smoke stack of the rolling mill that had the greatest monthly output. It worked wonders as a stimulus to human endeavor. Carnegie understood human nature—the ability of people to work together, to pull together under the proper stimulus of fellowship due to sympathetic and just leadership. The greatest progress in safety work will be found in those places where systematic educational safety work is carried on, where the right spirit of fellowship exists, and where the manager and the workmen at the bench

feel that they are fellow-employees. There must be respect for superiors and discipline, but at the same time there should be friendly confidence and mutuality of interest.

A certain day and hour each month or each week should be set aside for safety meetings and the meetings rigidly adhered to. When the time of meetings is arranged to suit the convenience of the employees, or the business itself, it is often neglected entirely. If the employes know, however, that the time of the meeting is fixed and they are expected to be present, they will plan their work accordingly, especially if the whole idea is backed by the manager.

One of the most important subjects is the formation of safe habits. This subject may be termed a foundation for all accident prevention work. The employee who has formed safe habits does his work in a safe and efficient manner as a matter of habit.

Lectures on safety should be given in such a way as to arouse the interest of station agents and division heads.

Responsibility of Agents

There is an increasing tendency in our safety work to use the bulk of distributing agents as centers from which to radiate safety ideas. These men should be brought together in groups and given actual instructions in first-aid and accident prevention work.

When an accident does occur, the station agent is to be notified immediately and he, in turn, directs the employee who has had the accident when and where to get medical aid, how to secure names and addresses license numbers and statements of witnesses. The station agent is also in a position to make recommendations concerning the safety of his plant; he is urged to place orders to have safety devices installed, and he is held responsible for the safety, sanitation, and welfare of every employee in his plant. The agent, in other words, has every facility and every liberty in instituting accident prevention work and in using discipline if necessary.

There is every reason, therefore, why the station agent, or division head, should feel the responsibility for accidents that occur to employees in their departments. As in safety work, so it is with other things; if we center responsibility in the station agents and division heads, placing every facility and suggestion at their disposal, we accomplish the best results.

As health plays an important part in accident prevention work, employers are taking greater pains to inquire into the physical fitness of present employees as well as new employees. This is not being done with any idea that it should be substituted for the activities which many companies have adopted and which are of special interest to employees as vacations, rest periods, visiting nurses, social activities for employees old-age pensions and profit-sharing plans.

Where such responsibilities are assumed and where large sums are being spent to increase the efficiency, health, comfort and safety of the

employees, it is natural that employers should be extremely cautious of the physical condition of those about to enter their organization. The introduction of medical and physical examinations of new employees is one of the greatest steps taken in recent years, toward placing a premium on health.

Marked progress has been made in recent years by large industries in installing emergency hospitals for the care of the sick and injured, and in the general instruction of their employees in first-aid work.

Owing to the fact that some sales organizations are spread out over a number of states, it is not convenient to install complete first-aid stations with regular attendants in charge. Therefore, it is obvious that first-aid kits should be installed at convenient places about the plant offices, warehouses, machine shops, etc., and that the agents, or their employees, be taught first-aid methods.

Fire Prevention Vital

There is probably no form of accident prevention worth more to the petroleum industry, especially, in the matter of storing, handling and distributing of petroleum products, than the prevention of accidents due to fire.

In locating sites for erecting either a bulk distributing or gasoline filling station, thought should first be given to fire hazards. The community surrounding the proposed site should be carefully scrutinized from a safety, as well as from a business standpoint; the inhabitants themselves should be studied to ascertain their habits and mode of living—in short—everything of a hazardous nature should be carefully considered and recorded before the actual purchase is made.

Plans, drawings and specifications should be checked by the safety department to make sure that every provision is made for safety. This scheme should be followed throughout the building program and until the station is finally completed. In the building of large bulk distributing stations, modern fire-proof structures should be built of: concrete, brick and steel, having large window spaces, plenty of ventilation and ample exits. The diking of tanks and other rules governing the erection, spacing, etc., should be strictly adhered to.

It often happens that long after a bulk distributing station has been built other concerns erect their plants adjacent to the properties of the oil company. These are often granaries, lumber yards, saw mills, coal and wood yards, and electrical supply stations which often stretch high tension supply lines over or near the oil station. All these are considered elements of danger, therefore every precaution should be taken to insure the plant against the probability of fire.

The problem of fire protection after the station is completed should then be considered. The main thing about fires is to prevent them. Fires are of two kinds—those that could have been prevented and those that could not have been foreseen.

To prevent the occurrence of fires from ordinary means, metal containers should be placed at all stations to hold waste matter and oily rags, and further by not permitting employees who handle petroleum products to smoke while on duty. All buildings should be supplied with ample fire-fighting apparatus, consisting of sand pails, large and small hand extinguishers, hose reels, and in many cases a number of the larger extinguishers of 40-gallon capacity and over. A complete fire alarm system should also be installed. Volunteer fire-fighting units should be organized at the larger and more important stations. The plan of organization should contemplate the stimulation and development of interest on the part of each employee by giving each of them an active part in the unit, either as member or substitute, and by holding regular fire drills. These drills should be called often and all the units in the field frequently inspected by the division manager or other officials of the company.

Considerable thought should also be given to the probability of fire due to so-called static, dynamic currents and lightning. This should be considered a part of the building program. Grounding devices should be installed at all loading platforms and all service stations.

Fire protection should also be provided by placing small hand extinguishers on all automotive equipment and two and one-half gallon capacity extinguishers at each of the service stations. Thus, adequate fire-fighting apparatus is provided for the protection of the employees and the products involved.

Others Mediums of Safety Education

Other methods could be employed to keep safety constantly before the employee. Pictures and stories in the form of bulletins which drive home what the workman can do to protect himself, have come to be recognized as one of the most effective means of reaching the men. Bulletin boards should be placed at convenient points at each plant. The secret of a live bulletin board is constant change—always something new, something striking. In addition to bulletins published by the National Safety Council, home-made bulletins could be used showing accidents or near accidents which have actually occurred in the various plants.

The house organ is another valuable medium. A certain amount of space should be regularly assigned to the safety department, and all divisions should be expected to contribute articles, pictures, etc., to further the interest.

Another good method whereby the drivers of tank trucks, stake trucks and even salesmen, are constantly impressed with safety by placing before them a form of "Reminder Cord." This card should not be over 3½ inches and should be printed in various colors and include thought suggestions or safety hints. A small metal card holder could be attached to the dash-board of each vehicle and the card, (which is changed ea

Since the stopping at all railroad crossings has become a national topic, it would seem that other companies would see to it that their drivers come to a full and complete stop before crossing any railroad crossings. This can best be done by having every driver sign a form of "Pledge Card" or by placing a small sign on the rear of his vehicle reading: "This vehicle will come to a complete stop before crossing railroad tracks."

Many other methods could be employed in carrying out the accident prevention program but it is needless to go into detail on the subject of general safety methods. It has already been said, however, that education is the keynote to universal safety. If accidents are to be prevented, the employee must be taught to be careful, to think of the safety of his fellow workmen and to refrain from taking chances.

RECENT PROGRESS IN SAFETY IN THE CALIFORNIA PETROLEUM INDUSTRY

Roy Willmarth Kelly, Manager of Industrial Relations, Associated and Pacific Oil Companies, Representing the Chamber of Mines and Oil of California, San Francisco, Cal.

So rapid has been the recent growth of the California petroleum industry that it is difficult to describe any phase of its operations with any degree of accuracy and completeness. There are now operating in the state several hundred oil companies, having on their payrolls upwards of seventy thousand employees. To give you some worthy perspective of what these companies and the organizations interested in the welfare of their employees have recently accomplished, it seems best to attempt to describe only three or four of the outstanding tendencies, leaving apart the detail of safety equipment and individual practices for a sketch with some slides, which will be shown at the close of my remarks.

In 1923 the California State Industrial Accident Commission issued in tentative form a set of petroleum safety orders. These were prepared as the result of an extended series of meetings participated in by oil operators, safety engineers, and the safety inspectors of the commission. As adopted in their tentative form and later made a part of the regulations of the commission, these regulations stipulated certain modifications in the erection and maintenance of field equipment, the orders being confined almost entirely to oil field operations, little or no attention being given to refineries, sales, pipe lines, or marine departments. By issuing the orders in tentative form, they were subject to general criticism and suggestion, and their final adoption represents the result of very careful and co-operative study by everyone concerned.

Under these regulations, every company must provide first-aid cabinets wherever eight or less men are employed in one locality. Both employers and attendant physicians and surgeons must make reports

of every injured employee where the disability lasts through the day of the injury or requires medical services beyond the ordinary first-aid treatment. Reports of this character have been received by the Industrial Accident Commission over a period of many years, and these are made in such detail that they furnish an excellent fund of information for the study of the causes of industrial injuries.

Under the petroleum safety orders, specifications are given for the construction of derricks and for safeguards for both drilling and pumping equipment. The orders also give specifications for safeguards for loading racks, and require the use of gas masks and the presence of an assistant whenever a man is put inside a tank or container known to have previously held oil or gas. Provisions are also made for the prevention of fires at distributing plants; loading racks and warehouses where static electricity might cause petroleum vapors to ignite. Under the orders, as finally adopted, the complete list of safeguards are required only on new construction, except in cases where wells are being redrilled, when certain essential safeguards must be incorporated in the derrick construction. All this work is going forward very successfully and should result in materially decreasing the number of hazards encountered in the drilling and operation of oil wells.

Maintains Force of Inspectors

For the purpose of enforcing these orders, the Industrial Accident Commission maintains a small force of inspectors. It also publishes a monthly bulletin which has been of considerable service in disseminating safety ideas of educational value.

One of the outstanding contributions toward safety in California has been made by the United States Bureau of Mines through its first-aid courses. Its instructors are constantly at work giving lectures and demonstrations throughout the state. First-aid courses, usually one week in length, have now been given to the employees of nearly all the larger companies and many of the smaller concerns, in the producing fields, pipe line departments, sales departments, and in most of the larger refineries. This work has been supplemented by instructors employed by many of the large corporations, engaged both in the oil industry and in other industries, and by the work of the American Red Cross. The state holds an annual first-aid meet, which will convene this year at Riverside. Present indications are that twenty-five or thirty companies will participate in this annual meet.

The California Society of Safety Engineers has taken an active interest in promoting safety in the oil industry. In April of this year the National Safety Council held in San Francisco what was known as the Pacific Safety Conference, the first large conference of the kind to be convened on the Pacific Coast. Following the two-day convention sponsored by the National Safety Council and the California Society of Safety Engineers, the petroleum industry held a session lasting one

day. This session was attended by some three hundred delegates, and resulted in the formation of what was then designated as the Petroleum Safety Handbook Committee.

The original purpose of this committee was to prepare a series of safety handbooks for distribution to employees in all divisions of the petroleum industry. The committee has since been requested by the California Chamber of Mines and Oil to act as its official committee on all safety matters, and it is anticipated that it will be continued as an active body for some time to come. As at present organized, there is a main committee which outlines general policies. There are, in addition, sub-committees which will deal with the following divisions of the subject of safety as it pertains to the petroleum industry of the state:

1. Producing Fields
2. Pipe Lines
3. Refineries
4. Marine Transportation
5. Automotive Equipment
6. Sales Department
7. Engineering Construction

Each sub-committee will break up the field assigned to it into a number of sub-topics. Each member of the committee will work on an assigned subject, and the material thus brought together will be put into shape by the Executive Secretary of the Chamber of Mines and Oil and by Mr. H. C. Miller of the United States Bureau of Mines, who is co-operating with us in this undertaking. Since the formation of the committee, several articles on safety have been published every month in the Mining and Oil Bulletin, the official journal of the Chamber of Mines and Oil and contributions have been made to other oil trade journals. As soon as any considerable body of material on any one subject is gathered together, it will be published as a supplement to the Bulletin, or as a special publication by the National Safety Council. It will then be available for distribution by companies that desire to purchase the bulletin at cost for their employees.

This committee is largely the outgrowth of a co-operative undertaking entered into by five or six of the leading oil and gas companies of the state two years ago, when a safety film was produced under the title "When Wages Stop". A number of copies of this film are now available, and it has been widely distributed throughout the United States.

All Companies Active Safety Boosters

It is difficult to say very much about the accomplishment of individual oil companies in the safety field. Several of the larger companies are employing one or more safety engineers, and are active in holding meetings, making inspections, installing safeguards, and doing educational work.

I think I am safe in saying, however, that most of us who have give very much thought to the subject are well agreed that safety is onl one aspect of the whole problem which confronts us in dealing wit our employees. It is useless to set up a thorough-going safety campaig unless we back it with good housing, proper sanitation, adequate medic supervision, and modern employment practices. Our California cor panies are giving considerable attention to these matters, and if w have had any considerable success in safety, it has been largely due t the fact that these other conditions, prerequisite to a satisfactory lab situation, have been properly met. In our own company, safety educ tion has been part of the functions of the industrial relations depa ment. It is being handled in part by men who are also responsible f employment, general education, housing inspection, and other simil personnel activities. The greater part of our progress along the lines has been due to the work of individual superintendents and fo men who have been helped to get the idea that there is room f improvement, and they, with the help of our regular resident enginee have instituted and carried on practically all the mechanical sa guarding and the changes which have taken place during recent yea in our methods of operation. We have, of course, helped them grea by conducting meetings, giving publicity to successful accomplishmer in the pages of our house organ and on the bulletin boards, and compiling every month a statistical summary of our safety reco arranged by occupations and by divisions.

We feel that our organization in California is reasonably adequ to handle the safety situation. Fairly good progress is being ma and we hope, with the help of the Pacific Coast Section of the Natio Safety Council, an organization which ought to be immediaely est lished, to look forward to even better accomplishments in the fut than we have seen in the recent past.

DISCUSSION

ROY S. BONSIB (Standard Oil Company, N. J.): I thought it would interesting to find out about what the other companies were do about smoking, so we got the Council to send outa questionnaire of 1 questions. I wondered if you would be interested in the results?

The first question was: "Have you any definite rules regarding wh and when men handling or delivering petroleum products can smok We found that practically all the companies have rules, although so of them are very indefinite. Some of the man are not allowed to sm on company properties, others not allowed except at meal times, w special places are provided, others have rules where it is absolu forbidden to smoke any place within the fence surrounding the p erties. In a large number they permit the men to smoke in the o or in the clock house.

The next question was: "How is this rule stated and what means are used to insure that the rule is enforced?" Some of the companies enforce it by agents and other supervisory officials; others by company guards; others simply by signs posted around the plants and repeated to every new employee. In one company if men are found smoking, they are suspended for the first offense and discharged for the second; another company reported that they had signs up "smoking absolutely forbidden within this plant" and discharged for any violation. One company said they suspended or dismissed without further notice for smoking or carrying matches other than safety matches. Others have the rule published in their rule book.

The third question was—and I might say that this questionnaire was answered by 29 companies which are the principal companies in the country: "would it be possible to have a rule prohibiting men handling the lighter petroleum products from smoking during working hours?" Most of the companies answered in the affirmative. Some companies replied that they had the rule but did not always enforce it; others were very emphatic about enforcement, but the majority enforced it very rigidly. One company made the statement that they believed it desirable to permit smoking at safe locations because they consider that the men will observe this regulation more carefully than if smoking were entirely prohibited. Another answer gave the information that men handling the lighter petroleum products should be prohibited from smoking during working hours, but they added that provision should be made so that the men may smoke in safe places during lunch hour.

The fourth question was: "have you a rule requiring that men shall carry and use nothing but safety matches?" I was surprised to find that a large number of companies did not have that rule, although quite a number did. One company replied very picturesquely that "strike-anywhere matches" are entirely prohibited in the refinery and that safety matches are furnished to employees who have use for them. Another company made the statement that carrying matches about the works was strictly forbidden and that the watchmen and others in authority see that this rule is enforced, and that they furnish matches at the office and lunch room.

Danger of Matches

I think that is a point everybody should consider—the danger of carrying anything but safety matches. The danger of the ordinary type of match should be emphasized because you might pull your handkerchief out and drop these near gasoline or other inflammable material, step on one of them, and start a fire. I saw a very good slogan by a twelve-year old girl in which she said, "All matches have heads but no brains." I think that is a good one.

This is the fifth question. "Have you a rule requiring that men whose clothes become saturated with the lighter petroleum products change them immediately, or as soon as possible thereafter?" Of all the com-

panies answering this question, only two had such a rule. That is sta ling. I consider that a very important rule. One of the two said tl they had written several articles on the matter and published them their paper and had tried to impress upon agents and others the portance of it. That is an awfully important thing and I think n should be required to change their clothes and wash and dry them wl they are saturated with the lighter petroleum products. One compa reported that their men are furnished slicker suits which are chan after they are through their work. One of the companies said tl had no rule but think it a good suggestion, but didn't say whet they were going to adopt the idea or not.

We have heard a lot about carbon monoxide around garages. Th are a lot of signs gotten up about it. The Bureau of Mines did some cellent work on this as well as the boards of health. We have b working a long time to get something that we could get across to men and after a lot of thought we have gotten out a poster whic believe gets across. This is in all of our garages and sales departme and I suggest that the wording of the thing gets your attention, not only the wording, but the color combination. There is a cl between yellow and red. We have first the yellow to attract atten and then we have the red to make the clash. It reads as follows:

"Warning

"The Exhaust from ALL Gasoline

"Engines Contains Carbon Monoxide

"A Deadly Gas

"You Cannot See, Smell, Taste or Feel

"This Dangerous Gas, So It

"KILLS WITHOUT WARNING

"You Will be Safe if You—

"1. Always do Repair Work on Gasoline Engines in the OPEN when possible.

"2. Never Work Under a Car with the Engines Running, even th the Car may be in the Open.

"3. Never Run Engines of Automobiles or Motor Trucks insid Garage with the DOORS CLOSED.

ALWAYS SEE THAT THERE IS PLENTY OF VENTILATION

"4. When Gasoline Engines are Run in Shops for Testing or Wor in Bearings, the Exhaust should be PIPED to the OUTSIDE OF BUILDING.

"5. Tell ALL Employees and Customers about the DANGERS EXHAUST GASES From Gasoline Engines.

"FAILURE TO FOLLOW THE INSTRUCTIONS OUTLINED
"ABOVE MAY COST YOU YOUR LIFE.

"STANDARD OIL COMPANY, (N. J.) . . ."

On Cranking a Car

That has proved very effective. We had our different sales managers send in what they thought would be a good warning sign. The shortest one—I counted the words—had 142 words.

I think that anybody who has men operating trucks has had the experience of men cranking when their trucks are in gear, so we got up this little yellow sign and put it up:

"STOP
"If You Crank Your Truck
"WHILE IN GEAR
"You May be Seriously Injured or
"KILLED"

Just one other point, if I may have the time, that I would like to mention, and that is the value of sand around sales stations. Personally, I don't think much of fire extinguishers, although they are all right to have, but not to depend on. We had a certain case of one of our sales stations in the South, where a man was filling a tank and it suddenly burst into flame. They tried three extinguishers and they didn't feaze it. Then they threw sand on it and had the fire out after three extinguishers had failed. I think that that is very good proof of the value of sand.

There are two fire hazards around sales stations that I would like to mention and one is to repeat what I said about matches. Be careful about matches, and the other is birds' nests. We used to have a lot of birds, but maybe they don't bother the Standard Oil plants, but according to the American Bureau of Fire Underwriters, it was stated that sixty-two per cent of the fires around stations were due to birds' nests. I think that is a point well worth mentioning.

ADJOURNMENT

Plant Publication Section

SYDNEY W. ASHE, Chairman
Editor, Current News, General Electric Company, Pittsfield, Mass.

MISS MARGARET STEVENS, Vice-Chairman
Associate Editor, B. & O. Magazine, Baltimore, Md.

A. G. STRICKROTT, Secretary
Editor, The Synchronizer, Adirondack Light and Power Corporation
Schenectady, N. Y.

THURSDAY MORNING SESSION

CHAIRMAN ASHE: Despite the fact that people will continu to come drifting in for awhile, I think we had better get started since we have rather a long important session ahead of us.

I want to say a word to you, if I may, in regard to the policies o this section and what we have attempted to accomplish the past yea Under the very good work that Mr. Augustus, former chairman did, the section took on real life and we had a most interestin meeting at Buffalo last year.

We have given a good deal of time to this work and we wer fortunate in getting together a most interesting group of capabl people, such as Mr. Price of the Warner Gear Company, who wa chairman of the program committee, and Mr. Jessup, who has don such splendid work in getting this poster exhibit together.

Mr. Jessup cannot be with us this morning, and, although he an Mr. Price and others have done a very splendid piece of work i regard to this exhibit, I am going to take the liberty of following hi suggestion for the appointment of judges for the plant publicatio contest. We have selected Mr. A. L. Watson, Mr. R. G. Conover an Mr. C. F. McGuire.

The problem of judging in this contest has developed into a fa more difficult thing than the committee originally anticipated and w have got to take a little time for it. It will be absolutely impossibl to give snap judgment to it.

The general plan is to classify the papers into two groups, the large papers and the small papers, and then due consideration must be given to the amount of safety material that is used.

We are having a complete list made of all these papers and if any of you want to get a copy of that list so you can communicate with these people and get samples of their papers, we will be very glad to see that you get same. It will take several weeks to judge this contest, because the judges have got to go over the papers very carefully.

I think it is the plan of the secretary to communicate with all the editors, and by the way, if there are any of you whose magazines have not been included, I don't think it is too late. If you would send them in within a few days after you get back, we will appreciate it.

The first paper will be presented by Miss Margaret Stevens, who is the associate editor of the B. & O. Magazine.

PLANT PUBLICATION POLICIES

How to Awaken Human Interest

Margaret Talbott Stevens, Associate Editor, Baltimore and Ohio Magazine

"A man without a purpose is like a ship without a rudder," and trying to run a plant publication without some kind of policy, or workable basis, is like trying to hold a safety meeting on a railroad track—the results are mighty uncertain.

The big idea that lies back of the plant publication is that it shall be not simply a paper for the entertainment of its readers, but that it shall help each employee to feel that he is a big part of the great machine, a member of the big family of employees; and that if he does his work well, he is helping in the progress of the company and helping himself along the road to advancement.

There recently came to our office a picture bearing the inscription, "Steam Alone Cannot Turn the Wheels." Back of the engine, and behind the engineer, are a girl stenographer and an office man, showing that everybody has a part in the running of a railroad. Although this picture is purely symbolic, yet it seems to me that it is incomplete; there should have been portrayed the great army of railroad workers who run the railroad—for every job, no matter how insignificant it may appear, is a necessary job, or it wouldn't be filled. And it is the purpose of the magazine to stress this fact.

When the engine of the Capitol Limited has finished her run from Chicago to Baltimore and is sent down the yard, a small sized multitude of people gather around her and go over her like bees. Sweeping, brushing, wiping, polishing; nothing is left undone for the appearance and comfort of the passengers. Only selected crews man her; the

tracks are cleared a half-hour before her in order that there may no chance of her delay. But, suppose the grease-cup boy shou neglect to keep his oil cans clean; suppose he should allow sand get mixed in with the oil, and that sand went into the fine bearir of the Capitol Limited's engine. What would happen then? Whe would our reputation for good service be then? That in itself is big lesson in safety that the magazine can teach—even to the grea cup boy.

For this reason, it is the policy of the Magazine to present material in an interesting manner, in simple, clear-cut sentences tl will be understandable to any employee. In this way we endea to promote habits of safety, courtesy and good neighborliness; neatne thrift, pride and loyalty among our people; we encourage them throu example rather than by precept; a commendable act on the part some employee, told of in a short story, together with one or m illustrations, will do more toward encouraging purposeful thinki on the part of the others than will a dozen pages of type.

Illustrations Arouse Interest

President Willard once asked Mr. Van Sant, the editor of t **Baltimore and Ohio Magazine,** if he knew the reason for the succ of the Hearst publications. Mr. Van Sant replied that he belie it to be due in part to the great number of photographs which th publications use. Mr. Willard then advised the editor to apply same principle in presenting facts to the readers of our magazi And we have found that it does work. The more illustrations have, the better; the more pictures of employees that we run in e issue, the more interesting will be our publication from the ployees' point of view. Our September issue contains in its pages, the pictures of nearly 5,000 employees, including those pictu in the large groups.

We give credit where credit is due, and wherever there is slightest excuse to give credit to someone not on the editorial st we give it. If an employee has contributed something to the magazi we always try to use it, even if it has to be re-written entir Seldom does a contributor object to re-written copy. In case many changes, we frequently send the edited copy to the writer his approval. If he is satisfied, we run the story over his signatu

Sometimes, in the divisional notes we get a tip for an interest story. In this case it is only fair that the correspondent rece the credit, even though we get the big story ourselves.

Advertising is a good thing for a plant publication. It may only a small fraction of the publication costs, but it makes it l like a real magazine. We do not guarantee our advertising but believe that each advertisement means exactly what it says or would not publish it. For this reason we feel free to urge our employ

to patronize our advertisers whenever they consistently can. There are certain forms of advertising which we do not accept, such as patent medicines and questionable financial schemes.

To sum up our policies, we might say that our big aim is to run a clean magazine, with clean illustrations and text, and clean advertising—a magazine that will be not only interesting and helpful to the employees, but one that will encourage the fine spirit existing in our big railroad family, and that will help to make them better citizens and happier men and women.

Editor Must Have Imagination

The question of awakening human interest in the magazine lies largely with the editor. He, too, must have his own policy—that of placing himself "in the employee's shoes" before writing any article that he expects to "go across." The employee reads the thing that appeals to him, and if the editor lacks imagination that will enable him to see, partly at least, the point of view of the reader, he had better cultivate that ability or quit.

The editor must be ever on the alert for new ideas. He cannot afford to sit back in his corner and merely wield his blue pencil. He must talk with the men; he must get a slant on their work, get their ideas and understand their attitude toward the company in order that he may the better present the material to them.

The plant publication is the great point of contact between management and employee, but unless the employee is talked to in the language of his own work, unless your copy is based on some experience that lies within the understanding of the man you are talking to, the result is questionable. For example, you want to write an article calculated to encourage Safety practices in the shops. You begin:

"Safety is the greatest element in the preservation of human life. He who does not observe the principles of Safety. First endangers not only himself but his fellow men," and so on. Do you think that you are writing something that will interest the shopman for whom it is intended? How about this instead: "Tom Robinson lost an eye. Tom was a good worker, as all of us know; he was, generally known about the shops as a safe worker, and he was, until yesterday. But occasionally he had a habit of laying off his goggles. Yesterday was a hot day, and Tom laid them off just once too often. Today he is suffering in the hospital. The doctors say he will never recover his sight." And so on. Which of these will the shopmen read? We must be specific; generalities will not go in a plant publication.

Keeping the Reporters Interested

The keynote to our magazine is that section known as "Among Ourselves." Other magazines have different names for it; it is that section devoted to divisional notes from office, shop and track. Every division has its own correspondent and assistants. Once a month there goes

out from the editor's office a multigraphed letter to correspondei In this letter the editor gives the date on which the next mont notes are due; he praises the work of those correspondents who ha done particularly good work; when a special campaign is being c ducted on the Railroad he calls the attention of the corresponde to the fact and asks their co-operation; he tells them how to go af news and how to write good, constructive notes.

Our correspondents are not paid for their reportorial work, althou many of them write the notes on their own time, and we have ma of them who almost never miss an issue. However, several pri are awarded annually for the best all-around correspondents for year—although this fact is never advertised. The prizes are sim awarded and the names of the winners published in the Janu magazine.

One of the biggest "interest-getters" that we have ever had wa "Correspondent's Convention" last year. The Railroad provided t transportation for correspondents from all over the system to and fi Baltimore, food, lodging and entertainment for them during the days of the convention. Interesting and helpful meetings were h in the mornings, a big informal dinner on the first night, a water on the first afternoon, and on the second afternoon they were guests of the Railroad at the Navy-Princeton football game. results of this convention are plainly seen in the improvement of "Among Ourselves" notes, both in quality and quantity and in r larity. The fact that our president, one of our vice presidents, of our general managers and other officers took the time to add them made them realize what their help is to the railroad and the magazine.

I am dwelling on the "Among Ourselves" section of the magaz for it is the biggest interest-getter of all. Almost any employee tell you that he reads the divisional notes first. There are o departments, however, which have their places in the varying inter of our readers and which we consider necessary.

Honoring the Veterans

When a man is placed on our retired list after years of fait service, it is only right that he should have a place in the Maga It is almost the last time that his name will appear there. So we our "Pensioner's Roll of Honor" in each issue, in which each pensioned during the previous month has his picture and a sk of his life.

The honor roll is for those who have averted accidents by fore or prompt action. The editorials, under the title, "The Editor's Table," aim to keep in mind the Railroad's policies, to call the atte of the reader to important articles in the magazine, to help the ployee keep his eye on the job ahead of him, to encourage hi

every possible way, and to give the editor a chance to interpret to the men the wishes of the management; it is the Magazine's clearing house.

Several pages are devoted to "Our Veterans," men who have been in service for 20 years and more, and their various activities, picnics, meetings and celebrations. "In the Realm of the Riddle," edited by one of our officers who is a nationally known puzzler, provides food for thought for those who like puzzles.

The magazine that gets into the home is the magazine that is the most effective. And it is necessary that the plant publication shall reach the families of our workers. We may run all kinds of articles which are calculated to encourage a man in habits of thrift, good health, safety, etc. But if he has a wife at home who is wasteful, who is careless, who is a poor cook, or who is constantly nagging at her husband and thus keeping his mind continually upset by domestic disturbances, then our magazine articles might just as well be unwritten. On the other hand, if we can, through a Women's Department in our Magazine, help to create a contented atmosphere in the home, tell in picture and story the value of good housekeeping, suggest household economies, give her ideas of food values and cookery hints, tactfully suggesting the value of a peaceful mind to her husband and the part that it plays in accident prevention; if we can do these things, is it not worth while? We endeavor to impress upon the minds of the man the principles of his company; why not complete the job and show his wife that she is his silent partner in business? This is the purpose of our Women's Department. Our women have become faithful contributors to their department; this feature alone would seem to make a women's department worth while.

The Children Read it, too

As to the Children's Page, not all of the children of our employees are the future engineers, firemen, conductors, clerks, trackmen and officers of the railroad; but there are enough of them to warrant our teaching them through picture, verse, song and story, the principles of the company through which Daddy earns his daily bread. The object of having a children's page in the **Baltimore and Ohio magazine** is not only to remind Daddy to bring home the magazine, but to help Daddy and Mother and Teacher to train their little railroaders in habits that will make for good citizenship, and consequently that will help them to be good railroaders, should they choose this occupation when they grow older.

All of these departments of the Magazine, as you will note, are, by their nature, interesting to the employee, if only because they make a personal rather than a group appeal. And this, of course, does not accomplish the primary purpose for which the Magazine is published—which is to show to all of our employees the fairness of the company's policies and to stress the fact that what is for the good of the Railroad is, in the last analysis, for their good also.

Hence, the articles dealing with the social relationship of the em ployees, both off and on the railroad, are intended chiefly as a back ground from which to make stand out those other articles covering the railroad's constructive policies, and to stimulate the sympathetic interest of employees in them.

As President Willard has said so aptly, "I would like to have thei constant and helpful co-operation toward improving the operation o the property in such ways as may be possible—not however becaus they feel obliged to do so, but just because they want to do so."

DISCUSSION

MR. E. H. THOMAS: I would like to know what you do when on of your correspondents begins to get negligent and loses interest.

MISS STEVENS: We seldon have correspondents who lose interes Occasionally we do and when it does happen, we try to find out th reason. Generally it is because he is too busy to attend to the worl In that case we write him a letter and at the same time send a cop to the superintendent asking the superintendent to employ some on who is not so busy.

MR. A. B. TUNIS (Editor, The Chesapeake & Ohio and Hockin Valley Employees Magazine, The C. & O. and Hocking Valley Rai road, Richmond, Va.): I would like to ask how you circulate you magazine.

MISS STEVENS: The magazine is printed in Baltimore. We have tw buildings and the bulk of the magazine goes to each building ar they are distributed from there.

MR. A. B. TUNIS: Do you find that system practical? Our syste is very similar to that, but we are convinced that we do not rea all of our employees. We print 35,000 copies and occasionally w have complaint of failure to receive them. I think it is really a ve interesting subject and I would like to hear some thoughts from oth representatives of plant publications concerning it.

MISS STEVENS: We have had a few complaints, but whenever we he of one we always hunt up the source and find out the reason why a correct it.

Distribution via the Foreman

MR. R. F. JOHNSTONE (Belden Manufacturing Co., Chicago, Illinois Of course, our magazine isn't anywhere near the size of the B. & We have about 1200 employees in two plants and we make it a pract to distribute the magazine to the foreman of each department a those foreman have permission the day the magazine is distributed hand copies out to the employees five minutes before quitting time.

MR. ERNEST AUGUSTUS (Editor, Mead Cooperation, Mead Pulp Paper Company, Chillicothe, Ohio.): We only have a circulation

about a thousand and we have found it much more satisfactory to mail our magazine direct to the man's home than to distribute it to him in the factory. Our plant is in continuous operation 24 hours a day and we find when we distribute the magazine through the plant the employee neglects his work and in paper manufacturing that means a lot of paper lost. By sending it to the homes we find a greater interest is shown on the part of the man's wife and his family. If the paper fails to reach them on a specified date some member of the family calls up and wants to know where the magazine is. We get contributions from the wives and children of those families which we didn't get when we distributed the paper through the plant.

MR. HENRY HINES (Springfield, Mass.): I would like to ask Miss Stevens, if I may, if she has any way of seeing to it that employees who are sick receive copies. I adopted a year ago a system of having the Personnel Department send to me each day following the date of distribution of our publication a list of all absentees with their home addresses and I had copies sent to them. I got mighty good results. Of course we only print 2,000 copies.

MISS STEVENS: No, we don't do that. We distribute 52,000 copies each month and it would keep one person busy all the time looking after the sick people. I am sorry we are not able to do that, but with 72,000 employees it would be some job. Our paper is a monthly magazine and they would probably be well and back to the office before they received it.

MR. E. T. WILKINS (Editor, Schenectady Works News, General Electric Company, Schenectady, N. Y.): Speaking of the children's page, I have had very good success with the children's page and I offer prizes for my juniors. One is a note-book with a puzzle prize and the other is a key container for the boys. I have them solve the puzzles and I get about 300 letters about twice a month. The children are always looking for the magazine and when we offer these prizes we stimulate interest and get the magazine into the home.

MISS MARGARET STEVENS: I don't know what would happen if we started to offer prizes because I have about 2500 children to take care of. There is one thing we have done in connection with our puzzle section. I have gotten in touch with a number of tooth paste companies. We have been running some good health pages and particularly emphasize keeping clean teeth. I find that these people are willing to give as many samples of tooth paste as I need to send the children, so I offer two tubes of tooth paste for every correct answer to the puzzle each month.

HOW TO REACH READERS WITH SAFETY MATERIAL

Richard G. Conover, Director of Publicity, Yale & Towne Manufacturing Company, Stamford, Conn.

To reach employee readers most effectively with safety material, there should be first compiled the complete data upon which a safeguarding

campaign of publication may be systematically based.

There should be listed the places in the plant where accidents are most likely to happen. There should be listed and fully described the conditions surrounding and the conditions conducive to such accidents. There should be listed and set forth in comprehensive detail the acts—or the omission of acts—contributing to possible accidents as described.

Of course these lists and the data assembled are special and supplementary to the general safety regulations ever in force throughout plants. Prohibition of smoking, for instance, and other similar rules, require no unusual checking up to prove they are part of a safety publication campaign. They cover all places, all conditions, and all hours within the Works.

Having gone through the data and the lists, and having spot-lighted the danger places, the danger conditions, and the danger acts, you have the potential text for your safety material. Now how will you present this material in your publications? What is the best method of treatment in order to grip the interest of the employee reader and to warn him surely and effectively concerning the danger place, the danger condition and the danger act.

At the start your treatment calls for the selection or preparation of pictures, articles, trenchant box paragraphs, symbols, or slogans that will serve as the best medium of appeal. And again, this choice must carry in mind the differing temperaments and tendencies of employee readers. These are the influences governing their eyes, their interest, and their varying degrees of receptiveness.

Trying to Accomplish Too Much

And in making this choice of treatment you are confronted with a fundamental fact regarding the employee eye, and the employee interest: you cannot print anything about safety or anything else that will approximate a 100 per cent appeal. Do not write or prepare with any such hope or idea in mind. Trying to accomplish too much you may accomplish too little. Planning over much, or on too stupendous a scale, you invite failure with consequent discouragement. Consider yourself fortunate if you attract and hold as much as 40 per cent of the attention of your employee readers.

The foregoing will serve as a preliminary tabloid of the publication campaign planned. In expanded form the details will suggest themselves somewhat as follows:

The data. Figures should show the number of employees engaged in each division of manufacture. Also the number of employees according to age so as to indicate the totals in the youngest class, the middle-aged class and all those above middle.

If possible to obtain without too much trouble, inconvenience or expense, the data should include the recreations, sports and hobbies of employee readers. The data should also indicate the percentages of addiction and what rules are most and oftenest violated.

It is not intended that all this data should be in the form of long rosters of employee's names. It is solely for the purpose of ascertaining the percentages of these various classes in order that a more personal appeal may be made with specially prepared safety preachment. If you know the kind of a man you are talking to, and if you know how many of his particular kind are in your congregation of readers, you will know better what to emphasize and how strongly to apply the pressure. You reach him better through knowing his predilections.

Other data will suggest itself according as you plan to specialize your safety appeals. First prepare yourself with this definite memoranda, as a whole, and your attack on carelessness can be made all the more successful in detail.

"Places of Danger" List

The places in a plant where accidents have occurred will of course form the basis of the places-of-danger list. To this may be added such other places throughout the Works as experience warns are spots where accidents are likely to happen. Employee readers should be cautioned frequently about such spots. It may be a case of low shafting, it may be a sharp curve in a stairway, it may be a passage way across a necessary piece of slippery metal.

But every place of potential danger in the Works should be on this list and the list should be expanded according as actual or "near" accidents are reported from time to time. Remember this, however. Do not put anything in print that will assert under a caption that such and such is a dangerous spot. You may unnecessarily alarm employees. Caption the list as spots where it will be well to observe greater caution than usual.

It is of course understood that this list of danger-places does not mean places that can be made safer immediately by some reasonable alteration or re-construction. We assume every management makes its plant as absolutely safe as it can be made. The danger-places are those spots where more caution should be used because, despite all that can be done for safety in the way of construction or rules. some spots necessarily contain more hazard than others.

In the Rules and Regulations of the Yale & Towne Manufacturing Company applying to the foregoing, a few words may be quoted as an earnest that managements are anxious to keep plants permanently safe. The paragraph reads:

"Modern industry is committed to the principle that safety is a primary consideration in every enterprise. This Company was one of the first to recognize this principle, and expense is a secondary consideration where the safety of employees and the Works is concerned."

Having listed the danger locations it will be proper and effective to tell why they are dangerous, either in a lesser or a greater degree. It has been said that nothing gives so much courage in danger as good reasons. If you tell an employee reader the "why" in preference to

placing before him a blunt rule bidding him to look out, and thundering he "mustn't," you will be more likely to win his attention and his remembrance.

Description of Hazards

Certain surroundings increase the danger in places. Just what are these surroundings and why are they likely to have the effect you warn about? No doubt the danger in many instances is apparent to all employee readers. But in some cases it may not be. There is apt to be heard: "I don't see why the bosses are so particular." Describe the surrounding danger in detail and you will better convince. Graphic detail impresses deeply.

The prosecuting attorney arouses the jury to indignation by dwelling on the details of the murder. He does not take it for granted that the jury should know enough of the law against murder to make his appeal superfluous.

In the list of the acts, or the omission of acts contributing to accidents, there should be handy a complete roster of every class of machine throughout the Works, in the operation of which the employee reader may be injured through carelessness. The danger point or points in the service or operation of these machines should be dwelt upon. How the careless employee reader may have his fingers, or hand, or arm, or leg, or head injured should be described in detail.

It is never too often to tell it. Describe vividly down to the smallest movement the poise of the hand, or the glance of the eye, and show just how danger and accident surely follow negligence at the danger points of machine operation.

To illustrate. Two classes of machine in your plant may be power presses and riveting machines. In pointing out the danger acts of commission or omission, you might do something equivalent to the following:

See that the safety guard is on the machine and is in good order before starting to work.

Do not leave your machine running even for a moment while you are away from it to get a drink of water or for any other reason.

Follow the foreman's instructions as to how to operate the machine and especially as to how to hold the work when placing it in the machine.

Do not try to adjust the safety guard yourself. Call a machine-setter, and wait till he comes before going on with your work.

Remember that picks are supplied to use. Do not use your fingers.

Do not try to put in just one more piece of work before the whistle blows.

And in the way of general safety regulations you might set forth the equivalent of:

Do not run out of the room when the whistle blows. Walk!

Do not ride on hand trucks.

Do not wear loose sleeves. Roll your sleeves up or fasten them tightly about your wrists.

Wear goggles when grinding tools, chipping, pouring hot metal, or near any machine where chips are flying.

Avoid horse-play and fooling. Keep your mind on your job.

Summed up under this head you may profitably prepare text equivalent to saying:

Accidents are more liable to happen at the (named) machine in Room A, at the (named) machine in Room R, at the (named) machine in Room W. Accidents are more liable to happen in connection with the operation of these machines at the points where you place, or put, or transfer, or supply or feed material that is being converted into product. (Then describe the spots exactly and the surroundings conducive to danger.)

Points of Operation

Accidents are liable to happen at these points described if an employee is careless, if an employee lets his attention stray, if an employee lags in his movements or if he fails to hold himself at a high pitch of caution. Accidents are liable to happen here more through omission of some safeguarding act. So much for the danger point, condition and act. What is the strongest presentation method so that the employee reader may be quickly attracted and permanently impressed.

I have said that we should be satisfied if we make our published safety appeal 40 per cent effective as employees' reading material. This leads to comment upon the method and the efficacy of any printed appeal whether it be in the cause of safety or any other cause. In fact I had hoped, originally, if I were to say anything here at all, that it would be upon the topic of method in the presentation of material alone. But as we are an important annex of the great National Safety Council, with safety as a constant golden text, it was only proper and right that safety should be my subject matter. And, after all, safety may be made one of the best topic illustrations of how successfully a method of presentment may be employed in house organs.

When I speak of 40 per cent of effectiveness, I may be thought trite. Perhaps you have checked up this way long ago. Sometimes, however, I can't help observing that we editors are cocksure we have convinced everybody who comes within the reading range of our print. The joke is on us, whenever we think this, because it is absolutely impossible to print anything for general reading in a plant that will make a general hit.

Think a moment how absurd it is to suppose that you can ever write or prepare anything that will move and stir everybody. Why it often seems impossible to get some employees to start reading a head or a first line. All of which warns us that we must, as far as possible, serve a variety of printed dishes that will be apt to suit every employee reader's appetite as we discern it.

This fact is dwelt upon because to a large degree the winning of employee readers to a plant publication is a much harder task than winning readers to a daily newspaper or a monthly magazine. The reason is this. Yours is the only publication in your plant and your employee

reader must take it willy nilly. He may not like it at all but there i no other. This same employee reader has the privilege of pickin his daily newspaper or his magazine to suit his own taste. In your plan you may have a score of different-minded employee classes when i comes to selecting newspapers or other publications. But in the choic of the plant publication—well, there is no choice, or at least only on choice.

Unity of Purpose

Now nobody will deny that many varying newspapers and magazine are ably conducted. In many instances they are conducted with equa ability. But, for all that, some readers positively refuse one and warml champion another. In a plant organ, you must ever bear this in mind that you are trying to win and hold employee readers to one publicatio You are trying to unite them on the one periodical, whereas, outside c the plant they would make their pick from perhaps a dozen differer periodicals.

Of course the common interest should unite, you would say, all th members of the plant family. But remember again that rival new papers also say they are for the common interest. Yet men differ i their newspaper choice. It is also well to keep in mind that in a plar publication you seek the employee reader. Outside, the employee reade seeks the publication he likes. This makes a difference in the ir pression formed by him and affects his attitude of mind and attracts repels his interest, as the case may be.

Now it has been indicated that to get the best safety campaign resul with a diverse congregation of employee readers, your methods of a peal must be interestingly diverse. Take differences in the age of e ployee readers. Should we not approach the young employee in a diffe ent way from that in which we approach the middle-aged or older e ployee?

I asked our Employment Manager to furnish me with data indicati the variations in age of employee readers, so that I might place them age groups. His figures show that 22.3 per cent of all our employees a under 21 years of age. He also states that practically 75 per cent these are but 19 years of age or under—down to the youngest legal wo ing age. So we say that 16.5 per cent of our employees are in th teens.

Now how do you write best, or present things best for persons in th teens, as contrasted with those who are from five to thirty-five years pa their maturity? The same presentment will not attract both kinds employee in the same way or in the same degree. When you prepare yo safety appeal—or in fact any appeal—shall you not have this in mi with profit to your editorship. Shall you not say before you put pen paper: "Suppose I were nineteen years of age, what would be likely appeal to me as safeguarding propaganda?"

You have the dreamy employee reader, and the poetical reader, a the athletic employee reader, and the golf employee reader, and the

kinds-and-sorts of employee reader. As sure as you live they will be attracted to your plant publication in the same ratio that you make it interesting to them along the lines of the things nearest their hearts and brains. A safety appeal will best grip the athletic employee according as it takes into consideration what he likes and how the presentment fits in with his liking. Even if you have to start in talking pure athletics and switch to safety by way of parable or fable, it will be better than to talk straight out about safet to unwilling ears of eyes.

Building Up Caution

In the main our printed safety appeal is to battle against carelessness and build up caution. There may be other attributes of human nature that aid some in promoting danger but not enough to warrant a special attack. A man may be stingy, or revengeful, or a natural trouble maker, and yet not be careless or a promoter of danger. We have no need to combat his bad qualities. But if he is careless in addition to these bad qualities, a way to lessen his careless habits by printed appeal may be to approach the task more understandingly through a knowledge of his weaknesses. And whenever I mention employees as individuals I mean they are also representatives of similar type groups in a plant. When you plan to lay your safety argument before one, it means that it is planned to be effective with the entire group that is like that one.

Phrenology is no longer in fashion. Nowadays, everybody talks about the psychology of this or the phychology of that. Yet I question whether or not a safety appeal planned to convince the employee reader with the pugnacious bump, or the acquisitive bump, or the egotistical bump, or yes—the bump of amativeness—will not get you there quicker and better than just a general screed directed at the employee reader. I believe we must specialize often in our appeals, so as to convince the different temperaments, tendencies and varying volumes of receptiveness in our plant congregations.

With respect to the method or methods we are to use in presentation of the printed safety appeal as well as the practical accessories of such methods, let me hope that the title of this article does not carry the idea that I have a sure-fire, superman's battery of safety artillery to recommend. No editor can devise a universal system of effective presentation. Plant conditions, circumstances and peculiarities prevent this.

When the single editorial brain gets working it is wisest to let it go its inspired way. From these our talks and conferences, suggestions and plans may proceed that will temper, guide, modify or expand our ambitions and our inspirations connected with putting safety appeal successfully across. Each editor knows best his own plant, his own employee groups and his own needs for special presentment tasks.

Illustrations

In the way of pictures, the magazine of the National Safety Council indicates clearly the topics that may be vividly and graphically prepared

for eye appeals. In addition there should be pictures of plant machine showing exact detailed points of danger in machine operation. Pi tures of accident points in the plant, or posed photographs showing ju how accidents have occurred, are, valuable aids. Vivid portrayals or wh the loss of a finger or a hand means are also to be used frequently.

Safety slogans, apothegms, and symbols may be advantageously s lected in accordance with what would appear to be the grip force news value of the principal appeal idea. There should be frequent a emphatic reference to the duty an employee owes his family to obser constant caution and thus preserve a whole and healthy body for th family's protection. Irony may be employed very effectively in cartoo and photographs and articles, provided it is tactfully evolved. Oft when other forms of appeal fall flat with an employee, he may react an appropriate picture that bears a caption reading perhaps somethi like this: "Ten Employees crippled for life through Brown's carelessne will often think of him and express a wish concerning him."

Possessed of the data and lists forming your potential safety text, a having mulled over methods and material accessories calculated make the most forceful impression, you come to the style and oth components of the phrasing that will round out your presentment. other words you are down to the language vehicle that is to transp your safety appeal. This is a task that is as wide and as indefinite in shiftings as the ocean. Only approximately, can any one writer adv another as to the most effective way of putting a thing. The style the men and when one stylist attempts to direct another stylist he fa before he starts.

I know from amused experience that there are editors so self-su ciently strong that all they wish to obtain is a memo of the facts and th have the greatest confidence in the world that they will write their pansion of these facts in faultless phrasing. In fact they think this con always in a God-given automatic sort of a way. Their individual writ vehicle is always a Rolls-Royce—to hear them confidently assert it.

Forceful writing

I am one who believes, however, that forceful writing does not come a matter of course even to geniuses. Geniuses strike out and cha and polish. So we may well agree that our language should be quently tested out. It will not satisfactorily operate without care just as a matter of course.

But I am in favor of constantly attempting original ways of say things rather than nursing a slavish imitation of the fine writers. Be for an editor to be guilty of faulty lapses, now and then, when tell things in his own way, than to copy almost word for word the writi of the illustrious authors.

The scope of my subject does not permit an extended reference to phrasing angle of safety material presentation. In the past I have m [illegible] but will not intrude them here. I do

impelled, however, in closing, to make a few general statements along this line in the way of disjoined suggestion.

These general statements are in separate appended form, and may or may not be deemed an apropos part of this article according as you choose. Let me state in conclusion that if there is any tabloid message to be culler from what I have said I would like to think it is something similar to the following:

Plan your printed safety campaign systematically. Gather your data material all about you. Choose your best methods and accessories of presentation. Then write in accordance with your knowledge of the variance in the mental receptiveness of your employer reader—a message for these and a message for those, one kind of a safety appeal now and another kind of a safety appeal then. Use the varied language of your varied readers, and cater to the temperaments and tendencies of all in your plant through successive issues of your publication. Through a routine and method procedure of this character, carried forward as a permanent program, I believe you will put across a safety achievement that will drive the accident devils down into the lowest depths of despair.

DISCUSSION

MR. CLARENCE H. HOWARD (President, Commonwealth Steel Company. Granite City, Ill.): I would like to ask just one question: How do you reach the different papers? I had occasion once to write a letter to 3,500 people, and I first thought of this man and the other man that started with the office boy up to the president of the United States, I finally confined my letter to fellowship. Fellowship is the same in the office boy as in the president of the United States and I wrote the letter from that standpoint and I got the most marvelous replies which shows that the principle was the thing I was trying to approach and not the personality.

Another thing I would like to mention is the red danger signal that we have in our plants which is the greatest hazard we have. When I think of a red danger signal, I think of crime; I think of accident and I get a sense of fear, so I just turned it upside down and called it "Safety First," which gives a confidence or a trust and faith that you are going to be safe and it took from me that fear of accident. That is what I call the negative suggestion that always, if you don't protect yourself against it, produces the very thing you don't want. Therefore, I think the greatest safety rule in the world is to stick absolutely to the positive side of life and not take into consideration the negative.

Now, I went into the safety business a good many years ago. I think our company was the first to put up money in that direction and even our worthy general manager, who is a great safety man, started in to show how a fellow got hurt and how he mustn't get hurt. I said, "We will stop right there." Wars never taught you how to have wars. Let us keep in mind right conditions and study

them in the right light. Keep your mind clear and free from the suggestion of accidents. That is what I mean by the positive side and I think the greatest safety man, the greatest business man and the greatest man the world has ever known is the Great Master and he always approached everything from the positive side. So in all work we take up we will find that 30 per cent perhaps can be safeguarded by machinery; the other 70 per cent has to be done by fellowship or by training the positive side. You take a man, if he doesn't think, even with safeguarded machinery he can get into trouble. After all, when we get down to the last analysis, it is doing the right thing in the right and orderly way without any sense of fear attached to it, because fear is the basis of all difficulty and all accidents and all trouble.

Boil It Down

CHAIRMAN ASHE: If you are going to present an editorial, or if you are going to write up some story, write it and rewrite it and throw away every word you can take out until you get more and more strength in your paper. Instead of printing a lot of pictures, look around and see if you can't get pictures with real life in them and action in them; something that will carry strength. The trouble with most of us is that we don't put enough of ourselves into these things.

MR. HENRY HINES (Springfield): I would like to ask Mr. Conover if he thinks as a general rule it is wise to publish in his paper the danger spots in the plant. It seems to me that it is unwise. In our own policies we avoid anything of that kind, but we emphasize so far as we are able the fact that no accidents will happen in the plant provided the employees use the gray matter which God has given them and follow the instructions given them by their foremen who are always informing new employees of the right way.

MR. CONOVER: In answer to that I will say that suppose you have a one kind man. Suppose you tell one man a certain thing, is he going to look on it the same as you do, as Brown or Jones? We have fifteen or twenty different groups that we try to analyze. If you went through the policies manifested in these various publications, you would find diverse opinions.

MR. W. D. PRICE (Industrial Service Director, Warner Gear Company, Muncie, Ind.): I have a thought on that subject that may be a little different. I believe it is a good policy occasionally to bring out the danger places in your plant and continue hammering on them until they are corrected.

THE CONTENT OF PERSONNEL PUBLICATIONS

Gilbert F. Close, Assistant to President, Commonwealth Steel Company, Granite City, Ill.

In considering the content of personnel periodicals, the fundamental question which arises is "what is the purpose of a personnel peri-

odical?" Any large group of men or women associated together in business, whether it be in an industrial plant, a department store, or any other organization which requires the work of a large number of people, should be essentially a large family group in which all, whether stock holders, management, or workers, have the same object in view, realizing that the success of any one of the groups is dependent upon the success of the others and that any division of interest is fatal to all parties concerned. The essential purpose of a personnel periodical should be to foster this spirit of mutual interest and cooperation.

In many respects a personnel periodical should fill the same place in the organization as a small town newspaper fills in the life of the community in which it is located. The successful town newspaper contains the news of special interest to the town, discusses in its editorial column questions, the proper solution of which will improve and advance the community, and it also has a considerable portion of its space devoted to personal news about the residents of the town. In the same way a personnel periodical should be the family newspaper of the organization. It should tell the news, such as the developments and improvements which are taking place in the business, something about the work which is being done and how the product depends upon all working together to produce it, efficiently and intelligently, and also personal news about the members of the organization, from the president to the office boy, and from the manager to the apprentice.

The content of the magazine depends very largely upon the company's labor policy. If a company does not have the real interest of its workmen at heart, if its main and only purpose is the making of the largest possible margin of profit for itself, regardless of the well-being of the employees, it would seem that the publication of a personnel periodical would be a wasted effort. No such magazine can really succeed or be received and read sympathetically by the employees, unless they have had a large part in producing it and unless they feel that it reflects the fundamental unity of purpose of management and men.

Consideration for the Employee's Viewpoint

If the workers look upon a plant magazine as an instrument of the management to force its views upon the men, it is a useless effort. On the other hand, if the company's purpose in financing a personnel periodical is to foster the spirit of cooperation and to give proper consideration to the employees' point of view, it has every chance to succeed.

A well edited personnel periodical which in its news articles, its editorials, and its other departments is able to reflect a true spirit of fellowship throughout the organization and shows that all parties in the organization are working to the end of producing the finest products in the finest way will also have for the company a great value if sent out to its customers.

When you are in the market for any product and know that it is produced by a company which is operated on the principles of mutual cooperation, where there are no cross purposes at work, you will be very much tempted to order your goods from such a company. This element of value in a personnel periodical from the company's standpoint, is sometimes overlooked, but many companies which have been successful in producing a periodical of this type feel that it is one of the very best advertising mediums which could be had. Many companies are willing to spend considerable sums of money on a personnel periodical, not only because it is an instrument for the promotion of fellowship in the organization itself but because of its advertising value.

When this secondary purpose of using a personnel periodical for general publicity is adopted there are certain difficulties which arise because while the customers and other friends are interested in the general conditions of the organizations they would not be interested in reading detailed accounts of meetings of shop representation committees, financial and other detailed reports of benefit associations, minutes of meetings of plant safety committees, and other items of this kind which have a tremendous value in keeping the employees of a concern interested and informed on all these matters which concern them very deeply. The Commonwealth Steel Company, which publishes the "Commonwealther", has overcome this difficulty by supplementing its regular issue of the magazine, which is sent out to a large mailing list of railroad officials and others interested in their products, by a special home edition, devoted entirely to the employees themselves, in which such items as those mentioned above, and reported in considerable detail. This plan has worked out satisfactorily and both the home edition and the magazine edition of the "Commonwealther" are looked forward to and read with great interest by the men in the shop.

Of course, the content of a personnel periodical depends largely upon the sort of people who are expected to read it. If there are a large number of illiterates in the personnel of a company, it is extremely difficult to reach such a class. However, our experience has been that even if the workers themselves are poorly educated, they almost always have children at home who can read, and about the only possible way of reaching such a class is to make the paper so interesting that they will take it home and have the children read it to them.

Reaching the Illiterate Through the Children

This same condition arises when there are in an organization a large number of immigrants who are not familiar with the English language, but the same solution applies in this case also, and it is our experience that the children of our foreign workers can almost invariably read English and through them the parents frequently get the important things from the plant magazine. In any case, the

writer does not think it is wise to attempt to publish a magazine in any language but English because if it were attempted to reach all of the foreigners in any industry, the number of languages represented would forbid such a policy. It does not seem wise either to discourage the learning of English on the part of the workers by making it too easy for them to understand what is going on.

There is no point in shutting one's eyes to the fact that there is a real problem involved here which cannot be completely overcome in any way except by foreigners learning the English language. Much interesting and valuable material published in any plant magazine in the English language is bound to go over the heads of those employees who come from foreign lands or are natives without education. A great help, however, apart from the help which these men receive at home, is in publishing in a magazine a liberal number of pictures of various kinds which bring home vital thoughts which are understood in any language.

Of course, it makes a great deal of difference as to the content of a magazine, whether the employees of an organization are mostly men or mostly women, and whether they are mostly of a mature age or or young people. Any magazine editor would naturally adapt the content of his paper to the type of audience. Articles on fashions and how to make dresses and trim hats and other material which is very suitable for a magazine read mostly by women would be pretty dull reading to men.

On the other hand, even when the readers of a magazine are men, it is very wise to devote a part of the periodical to such matters as will be of interest to the family at home, and no magazine of this type really fulfills the purposes of its existence unless it is very generally taken home and read, not only by the employee himself but by members of his family. The interest of the folks at home in a man's work and in the company for which he works is a very valuable asset to any company, and has a very vital influence in maintaining steady employment and overcoming labor turnover.

Interest for All

It is quite possible when several distinct groups are represented in an organization to devote certain portions of the periodical to certain groups. In this way all readers are apt to find at least something which interests them particularly, and there are, of course, many subjects which are of equal interest to all. I think sometimes we make a mistake in thinking that because a man wears overalls and gets his face and hands dirty, that he is not interested for the most part in the same sort of things which interest the man in the office wearing a white collar. The present wages paid in industry and the opportunities which are open in America to the so-called working man are such that he has access to and is interested in the general affairs of the day, just as the man is in the so-called higher walks of life.

Therefore, in any organization which employs a large portion of skilled or semi-skilled mechanics, these men will really read with interest the same things which appeal to office groups and others of that type. It is much better to make the contents of your plant periodical a little above the ordinary reach of the average working man than to bring it down to a supposed level.

In general, some of the subjects which should form a part of every personnel periodical are such matters as articles on safety which can be worked out in a variety of ways, both by reports of safety committee meetings, cartoons and posters illustrating safety points. It is always helpful when a man has invented some safety device or has by his forethought and care saved either himself or his fellow-man from injury or has done anything striking along safety ways, to mention his name in the paper, print his picture and thus let him stand out in the shop as a man deserving recognition.

All men in any organization should be interested in new buildings and improvements in the plant, in new products which the company is manufacturing, articles about the general condition of the business and other such articles which have a direct bearing on everyone connected with the enterprise.

All men in the plant are interested in reports of what the insurance society, or benefit association is doing (if the company has one); and general plant meetings, departmental meetings, addresses delivered by officials of the company can be reported more or less fully, and it is also desirable at times to publish biographical accounts of men in the organization who have won promotion or advancement or who have done some particular job exceptionally well. Such items have a real inspirational advantage to others to follow their example.

The Personal News

It is our experience that the first things in any magazine which the average reader looks for is the department devoted to personal news of the individuals in the organization. If this department of the magazine is well edited and representatives from each department can be enlisted as reporters, it is quite possible to have every issue of the magazine contain many interesting personal items about individuals. Such items as marriages, births, vacation trips and a good joke on an individual are always read with great interest and looked for by the readers. It is our opinion that while this section of a personnel publication has perhaps less permanent value than some of the other portions, it should be cultivated and developed by all means because it gives the magazine the first introduction to the reader and he is very apt to follow it up by reading the other parts of the magazine.

As mentioned before too much emphasis cannot be put upon the illustrations. They should be gathered together and worked up with great care for they probably do more to sell the magazine to the reader [illegible] a number of pictures of groups of men about

the plant can be taken and published in each issue it is very helpful. In this connection we have found it helpful in the "Commonwealther" to devote a page of each issue to pictures of the children of our workers. It is surprising how gratified a man is to have his baby's picture in his Plant paper. When we started this idea two or three years ago we had some difficulty in getting enough pictures of our company children to fill a page but our problem now is to satisfy our men when they send in the pictures and we have to hold them over for a subsequent issue. Apart from the pride of the parents, there is nothing which is more uplifting and inspiring to any normal person than a page of pictures of attractive little children with their appeal to all that is best in a man or a woman.

MR. G. A. DOELLER (Dayton Power & Light Corp.): A number of us here have been together at National Safety Council meetings of plant publications, in the Direct Mail advertising campaigns and that sort of thing. We have heard the contents of plant publications discussed pro and con. We have heard people speak about the benefits to be derived from publishing pictures of a group on a page, or an individual, or a little piece about Michael Grecolina, and in the meantime we have had a chance to see Isadora Savarese's husband come home with two fingers ripped off and Dave Zetterbloom when he was informed he would have to be laid off on account of the lack of employment. We have found out what happened to other men when they were notified they were going to work three days a week.

A questionnaire recently went out to the general managers of large industries and to the owners, and this question was asked indirectly: In your opinion does a plant publication have any other reason for existence except that it is a builder of good fellowship? A committee met in New York last week and here are some of the things they went into.

Positive and Negative

Contrary to what some people have said here about the negative and positive side of life. this fact remains at present, in the past and in the future. No research work will ever be undertaken that does not begin with a negative side, and this committee took some plant publications that have gone out of existence. They took a couple that are about to go, and their investigation and some of the things they have found are rather interesting.

The plant magazines that enjoy a hearty life base their reason of existence on an increase of production at a lower cost through the stimulation of the human element in industry. The editors base their policies on creating good-will sympathy with the management and fellowship among the workers, home stimulation, job stimulation, thrift, safety work and one or two other things, all of which brought out the fact that a plant magazine is simply a minor branch of personnel work, and the majority of plant magazine editors have a very poor knowledge of personnel procedure.

They found this out, that the reason for the failure of the plan magazine, except in one or two cases, is not due to any inherent weak ness in plant publication, but can be found further down the line. Thos concerned whose magazines failed or weren't healthy as they migh be had no job analysis, or man analysis. They were unable to selec their workers and place them on the job with regard to a man's capacity and interests or his chance for promotion. They had n definite line of procedure to show a man a definite object he had t obtain and the way he had to go about obtaining it. They still ha the commodity idea of labor and based their rate of pay upon the iro law of wages. They tried to create sympathy with the managemen by telling about the long hours and hard work they did, the low pa they received, without any regard for the fact that the worker doesn' care a thing about that.

As a general consensus of opinion that committee found out that plant magazine will fail in concerns that have nothing to publis that will be of general interest to the employees, and that a plan magazine will enjoy the same degree of life if the management i willing to take an active interest in its promotion.

Mr. Clarence H. Howard (President, Commonwealth Steel Compan Granite City, Illinois): I would like to say just two or three thing The Commonwealth magazine is for the purpose of instilling fello ship in the hearts and minds of every worker; to bring the office bo down to the same plane as the president so we can work out our pro lems together.

I know a lot of people don't agree with me on the positive ar negative, but I want to say it is just as true as can be that the pos tive is always successful and the negative is always a failure, a that is a principle that you and I cannot change. It is a principle ju as perfect as the principle of mathematics. I don't deal with nu bers; I simply apply the principle and the principle gets the numbe The "Commonwealther" is based on the Golden Rule and fellowshi both of which are principles. Our object is to co-operate with t employee, the employer, the man we buy from, the man we sell and the public in general. Any business that is organized just for t profit that is in it without due consideration for their employees a a desire to co-operate is all wrong. That is the thought we wish bring out—to co-operate, have confidence, and confidence is the ba of all business and without it you can't get anywhere. Confiden comes from honesty of purpose and truth and character.

I want to say that not one of our issues goes out until Mrs. Howa and I sit down and go over every word of it. We have more inter in it than any one. We are trying to put the "Commonwealther" the highest possible basis that we can. Honesty of purpose and tr and character is the whole business and we are doing it on t positive.

MR. GRIFFIN: One thing Mr. Close said in his paper about the plant magazine going out as an advertiser. I suppose all of us have requests for the magazine to go to outsiders and wonder just what we should put in it in that case. Within the last six months we have had that problem. The way we get around it may be of interest to some of you. We excluded all stuff that was not of interest to the men in the plant. We didn't exclude the stuff that was not of interest to people on the outside. If they want the magazine they can have it and read what interests them. The sort of thing we do put in that is of interest to them and also of interest to the men in the plant is stories about installation of our product and things that will inspire the men in the work they have done.

MR. R. F. JOHNSTONE: We have just completed our sixth annual golf tournament and all of the officials of our company, all the factory heads and employees, even the chauffeurs participated. It was sort of a handicapped affair and we let everybody that wanted to go out in that tournament and play that day. We found that everybody was interested in the golf end of it and they were treated just the same as the ones on the hourly salary basis.

THURSDAY AFTERNOON SESSION

CHAIRMAN ASHE: We are fortunate in having with us Mr. Robert Montgomery, who is manager of the investment department of the Louisville Gas and Electric Company. We had planned on having a Mr. Pfeiffer of the H. M. Byllesby Co., Chicago, give us a little talk on "Make-up and Art." Mr. Pfeiffer could not be here so Mr. Montgomery, who represents one of their properties here, very kindly consented to take the paper and read it to you.

MAKE-UP AND ART IN HOUSE ORGANS AND PLANT PUBLICATIONS

Theo. P. Pfeiffer, Advertising and Publicity Department, H. M. Byllesby and Company, Chicago, Ill.

Each plant publication presents so many questions pertinent only to its individual problems that it seems almost impossible to lay down any set of hard and fast rules that might be considered applicable to all of them. There are, however, certain features of art and make-up in publications of any kind that are more or less general; and it is the intention of this paper to call attention to these features, in the hope, at least, that they will receive the consideration due to their importance.

The subject of art and make-up has little, if anything, to do with the subject matter or contents of the publication. The premise of

"make-up and art" is so to present the subject matter that it will be attractive to the eye; and, above all, easy to read.

Size and shape, paper stock, typography and illustrations, are the chief items of interest in planning a publication of any kind; presupposing, of course, that the subject matter itself is interesting, and serves the purpose for which it is intended.

A house organ of general circulation for customers and among the "trade" should be of a size and shape to facilitate mailing; and to enable the recipient to file it away, easily and conveniently, for future reference. Perhaps a standard letter size of 8½ by 11 inches is best; certainly the outside dimensions should be no larger than these; and the thickness, or number of pages, must be regulated by the amount of material available or rather desirable for use. In the case of a publication limited in circulation to employees, where the question of mailing does not enter except in the matter of exchanges, the pocket size is to be preferred; in that case the over-all dimensions should not exceed six inches by nine.

The selection of the proper paper stock is most important. If half tone reproductions of photographs are to be used, it should be enameled or calendared; if no illustrations are intended, a laid or book paper is best, which also can be used when only line drawings, for reproduction in zinc, are available.

One of the chief objects of "art" or illustration in any publication aside from its purely utilitarian purpose in embellishing the text is to make the book atractive to the eye, both in the sense of pictorial beauty, and to fulfill that first of all requisites of good "publicity"—to attract attention to the subject matter. As to the use of halftones if you are not sufficiently well-posted on this subject yourself; let your printer determine the screen best adapted to the paper in use. If original art work or line drawings are used, have them good, or use them not at all. Cartoons occasionally are permissible in an employee's publication, if the subject be of sufficient interest; in publication of more general circulation, they should be marked "taboo," unless they are very,very good. If the amateur maker of cartoons were as good as he usually thinks he is, he wouldn't be earning his living at some other kind of work; not if the political cartoonist and comic strip artists command the fabulous salaries they are credited with receiving. Wit and humor, satire and irony, whether employed pictorially or by means of the written word, are tools far too delicate for the hands and brain of the amateur; they may prove to be amusing, but not in the senes intended by their creator.

Uniformity in Style

Select one style of type for your publication, and stick to it; any departure from this rule results only in confusion, and detracts from the sane, orderly method of presentation which carries the message so much more convincingly. This injunction is not intended to conve

the impression that the size of type may not be varied; but it does mean that it is better to use only Cheltenham, Century, Goudy or what not, than to attempt a mixture of all these faces.

Establish a regular style for headings and captions; don't let a one-line head, a two-line head and a three-line head appear on the same page; and never, by any chance, let a heading run over three lines. Try to pick out the real news value in the article for your head-line, and say it in as few words as possible; that is the secret of successful head-line writing, though in saying that I am encroaching on the editor's preserve. Establish also a style for capitalization, punctuation, sub-heads, paragraphs, etc., and stick to it; it makes for uniformity, but not monotony.

Set your type in a fairly narrow measure; don't try to put more in a line than can be read at a single glance. Three 14-pica columns on an 8½ inch page are preferable to two of greater width, and permit much greater flexibility of make-up, especially in the handling of short "personal" items which seem to be so essential in an employees' publication.

This presents, in a very general way, the ideas of one man on the subject of art and make-up; there is no doubt a wide diversity of opinion on many of the points mentioned. But here is one opinion to which there should be no exception—have your printing done by a good printing house. You may be able to save a few dollars a month by giving the job to a cheap printer, but in the long run it will cost you more in time wasted trying to correct his mistakes. It is the business of a good printer to know what kind of paper to use, what fact and size of type are best suited to your purpose, and a dozen other things that you, unless you are especially equipped by knowledge and experience, have no means of knowing.

DISCUSSION

CHAIRMAN ASHE: Mr. Montgomery has had a very successful experience here in Louisville in developing good community relations between his company and the community and his publicity work, and his works paper such as they issue has been a very effective medium in that connection. I think that is one phase of our house organ work we don't give quite as much thought to as we should.

For instance, how much is your paper doing to improve the relations between your own company and the place where you live? How much will the clergymen and doctors and the newspapers and all the rest of them do to help you in what you are trying to do? I was wondering if Mr. Montgomery supplementing Mr. Pfeiffer's remarks, couldn't tell us some points he has found successful in that work.

MR. MONTGOMERY: My experience in that respect has been a little broader. One of the great troubles with utility companies, and I presume it would apply to other businesses, in the past has been when a

newspaper reporter comes around they generally load him up with propaganda instead of giving him real news. The result is that they soon get on to it and they know every time they come in and ask for news you will tell them about a six-million dollar proposition you are going to put over, but if you happen to kill a man or have real news or anything with human interest in it, it is not given out. They minimize it and hide it. Some years ago, after I had started handling most of our publicity I made a practice of calling the reporters, if we had any sort of an accident or anything unfavorable. For instance, our pipe line, running to West Virginia to feed Louisville with natural gas had a break in it and I called one of the reporters, told him all about it, how much trouble we were going to have and didn't try to conceal anything.

When I find a human interest story I telephone my reporter friend about it and when I have something I want to put in he is ready to accommodate me. I tell him the truth, no matter what it is, and generally, through our friendship they will minimize, if I ask them to, but I always give them the full story. I believe that policy is the best for any company seking publicity through the newspapers. We have all of the editors on the mailing list of the employees' bulletin that we publish and we try to present such facts about the growth of the company and things that we want to have reprinted in the papers, and here in Louisville they copy something every month.

We have never felt justified in spending a large amount of money on a plant publication, and, for that reason we have limited the thing to an eight-page basis, which I do not believe costs us more than about $250 a month for 1700 copies, and of course it doesn't compare with the very splendid publications that the larger companies get out.

Home Talent Cartoons

MR. AUGUSTUS (Mead Pulp & Paper Co.): There is one thing I have to contend with, and I would like to know how other editors handle it. That is, what sort of diplomacy do you use when you get a home talent cartoon sent in from some fellow in the plant drawn on scrap paper or wrapping paper and he brings it in to you. He is enthusiastic and thinks you can run some cartoons. What do you tell him? What excuse do you give him that you can't use them?

Nine times out of ten you can't use the cartoon and the same is true of photographs that are not suitable for reproduction and at the same time you hate to tell a fellow you can't use his stuff; he thinks you are discriminating against him.

MR. MONTGOMERY: I believe that is one of the greatest difficulties that a plant publication editor has. I don't know of anything that is more embarrassing or that requires as much diplomacy. When I have those things come in I attempt to see the man personally rather than write him a letter and tell him why I can't use it. There is something in this last issue that is very much along that line.

have so many young ladies who get poetical and send in a lot of poems. Some of them come from our auditing department, and I said in this editorial that we welcome contributions from employees of all departments and will devote space to any department that will furnish a uniform amount of material regularly. We are particularly anxious to receive personal news from employees and whenever possible, photographs. We have but one word of caution for our contributor, that is in regard to jokes.

We are always glad to run clean humor, if it is really funny, but the sense of humor of different people varies to such a degree that it behooves us to use great care in trying to be funny. In a previous issue I had something about cartoons and in another about the poems, and I find it necessary every month to write some little thing in there to discourage them from their efforts along those lines. That is the only suggestion I have to offer, either see them personally or have some one do so, because what you say in a letter is sometimes misconstrued, and it is not so easy to say it in a letter as you can explain it.

I don't hesitate to tell anybody that a poem is not good and that is the reason I am not going to run it. If they improve and get so they can write like Riley, we will run it.

Poetry

MISS MARGARET STEVENS: We feel that the very fact that an employee sends in a cartoon or writes a poem, regardless of the quality, indicates he is taking an interest in the magazine, and we hate to discourage that for this reason: we seldom return cartoons or poems unless we find they are absolutely unusable. If we get a cartoon with a good thought in it we have our artist redraw it and use it that way with the credit going to the one who sent it. If we have a poem, or so-called poem, we make it over into something that sounds like a poem and if we find there is absolutely no point in it worth while making into a poem, we run it just like prose, without rhyme or anything else, just as a news item. We find that works well; we seldom send back a poem or cartoon.

CHAIRMAN ASHE: That is a rather good point. I know my own feeling has been that if it is absolutely in any way possible to use material that is contributed it is much better to try to do it and it means that sometimes you have to go a rather long way around Robin Hood's barn to get away with it.

Sometimes there will be things come in that you cannot use, and then you simply have to scrap them; that is about the size of it. People will send in things that nobody would care to print or to see in print, anyway, so I think that in nine cases out of ten like that you are perfectly justified in throwing it away and not worrying about it. As Miss Stevens points out, if a fellow does that, there is a real effort on his part and it is well worth while to help him. I know

that some of our best contributors have developed in that fashion. We have a man who at one time drew rather poorly, and we encouraged him in the work and now he turns out the very finest stuff.

He has developed remarkably and it is really wonderful to see some of the art work that man turns out. He has the trick of getting character and action into his pictures which is so difficult, and oftentimes the personal satisfaction of having developed that man is worth a good deal. I had a case the other day where the head of that department told the man that he couldn't do any more work for us because he found him doing it on the company's time. We were paying him for doing it outside. Several things have come up that we had to have done, and probably in the rush to get it out for us he took a little time finishing it. When I explained to the department head how much the man's work meant to us, he had a talk with him and the man agreed to cut off some of his other outside activities and do the work for us on the side.

I think that every editor feels that the more contacts you can get in your paper, the better it is. The greater the extent to which the paper is made up by the contributions of a large number of people rather than too much work on the part of the editor, the greater the strength that is added.

MR. GILBERT F. CLOSE (Commonwealth Steel Co., Granite City, Ill.): There is one point in that connection which I think is valuable, that is that in a rather poor cartoon or a rather poor piece of poetry contributed by some one in the organization there is a real appeal to his friends and to the people in the organization that a better drawing or a better poem doesn't have.

We do just about what I think the others do. We have an artist to whom we submit drawings and if there is a point that needs touching up the fellow is always glad to see his drawings improved and it suggests to him how he can improve his next effort. Sometimes we procrastinate a bit. If we have something we don't know what in the world to do with we hold it over for a while, then the interest in it perhaps grows less as time goes on. We have to leave out a good many things anyway and sometimes if there is no other way to handle it we find we can procrastinate a bit and get by.

Good and Bad Copy

MR. CONOVER: On the last page of my publication I served notice that unless something is absolutely rotten, we are going to publish it, and we believe that by so saying that and saying that diversified authorship is full of spice those that read it that know better or feel superior to what is furnished us haven't any come-back.

I guess the reason why we feel like throwing some of the stuff in the wastebasket is because we feel superior, and we rather fancy that some one judging us will say, "What kind of an editor is that, to allow such stuff to go into print."

When you take the attitude that the responsibility for a certain section of the paper, the quality of the stuff, etc., is on the employee, you have taken a lot of curse off of yourself.

MR. HENRY HINES (Springfield, Mass.): I find that some employees can't be approached personally and told that their cartoon is unsatisfactory. I believe in taking the easiest road. I send those always to the engraver with instructions to write on them and return to me with the statement that the illustration will not reproduce.

Then I take that to the contributor personally and say, "I am sorry, Bill, or Jim, but you see you have got to do a little better work, but keep at it," and eventually that fellow may turn out something good. I am a rotten enough poet myself and I have decided that I won't publish any poem contributed by an employee. I did publish one. I was almost nauseated over the thought of publishing it, but I felt that to keep up the good feeling of the plant it had to be used.

I used it and I had more adverse criticisms, from the president of the company down to the office boy, on the quality of that alleged poem and then I raised my right hand and took the solemn mental oath that from that day forth poets were taboo, and if they wanted any original poetry I would grind it out myself.

MR. R. W. SHELDON (Cadillac Craftsman, Cadillac Motor Car Co.): I encountered the same situation about four months ago. I tried out a little plan and had a good deal of luck with it. I made sure to get the man's first name and when I wrote to him I said, "Dear Bob" or "Dear Jim," and told him that I had received his contribution which for a very good reason I could not publish, and that if he cared to have me explain the reason to him, if he would stop me the next time he saw me and ask me, I would be glad to tell him. In the three or four months I have tried that out I have only had one man stop me and ask me the reason.

MR. T. B. SHAW (Mid-West Review): The thing I have always done on this matter of contributions for publication is to fall back on the fundamental principles of the court, that is stalling. I have never made any explanation unless the one who submitted the matter forced the issue, and I have been able to get by so far.

Sometimes my excuse is that the paper was already too full and I couldn't possibly get it in. On the photographs and cartoons, etc., I think the alibi that we couldn't make a halftone or etching is a mighty good solution. According to Webster's strict definition of a lie, which is an intent to deceive, it may be a lie, but I think sometimes the truth hurts the other fellow more than the lie would hurt me,—and the point of taking every bit of material that you possibly can, I think, is very important.

I always work on this plan: that those submitting matter for publication are average employees and the fact that they are interested enough to write or draw whatever it is, is prima facie evidence to

me that somebody else is interested in it, and I think that is the point on which we should weigh all matter that goes into the paper.

If there is only one individual in the plant interested in it it is hardly justifiable to print it, but that is the point on which it is hard to judge. If one is interested there must be others, and if a dozen or more are interested in something even if it is only a little joke understood in one department (and we all get those in our departmental gossip or whatever we call that particular part of our paper) it is interesting to a few and it costs so little that I never hesitate to print it.

There is one point, however, in connection with that I shall never forget. The superintendent of our plant, one of seven thousand publishers of the B. C. A. News, came into my plant office and pointed to an item of three lines, "Was Bill Jones lonesome when he walked home Friday night? I'll say he wasn't."

He pointed to that and said. "Now, I am not going to criticize you for putting that in, there was probably no way you could understand it, but those three lines caused a divorce and the dismissal of three people from this plant."

Bill Jones happened to be a single man, and the party with whom he walked home was a married woman. Her husband was also working in the plant and the boys started kidding him and caused that article in the paper, hence the dismissal and divorce, so I think jokes mentioned here and that in our looking over jokes, every care should be used that is possible.

In a large institution the editor can't be expected to know every individual or their families or family entanglements, but it is very important. I have turned down lots of jokes, however, on the ground that there were so few people who could appreciate them and I have always tried to put jokes in the paper in such a way that everybody could enjoy the joke and so they wouldn't have to have the joke explained.

MR. W. S. WOLLNER (Northwestern Pacific Railroad): We have no editors on our publication. We have people with the title of editor they are railroad people, and they know the railroad game and know a good many of the 2700 employees on the road, and when they pick up a contribution it is not weighed by its literary merit nor by the yardstick used by the editor of The American Magazine, but it is given consideration from the view-point of the men who are running that railroad, the men who are working on that railroad. It is something that if it is something that will interest them we don't care how rotten it is. If it tells the story our men should have we give it to them. If we want them to read good poetry we can conduct a department and refer them to good poetry. It is the same way with what might be called the literary angle. We do as little editing as possible. Some of the best articles we have published have been from men who have had very little schooling. We correct them to a point

where they are readable, not where they are literary efforts, but where they are understood by our men, because we want our men to read them.

BY-LAWS OF THE PLANT PUBLICATION SECTION OF THE NATIONAL SAFETY COUNCIL.

Name

Section 1

This organization shall be known as the Plant Publication Section of the National Safety Council.

OBJECT

Section 2

The object of this Section shall be to promote the purposes, objects and activities of the National Safety Council as the same more particularly apply to the special problems of the members of this Section.

MEMBERSHIP

Section 3

Membership shall include all members of the National Safety Council who shall be interested in the activities and purposes of this Section and who shall signify to the Secretary or to the National Safety Council or to the Secretary of the Section, their desire to affiliate with this Section.

OFFICERS

Section 4

The Officers of this Section shall be a Chairman, Vice Chairman and Secretary who shall have the usual duties of such officers and whose terms shall extend to the annual meetings of the Section following their respective election or until their successors are elected.

ELECTION OF OFFICERS

Section 5

Nominations of officers shall be made by a Nominating Committee of three appointed by the Chairman of the Section, which Committee shall report at the annual meeting its recommendations of officers, which report shall be followed at said meeting by the election of officers for the ensuing year. Other nominations for officers may also be made by any members of this meeting.

MEETINGS

Section 6

This shall be an annual meeting of the members of the Section held during the period of the Congress of the National Safety Council, notice of the time and place of which meeting shall be posted at the Information Desk Congress. Other meetings of members may be held on due call and notice by the Sectional Executive Committee.

COMMITTEES

Section 7

The affairs of the Section shall be conducted by the Executive Committee of the Section which shall be composed of the Chairman, Vice Chairman and Secretary of the Section and the Secretary of the National Safety Council who shall be ex-officio a member thereof and the Chairman of the following four Standing Committees which committees shall be appointed by the Chairman of the Section.

1—Membership Committee.
2—Standardization Committee.
3—Committee to study causes and remedies of hazards in the Section's field of activity.
4—Program Committee.

IN GENERAL

Section 8

The Executive Committee of the Section shall appoint such other officers or Committees and amend these by-laws or adopt by-laws and do such other acts and engage in such activities as may be needed to wisely further the objects of the Section.

SUPERVISION BY NATIONAL SAFETY COUNCIL

Section 9

The Section shall be under the direction of the Executive Committee of the National Safety Council.

All by-laws and amendments thereto, activities, expenditures, literature, bulletins and published data of this Section shall be under the name of the Section as a Section of the National Safety Council.

MR. HINES: I move that Article 8 be amended by striking out the words "and amend these by-laws or adopt by-laws" so that the section would read, "The Executive Committee of the Section shall appoint such other officers or committees and do such other acts and engage in such activities as may be needed to further wisely the objects of the Section.

(The motion was seconded and carried.)

MR. HINES: I move there be an added section, "These by-laws may be amended at any annual meeting."

(Amended constitution approved.)

REPORT OF THE NOMINATING COMMITTEE

MR. G. A. BOELLER (Dayton Light and Power Company, Dayton, O.): Your committee has the honor of presenting as candidates for the three elective offices of this section:

Chairman—Miss Margaret Talbot Stevens, Associate Editor, B. & O. Magazine, Baltimore, Md.

Vice-Chairman—Mr. W. D. Price, Editor, Warner Gear Review, Warner Gear Co., Muncie, Ind.

Secretary-Treasurer—Mr. A. G. Strickrott, Editor, The Synchronizer, Adirondack Power & Light Corp., Schenectady, N. Y.

CHAIRMAN ASHE: Miss Stevens, your new chairman, will conduct the afternoon session. I want to leave one thought with you. There are two things you are concerned with in editing a house organ. One is interest. The general interest you create is very important, and the second is the cumulative strength that your paper builds up or the thing which makes the paper live, because the genuine interest is more or less of a temporary nature. It is a thing like the illustration or idea which makes your paper read. The next thing is the thing the company will consider before they discontinue your paper, and it is very difficult to draw the line or differentiate between the two classifications.

I have found from our ten years' experience, that it is the general news items and the pictures and the general interest notes that create the temporary interest on the part of the reader. That is the thing that makes them want to take the paper home and look at it, it is surprising how little interest it takes to get a man to take the paper home. It requires very little interest on the part of a man to make him fold the paper up and put it in his pocket and take it home. So don't place too much stress on that. You have got to constantly get about and ask people who you may feel not friendly disposed toward the paper for they are generally the ones who will tell you and get the viewpoint on interest and those things.

Don't be in a critical mood when somebody tells you he thinks that piece of work is poor, but realize that if you get that from one person to another there must be some truth in it and you listen a little and harmonize those things you gradually win the people over.

The things I think make a paper live are the solid things, the solid material you have in your paper. What do we mean by solid material?

Some people reading our paper's current news wonder how we get away with so much heavy stuff in our paper. You look at the copies on the board and you find an article describing some department and the operations, autobiography or whatever you call it, of the man in charge, and you find a description, semi-technical, of some of the operations carried on in that department. It may occupy four pages of your paper, but that is the sort of thing you are doing, just as though you were compiling a history or something, of your plant, and as you work up this or that department you are making just so many units of strength for your plant, and that keeps accumulating so that at the end of the year, if you have a fair proportion of this solid material in it, and you have included as well the elements of progress in your company, the new developments, and the new things that happen, at the end of the year there is a history of the progress of your company for that year, and they will always look to your paper if they want to find out what has happened or what is going on. If you can get the management to do it, the result is that they will hesitate a long while before they discontinue it.

Another thing is the matter of having a very definite editorial policy. You will find from your experience that certain things you have done have worked out successfully. When you get new assistants and different ones helping on the paper, do not let them turn your policies inside out, but stick to certain channels you have found and gradually build along those lines. If you have a definite policy, even though it may not be quite as good as somebody else's in the long run, you will probably be much more successful by sticking to it.

Another thing is the trick of knowing how to get other departments to absorb your expense. That is an important thing. The more you can get others to absorb your expense so that when the final showdown comes as to how much the paper costs you can say it doesn't cost anything, the better off you will be.

A house organ is a well worth while proposition, and you should be able to show your employee that fact, comparing it with the $7 or $8 per employee per year for group insurance and the accident compensation which is costing $6 per year per employee. You then go down the scale and hit the paper which only costs $1 or $1.25 a year per employee, and they can understand it.

THE SPIRIT OF A HOUSE ORGAN

W. D. Price, Industrial Service Director, Warner Gear Company, Muncie, Indiana

The plant publication, is as yet a very modern youngster, as tc age; few veteran editors are in the field. Comparison with a giver standard is impossible. The text is rapidly changing, styles are varied make up is rather whimsical; but not withstanding all of these facts we are progressing. To decide this, compare your last edition witl your first. Today, there are almost as many ideas as to what a plan paper should be as there are editors. Soon, I believe, we shall grad ually begin working to a more uniform standard.

A few years ago a new branch of endeavor appeared in industry— the personnel man. These men began to study a very much neglecte field, materials, machinery, methods have been and are being im proved and perfected, all for the main purpose of more production a less cost. The personnel men then took up the human phase to se what could be done there. Many problems presented themselves im mediately, as to the human being and his performance. Consideratio for the worker has resulted so many times where previously he wa left out entirely in planning.

I wish to review briefly these well known facts to properly locat the plant paper editor. In many instances he has become the mouth piece of the personnel work.

The spirit of any publication depends upon the one person directl responsible, usually the editor. He is the dynamic force. He cannc be static. He is the creator, the real spirit exists in him; the rea meaning must come from him. Therefore, my thoughts will have t do largely with how he produces the correct spirit of his publicatio

He who produces a publication to be read by other people has certain responsibility which should not be regarded lightly. H cannot choose whether or not he will influence his readers, but ho will he influence and direct them. An editor, or prospective one, shoul study himself, before attempting the responsibility, to determir whether or not he is capable, or whether it is just an ambition to d something for which he has no gift. You can't bluff much on th job.

Genius Can Not Replace Industry

An editor need not be a genius. A careful study of our greate men in history reveals the fact that usually they possessed only mo erate talents but using what they had to the utmost brought the greatness. Time clock editors will fail. To know our public properl means out of work hours spent where we gather the habits, recreatio and language of those we are trying to reach. Some sacrifices on o part is essential, but back of all real progress we find sacrifice. community is like a human body; each part has its particular functio

and upon the right performance of each part depends the well being of the entire community, as well as the individual. Perhaps that truth is undeveloped industrially. Think of the supremacy of the American workman—he is atop of the world today. Why? Not by force, as some think; not by strategy, as others believe; but because we are gradually realizing this truth of group performance, perhaps not altogether voluntary, but nevertheless profitable. We can and must help our fellow worker to appreciate his position; help him to maintain it; assist him to attain even greater; warn him of lurking dangers which seek to tear down his bulwarks; teach him to think for himself and not take for granted so much that is propaganda. With approximately thirty-three million copies of newspapers circulated daily, where the bulk of America's thinking is done for them, this is a task.

Can we teach sincerely the nobility of work, the greatness of achievement, the mastery of material, the perfection of product, the mastery of self? John Ruskin left us these words: "If you want knowledge, toil for it; if pleasure, toil for it." Toil is the law. Pleasure comes through toil, not by self indulgence and indolence. When one gets to love work, his life is a happy one.

Permeate your paper with a zeal and an earnestness that will be contagious, remembering always that without ideals, without love, there is no real enthusiasm. Weld together the principles that the office and shop must be united, the boss and the man be one; all one mind, one thought, one desire, at least so far as company interests and success is concerned. Help the management to appreciate the man in the plant. Show Bill and Harry that the management is striving for better conditions—more work, more pay where possible. Teach each that permanent progress cannot be made alone. Teach the fellow who has a real continuous performance of monotony the part he plays in a great work. Hammer the truth home—that real joy in this life comes from tackling a hard job and mastering it. Success means hard work, but failure is harder.

All normal workers have a desire within them to develop, to grow more useful, to get somewhere, but so many times they lack the knowledge of how to proceed. This lack is appalling in some subjects, as raising and caring for children; financial planning and expending; eating; health; home care; cleanliness. I will go this far. Some of our American workers have changed the names of the seasons to sick and well. Sick in the winter when shut in to well in the summer when leading outdoor lives. They want a home, happiness (most of them have automobiles), and proper use of what they have would give them far more benefits.

Workers Respond to Sincerity

An editor can and should study such conditions and through his column deal with them fearlessly. The worker will usually respond

to a sincere desire to help him. It is a business problem to solve, not a welfare idea to talk about.

Encourage plant men to express opinions on conditions and plan life. If a rotten condition exists, acknowledge it, bring it out into th sunlight and relief will come. If a sore head appears, diagnose an prescribe. Perhaps you may unearth a skunk nearby. Don't sen him out to pollute some other place; take away his obnoxious char acteristics and domesticate him. Human beings can go a long way dow and yet return. Never lose faith in humanity, for when that come your usefulness as an editor is passed.

Politics and political parties are dangerous to handle in our publ cations, but good government can always be dealt with. Religio is complex, especially under present conditions, but righteous livin is a common ground upon which to take a stand.

There is a right and wrong side to most all questions. Some peopl seem to believe in degrees of each. There is no such place. We mus disperse the wrong, correct the degree idea. We must implant th right. The spirit of every plant publication should be—toe the lin on right and wrong in shop ethics. Be arbitrary when right and wron clash, (provided you are right).

Editorials give an outlet for many difficulties. Many, many time it is creating the desire rather than teaching the lesson that is neede That word create excites my imagination. An editor must create, I can't live as an editor and not create; but let us make sure we crea something helpful, something beneficial. The mere reporting of ha penings in the finest way, is not enough. We must feed our publ solid food. Let the current news be a carrier only, not the mea You know some people in this world make great financial success l appealing to the lower instincts in those about them. I can't see possibility of success for a house organ editor unless he appeals to th best in those of his readers.

Literary ability to say what you mean accurately, surely, quickl is genius in publication work. Often the spirit of a paper is spoil by much words and little said.

Opportunities for Service

Each issue should be an unfolding of events and issues in naturalne and interest. Last minute fill-ins are killing to effect.

We must first tie our public to our own plant, keep forever the sta of mind that of boosting for your concern difficult to do without ove doing. Publicity of plant policies and plant production will hel Keep sons and daughters of your workers naturally coming to you f employment.

Tie also to your city. Promote the happenings of your home tow

Tie your public to the nation—right thinking on good government. Remember this—the foreign question in our plants is our greatest opportunity and privilege to train and implant sound American principles, and when we appreciate this fact we are progressing toward one people, one language, one nation.

We have not done our full duty unless we touch occasionally upon several of our American curses. Some of the most outstanding ones today that affect our public are waste—divorce question—disregard for law enforcement. There are more, but these three are vital and need clear thinking and right action to eradicate. You may disagree with me as to talking on such subjects in our publications, but consider my viewpoint a minute.

We waste enough food in America today to feed some of the starving thousands in Europe and Asia. Is that right? Is that fair to us or to them?

Divorce affects our most worthy institution, the home—one divorce to every seven marriages in 1922, or 136 divorces to every 100,000 American people. We need uniform laws—laws making it more difficult to marry.

Disregard for law is costing our country untold millions of dollars. It costs a taxpayer in the U. S. about $35 a year for tuition for each of our twenty-two million school children, but it costs the states an average of $400 a year to send each of our 675,000 criminals through a penal institution; 675,000 commitments last year; 165,000 constant prison population. We must touch on such subjects and help bring about a conscious public opinion to better conditions.

We cannot develop the very necessary spirit of mutual understanding unless we bring out the real issues of life and discuss them. Call things by their right name, even if we do have to rechristen often. Let us raise a standard to which the wise and honest may repair.

Although we are living in a day of speed and rapid development, we cannot take a grandstand seat and watch the parade pass. This is a wonderful day and age in which to live, and as editors of plant publications, we have the greatest chance possible to get into the parade and help direct its course. Let us not be satisfied with the mediocre—the cub reporter stuff. Get into things and direct. I firmly believe it is expected of us. Let us set a pace that our successors will have to step on the gas to maintain.

High Ideals Promote Usefulness

The past holds fast that performance of yours. The present means work more to learn to enjoy. Let the future star your heavens with friends brought out of the mists into the brightness of more usefulness.

A high ideal for your publication should be charted and followed. He, who scorns high ideals, has yet to learn that sailors steer their ships by stars. Too many issues of plant publications look like side

lines without a fixed guiding star to lead on. We need to get the modern chicken growers' habit—cull again. Often we read that department so and so has failed to report any happenings. What's wrong? I would say often the editor. If you give them something, they will crowd to get in.

Have you reached the point where your advice is sought by plant men on other than plant questions? You are progressing.

The broad horizon of the plant publication field has hardly been traversed and really some parts never discovered. Many real beneficial possibilities exist untouched. Let your thoughts wander and collect some of the rich finds that others have missed. Explore to the last range your own hills and delve into the virgin soil around you. Open up for general good the natural resources that your particular world contains. A great many of your men are potential gold mines of ideas and thoughts, rare value untouched, perhaps unrefined, await your efforts.

The spirit of our plant publication should be to render service. We must assume leadership. We talk, we plan, we connive for the right service to render, the correct leadership, to better conditions and so often we fail, mainly because of human methods.

DISCUSSION

MR. PRICE: I would like to ask this question for discussion: What do you think of treating public issues in plant publication articles—divorces, lawlessness, etc. Isn't it our duty to treat them in our publications? I would like to hear that discussed.

MR. SHELDON: There are a lot of things we would like to put in a publication but there is always company policy to be taken into consideration. How do you work that out?

MR. PRICE: If I was working for a company and they had as little regard for the law as we read about in the papers they do have, if they were not men of high standard I would get a job somewhere else. I believe the treatment of vital issues properly handled—maybe not all the time, maybe not in every issue, but gradually created among our people—is all right. I was trying to estimate here this week how many American citizens the editors of the National Safety Council in their papers reached. The total is way up in the millions. What a wonderful possibility there is for us fellows to reach the public of the United States. We could almost elect a president.

MR. SHELDON: Do you think the average editor edits a paper according to his own way of thinking?

MR. PRICE: I think I answered that question in the start. There are those editors who do as mamma tells them, perhaps they are compelled to. There are others who have more range and resourcefulness. I

believe if we can show the good that can be accomplished by certain things, we can win the other fellow over.

MR. CLOSE: I think that Mr. Price has set before us a mighty fine ideal of what an editor ought to be, and I think that the sort of questions which he has raised are questions which are quite proper for discussion in a plant publication meeting, because certainly such questions as the proper enforcement of law, the divorce question and matters of that kind have a very vital bearing upon the men or the women employed in our companies, and our job is to interpret to them the highest ideals of life, it seems to me, and by so doing we are not only helping them individually but we are raising the standard of our employees and getting them to see these public questions in a higher light, and I think it is quite a proper field for the house organ.

Of course, it has to be done with due consideration to the other matters which are very directly concerning them and we may not always have the time we would like to have to discuss some of these questions, but to the limit of our possibility it seems to me they are very proper questions for a plant periodical to discuss.

MR. HINES: Anything which makes for the better citizenship of not alone our own employees but of the community is well worth while. We editors have got a great many things to learn, we are learning a good many things. I feel that in the work of making American citizens of our foreign population we fall far short of our duty in simply getting them to become citizens without instilling in their minds and hearts true Americanism. The great danger to American institutions today is not from the illiterate foreigner who first lands in the country with Bolshevistic ideas, but it comes from the men of foreign birth who have become citizens in name and in act but not in spirit, and the house organ ought to preach good citizenship, observance of law and everything which will make for the betterment of home life and of citizenship.

MR. WILKINS: The Schenectady Works in Schenectady has been boosting not only the ideas of Mr. Price but also the community spirit and it was through the Schenectady Works News that we got daylight saving, so you can see the accomplishment of an employees' magazine. That is just a little pointer.

MR. DOELLER: I agree with what Mr. Price has said. I would like to ask a question: what kind of a reaction have you had from your readers, particularly employees, on the questions we are discussing?

MR. PRICE: I find that they like it. They respond very well. Of course, I can't say that for all of them. You know we editors, a great many times, will put out an issue and all we get of it is the fellow that has a kick. The fellow who is pleased and likes the things somehow or other keeps it to himself, and it is rather hard to determine exactly whether you have put the thing over or not. I heard some one say recently that he had an idea and he put it over to

the public. That is rather hard to determine in our work, whether w have put the idea over or not, but as far as the response is concerned I would say that we have put it over.

I was interested in the discussion this morning as to how they ac when they don't get their paper. If a fellow doesn't get the paper h is on my neck. Of course, ours is a smaller plant than the ones w were talking about this morning. I believe a sincerity in the pape will get results, whether we know it or not.

Criticism

MR. E. E. NEUBIG (Hammerill Paper Co.): One of the first journa istic principles or practices you learn is that you can't criticize a ma about his work, religion or politics, and expect to get away with it in restricted community such as a plant publication covers.

For a purely hypothetical case, we will assume that a man i getting out a plant paper in a concern that employs 2500 people. O the executive staff, not in the mill perhaps, this divorce question ma be apparent in its different phases. He discusses the divorce prop sition. The particular executive he hits will not say anything b smile and in a short time friend editor will get the axe.

MR. PRICE: I care not, if I am in the right, whether I get the a or not. I believe in firmly standing on what I think is right. If hits the fellow in the shop all right, if it hits the fellow in the offic all right, but there is a right and wrong, there is a right place to sta and there is a right attitude to take. Diplomacy wins many battle but the right will prevail. I tell you that if you get canned off t job for doing the right thing there is a fellow who will grab you and give you a better job. I have found that out from experience.

COSTS OF EMPLOYEES' MAGAZINES

E. T. Wilkins, Editor, Schenectady Works News, General Electric Company.

The subject of costs of employees' magazines, is of vital importan to each industry or firm issuing an employees' magazine, as oft this item determines the life or death of the magazine irrespective the results accomplished.

We have heard of the effectiveness of employees' magazines almost every paper read before the plant publications section tod We know that they pay big returns, otherwise, we, as editors, wo not be here.

In our consideration of costs every editor should ask himself th questions frequently. Is this magazine worth all it costs? When O. K. the printing bill, have I justified the expense to the compan In other words, is the employees' magazine an asset or merely

One company, in order to justify the existence of its magazine submits, at frequent intervals, various issues to some outside newspaper critic for frank criticism. You can imagine how this keeps the editor on his toes all the time. It is a most excellent practice and if more employees' magazines were submitted to this test I am sure we would have more publications that would fully warrant their costs.

Figures on costs of issuing employees' magazines are difficult to compile owing to the different conditions entering into their publication:

Some magazines are issued weekly, bi-weekly, monthly, bi-monthly or quarterly. Some have a circulation of 50,000 and some only a circulation of 500. Some are printed on the best coated papers while others use a machine finished paper or even newsprint stock.

Some magazines have editors devoting their entire time to the work, while others only part time. Some are issued through syndicate publishing houses. This varies the cost of overhead.

It is impossible, therefore, for this group of editors to come to any specific agreement as to what an employees' magazine should cost. You know what it costs you at the present time. You may not be able to meet my costs and I may not be able to spend as much as you do. According to figures compiled from nearly one hundred replies the average cost per unit per circulation per year was $1.87 per employee. Some other compilations show that the average cost is around $1 per employee per year.

The ideas and suggestions which are contained in this paper may be of little value to the experienced editor, but the editor who has a hundred and one things to look after beside publishing an employees' magazine may get an idea here and there to try out for himself, which may be helpful in reducing the cost of his magazine without sacrificing quality.

The principal items entering into the cost of employees' magazine are: paper, composition, photoengraving, artist's work, photographs, ink, layout and corrections.

Paper

Paper is an important item in the cost of your employees' magazine. Here are three factors worthy of consideration in ordering your paper:

First—Requirements: Estimate your paper requirements for a period of six months or a year as the larger quantity purchased the lower the price will be. The cost of papers suitable for magazine use varies approximately between eight and fourteen cents a pound. When you figure the difference of 2½ cents a pound between ordering a ream and a ton of paper, a big saving is represented.

Second—Size: Plan the size of your magazine so that when cut from a sheet of standard size there will be as little waste as possible. According to paper manufacturers there are 28 standard page sizes

to choose from. The editor who plans the size of his magazine outside of these sizes is likely to pay a higher price for his stock. For a possible quarter inch in size one way or another, which is of no consequence whatever to the reader, the editor is adding materially to the cost of his magazine. It has been found in checking the sizes of one thousand magazines that they fall into twelve groups as follows:

1.1 per cent use 3x6 size
7:5 per cent use 4½x5¼ to 5¼x7⅝
3.3 per cent use 5½x8⅜
3.7 per cent use 4x9⅛
27.4 per cent use 6x9⅛
8.6 per cent use 7¾x10⅝
18.3 per cent use 8½x11
16.5 per cent use 9¼x12⅛
2.7 per cent use 12½x15 to 12x18½ (newspapers)
10.9 per cent use Miscellaneous sizes.

From this tabulation the three most popular sizes are 6x9⅛, 8½x11 and 9¼x12⅛. If you are in doubt about the proper size of your magazine, it is a good plan to consult your printer or your paper dealer

One company, among the very few, has standardized all its principa publications, catalogs, specifications, contracts and photographs to agree with the United States government standard of 8x10½. The 8x10½ size contains ten per cent less paper stock than the 8½x11 size. As a sample of economy resulting from the use of the smaller size this company annually saves more than $10,000. The Schenectady Work News is a sample of the 8x10½ size which cuts from a sheet 33x44

Third—Stock: Select your paper stock to meet your needs. Several things enter into this selection, such as character of illustration used, the impression it is essential to create with the employees, the speed of printing operations to meet publication date, and the allowance your budget will stand. The three grades of paper mostly used in employees' magazines are: MF, book or machine finished paper super-calendered, and coated stocks. Personally, I believe a good super calendered paper is of sufficient quality to meet the average need of employees' magazines.

Here is a simple method of figuring the cost on less than 500 sheets of paper: Double the weight of 500 sheets, which gives the weight of 1000 sheets. Multiply weight of 1000 sheets by number of sheets to be bought and multiply product by price per pound. Point off five decimal places (divided by one hundred thousand) and the result equals cost in dollars and cents. For example, the cost of 325 sheets of 33x44—7 pounds at 8 cents per pound. Just forget for the present the size but double the weight of 500 sheets to figure on the 1000 basis; for instance, 2x74 equals 148; 148 times 325 equals 48,100 and at 8 cents 8 times 48,100 will give you 384,800 with five places to point off, giving cost which is $3.85 for 325 sheets

In deciding upon the style of type for your employees' magazine it is best to consult your local printer. Much time and expense will be saved by establishing a standard type head sheet. Then mark each head with a number and specify this number on your copy so the printer can follow your instructions.

In forwarding manuscript to the printer to be set up, it is a good practice to write your heads on separate pieces of paper so the printer can set the heads while the text is being set on the linotype or monotype machines. Of course, a catch line corresponding to headline should be indicated at the top of each piece of manuscript.

Experiences have shown that either 8 or 10 point Old Style is an admirable type size for body use in employees' magazines with 12 or 14 point Caslon bold or Cheltenham bold for headings, sub-headings, etc.

Running type around engravings or cuts in heads or notes in the margin adds to the expense of printing. Foundry type, hand set, contains more words per square inch than the same number set on the linotype, but it is more expensive. Type set on the monotype machine may be either close set as foundry type or a trifle under as linotype matter.

The number of columns used on a page depends upon the size of type used and the width of the page. In determining the number of columns per page some of the best authorities agree that

Eight point should not be set wider than 3 inches
Ten point should not be set wider than 4½ inches
Twelve point should not be set wider than 6 inches
Fourteen point should not be set wider than 7½ inches
Eighteen point should not be set wider than 10 inches

As an illustration of economy of space permit me to give you a personal experience. I was using 10 point type across two columns on an 8x10½ sheet, but in substituting 8 point type and making three columns I was able to get nearly a third more material on a page. In fact, this arrangement gave me a better looking page. I was also able to make a saving on the size of my cuts. This also agreed with the table just mentioned.

To make reading easy, always leave room, if possible, for type to be spaced with leads between lines. The following table conforms to good practice in type setting:

1 to 2 point leads between 6 to 10 point type
3 to 4 point leads between 12 to 14 point type
6 to 8 point leads between 18 point type

In measuring copy to fit a certain space the following table may be useful:

6 point type solid contains 47 words per square inch
6 point type leaded contains 34 words per square inch
8 point type solid contains 32 words per square inch

8 point type leaded contains 23 words per square inch
10 point type solid contains 21 words per square inch
10 point type leaded contains 16 words per square inch
12 point type solid contains 14 words per square inch
12 point type leaded contains 11 words per square inch

Six letters constitute the average word in figuring words per square inch.

Photoengraving

The third item is photoengraving. Editors should study the standard scale prices for photoengravings to determine the style of engravings he can use to keep within the cost of issuing his magazine

The six types of photoengravings used mostly in employees' magazines are as follows:

Square finished with line.
Square finished with soft edge.
Outline or silhouette.
Vignette, fading off into space.
High light, made from pencil drawing.
Combination of halftone and zinc etching.

As to comparative costs: The square finished halftone takes standard scale price. Oval or circle halftones add 25 per cent extr to scale charge. Vignette or outlined halftones require special work o the part of the engravers and add approximately fifty per cent to th scale charge. Combination halftone and zinc etching doubles the scal price with $2.00 extra for each negative and an additional charge fc inserting in line negatives. High lights are four times the scale pric

In ordering engravings be sure to allow room for the full size (the engraving and not only for the part that is reproduced. An eight or a quarter of an inch is required on two or all sides of the engravin for blocking. In estimating the cost of engraings this margin or bloc size is always included.

One thing you can depend on absolutely is that the photoengrav everywhere is striving to produce quality work and he will produce it he is allowed enough time. The photoengraver in making up his cos takes the following factors into consideration:

First, labor. This makes up the largest percentage of the cost.

Second, overhead, which includes such items as rent, power a light.

Third, service. You want that little engraving tomorrow morni regardless of the fact that it may mean bad economies on the part of t engravers to produce it tomorrow morning instead of producing it wi a lot of similar jobs tomorrow afternoon. This rush or overtime wo must be paid for and consequently adds to the cost.

Fourth, materials. This is the smallest item in the total cost.

Editors sometimes use in one publication halftones of two or three different screens. Whatever screen you use, use it consistently. If cuts are ever submitted other than your regular screen, leave them out.

The halftone screens of engravings suitable with grades of paper mostly used for employees' magazines are roughly as follows:

100 to 120 line screen on MF, book or machine finished papers.
120 to 133 line screen on super papers.
133 to 150 line screen on best coated papers.

Just a word about proofs. One finished proof and one file proof are always furnished with the engraving. Additional proofs cost from ten cents up each, according to size. This is a small item, but editors who are accustomed to ordering from four to six proofs are increasing the cost of their publication proportionately.

You will find it always pays to make the cut fit the copy and not the copy fit the cut.

Artist's Work

It is impossible to make a schedule of prices which would serve as a basis for the artist's work.

Some editors include on their staff regular salaried artists, others obtain this service from professional artists, while many concerns maintain a staff of artists whose service may be called upon at any time by the editor.

In retouching photographs the cost of artist's work depends on the quality of the photograph, that is, whether it has many reflections, whether the details are plain and distinct or whether there are many distortions to correct.

If good photographs are secured the cost of retouching is nominal. Poor photographs greatly increase the cost of artist's work and detract from the naturalness of the photograph.

In placing an order on the artist, furnish all possible information that will prove helpful. A rough sketch will always prove of great assistance.

Sometimes arrangements can be made with a local newspaper cartoonist to draw cartoons or pen and ink sketches.

Often, talent will be found among the employees who will gladly contribute sketches merely for the publicity involved. This should be encouraged as much as possible.

Photographs

Photographs were mentioned in connection with artists work in the previous item, but should be considered separately. Photographic prices vary in different parts of the country depending upon who does the work. It goes up on a rising scale as the work is done by

1. An amateur photographer in the plant.
2. A professional photographer employed in the plant.
3. A professional photographer on contract.
4. A professional photographer called in occasionally.

The usual cost of a photograph is not more than three dollars each. It may, under favorable conditions, be as low as $1.25. Good photographs, though more expensive than cheap ones, always save their cost when it comes to retouching. Furthermore, you can always depend on a good photograph to make a good engraving, whereas, you run chances on a poor photograph.

Much could be said about the taking and selecting of photographs for use in employees' magazines, but this discussion is limited to costs and we must pass on to our next item.

Ink

There is no economy in the use of too low a grade of ink for printing an employees' magazine. Not only will the loss of time be greater in the press room than would be balanced by the difference in the cost per pound of ink, but more ink will be used on the job. The actual sum of money paid for ink to do a given quantity of work will thus practically be the same in the case of a lower grade as in that of a higher grade of ink, while the difficulties ensuing as regards drying will still further detract from any apparent economy.

The primary physical properties of ink are consistency, drying and permanency. The consistency of the ink is one of its most important characteristics, and must be necessarily to the greatest possible degree adapted to the work required. Differences in temperature, weather and stock play a most important role in the production of printing and have a powerful influence upon the consistency of ink. It may truthfully be stated that practically never do ideal conditions prevail in printing.

It is not always a question of the intrinsic value of the materials or even their quality that makes an ink good or bad, but its adaptability to its intended purpose. Neither can it be made to do impossibilities. Sometimes a printer imagines that he can use a cheaper paper and make his job come up to the required standard by paying more for his ink, but experience has demonstrated that cheap papers require low grade inks, and good stock high grade inks. Fine job black is just as bad for newsprint as news ink is for coated papers.

A good grade of ink for printing employees' magazines may be bought around 75 cents a pound. For color work the cost goes as high as $5 a pound.

Black inks are to some extent classified according to the paper on which they are used, as for instance:

Halftone ink is used for coated papers
Book ink is used for M.F. book or machine finish papers
Job or Book inks are used for newsprint papers.

Therefore, it is important for every editor to use ink which has been made in accordance with its intended purpose.

Layout

Some editors find that an economy can be made by submitting a dummy page layout with the original manuscript. This saves the printer's expense of making up galley forms and pulling proofs.

No compositor can do the best make-up with a careless layout. The layout should indicate clearly the relative position of each illustration and the type arrangement.

Editors can save valuable time by having the printer make up dummy sheets to conform with the type page including column rules. This facilitates the pasting of the galley in page form.

Corrections

Here is where an editor can spend or save money on the cost of his magazine. Corrections are made in four places as follows:

1. In the original manuscript.
2. In the galley proof which follows exactly the manuscript copy submitted to the printer.
3. In the page proof.
4. In the press proof.

The cost of making a correction mounts constantly as the progress of the work goes on, so that it costs several times as much to correct an error in the press form as in the galley; a hundred times as much as it would cost to correct it with a pencil in the original manuscript. Every editor should see that his manuscript is entirely correct before it goes to the printer.

Your original manuscript should be typewritten on sheets of paper of the same size. The printer usually finds pen written copy hard to read especially if corrected, and stenographic labor is cheaper than printer's time.

Other items enter into the cost of employees' magazines, such as folding, binding, distribution, etc., but I have simply looked for the loopholes where money can be spent unnecessarily, or where the expenditure does not always justify the results.

In closing, permit me to suggest that each editor plan his work of publishing an employees' magazine with the greatest care and thought and then work his plan by keeping within his allotted budget.

DISCUSSION

MR. CONOVER: I would like to ask whether a little further economy might be worked. You spoke of the eight-point type and then the ten-point. I set mine six-point on a seven-point slug. That might help if you adopt the standardized type.

MR. WILKINS: Oh, yes, absolutely. I look for legibility, and I think as I said eight-point is a good sized type, it is a little larger than newspaper type. What I use gives me a nice open space and we have to look out for the foreigner and the man who is not very well educated, yet that gives him enough space between his letters and the lines to be able to follow it closely. We were using two columns with ten-point and by reducing it to eight-point I could get one-third more material on the page; that was a big economy.

MR. PRICE: May I ask a question? It seems to me that there is a lot of valuable information there that the printer may not know in the smaller centers. You do your own printing, don't you?

MR. WILKINS: Yes.

MR. PRICE: Does the average printer know as much as you know? Does he know as much of these facts as you have given us?

MR. WILKINS: Well, he may possibly know them but he doesn't want to indicate it or give it out, but I think that in order to be an editor you have got to look into these costs. The rise and fall of employees' magazines as discovered by the University of Pennsylvania's Commercial Department was quite large right after the war. They found that about 108 magazines died a natural death after the war. And I think it is mostly because of the expense involved, irrespective of the good results accomplished during the period of the war. I believe that we have got to make a study of this employees' magazine proposition more than ever before, and I think this conference today has been leading up to that point, that we have got to look into these things. We have got to justify the expense to our company. I have to do it and in any magazine a certain budget is given and the magazine has to be run according to it.

If a certain budget is given to me to work on, I have to account for every penny I spend and have to make the best use of that money because, as I suggested here, although I didn't give the name of the company, the editor of the New York World criticizes every General Electric publication that goes to press. He sends the criticism to the president of our company; he sends it to the manager of the work and the manager sends it to the editor, and you can see the influence of this New York editor on the president of our company as well as the manager and it keeps the editors on their tiptoes all the time.

Those things have been mighty helpful and I think if some of your editors would give your papers to some one else to criticize, someone outside of your organization not in it, you are going to be wonderfully helped for your work.

MR. AUGUSTUS: I would like to know how many editors who are getting out publications, for instance a 36- or a 48-page publication employing 1,000 or 2,000 men, has stenographic help assigned to them I want to know. I have been trying to get a stenographer to help me out, and I haven't been able to get any help. I have to do it a

myself; I am also expected to circulate around through the plant and be a go-between, and I find to do that and get out the magazine is very hard. I would like to carry back a message as to how many others get help.

MR. RICHARDSON (General Electric Co.): Answering that specific question, I don't believe we could get out our paper unless we did have stenographic help and at times a very great deal of it. The copy submitted to the printer, unless it is typewritten and edited for minor corrections, punctuation, proper names, etc, comes back in very poor form from the galley, because the compositor is human and he is working on a piece rate a great many times. He isn't going to spend much time deciphering mistakes. Now, to get back to Mr. Wilkins' paper, he presented quite an array of things to look into as to costs, but I think that if we select a grade of paper we want and have our illustrations fit on the page and use square cuts we can safely leave it to the engraver about the screen and the rest of the details. I mean this for those of us who do not know more or less of the technicalities of the printing business.

CHAIRMAN STEVENS: How many have stenographic help? Put up your hands so that Mr. Augustus can see them. (About two-thirds of those present raised their hands.)

MR. AUGUSTUS: How many editors are full-time editors? We would like to get an expression. (Ten.)

CHAIRMAN STEVENS: The question comes up about the poster contest, and the magazine contest. Shall we have them for the next year? We haven't finished with them yet but they seem to have brought a tremendous response. If we can get as many members as we have magazines up here, we shall have to hunt new quarters next time. Do you think we ought to have these contests again this year?

MR. WILKINS: I move that we have them.

(The motion was carried.)

MR. RICHARDSON: If editors will send copies to the Inland Printer in Chicago, you will receive criticisms through the columns of the Inland Printer. That is on typography, make-up, and general appearance of the magazine; it is very fair and hurts sometimes.

MR. PULCIPHER: I am wondering if the committee of judges couldn't from the submissions compile a list of suggestions from the good points which they note in each of the magazines and let the members of the Section, or the editors or whoever is entitled, have them for their own guidance and their own use.

MR. WATSON: The judges had in mind in looking over these various magazines writing up a list of weaknesses rather than the good points in the magazines that we look at.

MR. PULCIPHER: What I had in mind was examples of good things in other publications which some of us who don't have them could follow or use as an example.

CHAIRMAN STEVENS: I don't believe it would hurt us to have a fev of our faults picked out. We don't want to make it a mutual admiratio society. It would be a good thing if the judges gave us the good an the bad points.

MR. WATSON: I believe that is what will happen. We will have a lis when we get through of both good and bad points. You will all b interested in seeing it.

CHAIRMAN STEVENS: Do you think, gentlemen, that we ought to a point a sub-committee under the Program Committee to arrange fo a contest for next year, set the standards and plan similar details?

MR. WILKINS: I agree to that. I make such a motion.

(The motion was seconded and carried.)

CHAIRMAN STEVENS: Now, I will read the appointments of the co mittees for the following year. As is the custom, the vice-chairma will be the chairman of the Program Committee, so that brings M Price to the position of chairman of the Program Committee, and w are asking Mr. A. B. Tunis, of the Chesapeake and Ohio, and Mi Ruth E. Cade, of the A. E. Staley Manufacturing Company, to assi Mr. Price.

On the Entertainment Committee, Mr. Herbert Roth, of the Au Strop Safety Razor Company, is chairman, and he can choose his ow committee.

On the Publicity Committee, Mr. E. T. Wilkins, of the Schenectad Works News, Mr. K. D. Pulcipher of the Pennsylvania Railroad, Chicag and Mr. Gilbert F. Close of the Commonwealth Steel Company.

On the Membership Committee will be Mr. G. A. Doeller, of t Dayton Power & Light Corporation, Mr. F. H. Sheilds of Armour Co., and Mr. R. G. Conover of the the Yale and Towne Manufacturi Company.

ADJOURNMENT

Public Safety Section

October 1, 2, 3, 1924

DAVID VAN SCHAACK, Chairman
Aetna Life Insurance Company, Hartford, Conn.

L. H. PALMER, Vice-Chairman
General Manager, United Railways and Electric Company Baltimore, Md.

A. B. WRIGHT, Vice-Chairman
A. J. Wright & Company, Buffalo, N. Y.

WALTER C. BOYNTON, Vice-Chairman
Department of Publicity, General Motors Corporation, Detroit, Mich.

JULIEN H. HARVEY, Secretary
Director, Kansas City Safety Council, Kansas City, Mo.

WEDNESDAY AFTERNOON SESSION

CHAIRMAN VAN SHAACK: Your section has continued during the past year all of the activities in which it has hitherto been engaged, has taken on a number of new ones, and is planning others in addition.

Perhaps the notable accomplishment during the year has been the preparation of the 10 volume loose-leaf encyclopedia of "Standard Practices for Community Safety Councils", which is now being used in 24 communities and is under consideration by others. This encyclopedia covers the entire field of community safety council work so far as it has been developed, going into the details of all activities that experience has shown to be really worthwhile; and it will undoubtedly prove to be invaluable to our 57 community safety councils, 36 of which have salaried staffs.

The section has prepared large monthly posters 25"x38" in size which are being used in several cities, and also monthly windshield stickers with safety slogans now in use both in a large number of cities and by individual companies. A pamphlet has been issued on "Conducting a Safety Education Week", and another on safety exhibits. The possibility of issuing a new magazine devoted entirely to public safety is under consideration by the executive committee of the Council. Such a magazine has been strongly urged by the Public Safety Division of the Council's staff, and if the probability of financing it seems sufficiently good, it will make its appearance at an early date in at least

tentative form. The Council's calendar for 1925 will devote half of its monthly illustrations to public and home hazards in addition to several others depicting general ideas of safety applicable to all conditions. Half a million copies of the 1924 calendar were sold, and these annual calendars are being increasingly used in schools, offices, public places and homes as well as in industry.

Perhaps the most interesting and significant new undertaking of the Public Safety Division is the making of comprehensive community safety surveys with and for community safety councils and the governments of the cities in which they are located. The first of these have been made in Kansas City, and Cincinnati, and requests for similar studies have been received from other cities.

Another important public safety activity of the year has been the Council's participation in the Conference on Street and Highway Safety which was called some months ago by Secretary Hoover, and which expects to formulate its conclusions at an early date. The Council itself was one of the organizations constituting the steering committee which aided in organizing this conference, and this section and the Council generally are represented on all of the committees of the conference.

Work of Education Section

The work of the Education Section is so closely related to that of our own section that I cannot refrain from mentioning a few of the notable accomplishments of this section during the past year. It has prepared and issued a hundred page manual for school authorities and teachers; it is sending out semi-monthly bulletins to 10,000, and distributing educational posters to schools. It has formed close relationships with the Parent Teachers Association, the National Child Welfare Association and the Playground and Recreation Association. It has secured the cooperation through membership on its executive committee of some of the most prominent educators of the country, and I am sure I do not exagerate in expressing the belief that it is well on the way toward securing general recognition by educational authorities of safety as an integral part of education.

I feel that this section may look for much greater accomplishment during the coming year. I know you all share my full confidence in the new director of our Public Safety Division, Mr. Sidney J. Williams, whose work as chief engineer has contributed so materially to the success of the Council in its industrial field. We were especially fortunate, when Mr. Rosseland decided to enter upon community safety work, in being able to secure Mr. Williams in his place. Associated with Mr. Williams is Mr. Earl J. Reeder, an engineer of training and experience, whose value to us has been well demonstrated by the "Standard Practices" encyclopedia, on which he did practically all the detail work under the supervision of Mr. Rosseland and the committee of local managers. On July 1 we secured as an additional assistant in

the Public Safety Division, Mr. Carroll E. Robb, who has had several years experience in general engineering and industrial work.

While we have been engaged for a number of years in the promotion of public safety, I cannot help feeling that our work has necessarily been largely experimental and that only now have we reached the point where it can be conducted upon anything like a scientific basis. We have been particularly successful in the organization of community councils, but not until this year did we reach the point where standard practices for community council organization and activities could be definitely set forth as the result of experience, so far as experience has gone. I know Mr. Williams shares my definite opinion, if he does not claim it as his own, that in public safety work we need to know more about the facts of accident occurrence and prevention, and it is largely along this line that I believe we should advance during the coming year.

We are working and planning to work in at least three ways in endeavoring to ascertain the facts regarding accidents and their prevention. One of these is community safety surveys, the first of which, as I have said, have been undertaken in Kansas City and Cincinnati. Another is increasing our contacts with the people who are applying specific accident remedies—the city planners, traffic control people of every sort, etc.,—including such subjects in our annual Congress program, and giving them greater attention in the *National Safety News* and, of course, in the new magazine which is under contemplation, in which they may be even more adequately treated. The third is giving more attention to accident statistics both nationally and locally. I am strongly in hope that the time is near at hand when the standardized scheme of obtaining such statistics, which has been worked out by the able chairman of our statistics committee, Dr. Dublin, will begin to go into actual effect. In the meantime, our Public Safety Division is doing its best, working closely with the statistical committee. It has been making studies of all available statistical data and developing some interesting facts which will be published in the *National Safety News* or otherwise as fast as they are ready, and it is arranging for a regular monthly collection and analysis of local records.

Study of Auto Accidents

A most interesting analytical study of automobile accident statistics and trends in the United States and in various states and cities has been made by the staff of our Public Safety Division. It deals only with fatal accidents, as no information on other accidents was available and it compares 1917-18 as representing the last two year period before the formation of the earlier community councils with the two year period 1922-23. Taking all the cities for which figures are available from the United States Census Bureau, and dividing them into two groups—those having had community safety councils long enough to have affected the accident record, and those not having councils—

the analysis shows that in 14 cities with local councils, the fatality rate has increased 15 per cent; in thirty cities without local councils, it has increased 43 per cent, and in the entire United States, it has increased 47 per cent. This analysis would seem to be convincing evidence that in promoting the organization of community safety councils, and especially on a permanent basis with salaried staffs, the National Safety Council and its Public Safety Section are moving along the right lines.

The development of public safety work, especially street and traffic safety, depends entirely upon the awakening of public sentiment. The right kind of traffic regulations will not be formulated nor will they be enforced by the police and the courts unless public sentiment is back of such action; nor will city planning and direction contribute the maximum to public safety unless such contribution has the support of organized public opinion.

So far there has not developed, at least in our cities of 50,000 population or more, a means of organizing public opinion in favor of a safer community which seems to be comparable with the community local safety council. Existing local organizations are interested in safety sufficiently to cooperate in safety movements, but they are not organized wholly for the promotion of safety nor are they adequately financed to carry on this work. So far as experience has yet shown, it is only by the organization of community safety councils that engineering revision, law enforcement and education, the three primary factors of a public safety program, can be stimulated by public opinion to work for the best results.

There are very many communities in which some local organization such as the Chamber of Commerce or the automobile club alone can, because of the relatively small population, sponsor the public safety movement, and this section and the Council should cooperate with such activity in every possible way by giving the community the benefit of its experience in larger cities and by placing at its disposal the great amount of information which it has concerning public safety activities of real value. In the larger cities, however, we should continue, I am convinced, our promotion of the community safety council organized on a permanent basis with a salaried staff, and drawing into its membership all the interests of the community having proper concern in the promotion of public safety. I think it is only fitting in this connection that I should express this section's appreciation of the assistance which is being given its work by the National Bureau of Casualty and Surety Underwriters in helping to finance the public safety field activities of the Council and in financing all the activities of the Education Section, whose work is so closely tied in with ours.

Hopes for the Future

I am very hopeful of a large increase in public safety activities from now on, and I believe the National Safety Council's part in the promo-

tion of public safety along really effective lines is to be even more considerable in the future than in the past, both in its direct work and and in cooperation with others. There has always been cooperation, but there should be more, and I believe there will be. Through the Hoover Conference, as it is familiarly called, the Council has been brought into closer touch with other organizations concerned in promoting public safety. Our own work and that of these other organizations cannot fail to be greatly stimulated by this conference, and general cooperation should result from each organization interested in public safety becoming more familiar with what others are doing. I know that the Council is desirous of cooperating fully in every possible way, and I believe that the same feeling exists in other organizations. We can all get from and give to each other, and by establishing close touch with each other we can eliminate much duplication of effort and strengthen each other's hands. As a further move in this direction, I hope this section will authorize its officers and executive committee to add to the membership of that Committee or create an advisory committee by inviting men prominently identified with other organizations interested in the promotion of public safety to serve upon it.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN VAN SCHAACK: I appoint as a nominating committee: Mr Anderson of Memphis, Mr. Rounds of Detroit and Mr. Gilmore o Louisville.

(At the request of Chairman Van Schaack, Mr. Harland Barthol omew presided.)

PLANNING AND REBUILDING OUR CITIES FOR THE MOTOR AGE

Morris Knowles, Chairman, City Planning Commission, Pittsburgh, Pa

The endeavor in this paper will be to bring out the two prim contributing factors to the prevailing traffic congestion; the method of control which have been tried for its alleviation; and more pa ticularly the need of physical improvement in our local traffic faci ities and in the overland highways.

There are two real causes of interest in this public safety questio and the prevention of accidents:

First, the concentration caused by the close association of busines commercial and banking enterprises and

Second, the tremendous increase in number of motor vehicles.

Effect of Concentration

As to the first, the erection of the skyscraper and of large bul buildings and other types of structures which bring people togethe in larger number, naturally must tend to create urban congestio Perhaps a good illustration is that of a block in New York where

was proposed to erect a thirty story building for the accommodation of a working force of 15,000 persons. But when it was realized that the required sidewalk space would be four and one-half times that available; that the passenger traffic on the subway would take up twenty minutes of the entire capacity of the trains and stations in this district and that streets to accommodate the motor traffic would have to be six or eight times as wide; the enterprise was concluded to be of doubtful value and the building has not yet been erected.

A point of interest here, with reference to office buildings, is that the greater traffic congestion occurs in the evening when the efflux of occupants apparently takes place in a shorter period of time than does the influx in the morning. This fact has been brought out by various traffic counts and in one instance is shown by the curves on Diagram I, which have been plotted from such counts made at Pittsburgh. These show that the sum of the vehicles leaving the triangle, the sum of the street cars, and the sum of the cars parked upon the streets is much greater between five and six in the evening than between seven and nine in the morning.

Effect of Increased Motor Traffic

However, the increasing centralization of large buildings has but served to intensify the congestion which has been brought about by the second factor referred to—the increase in motor traffic. Authorities have estimated that by the end of this year the number of automobiles in the country will be 18,000,000; and that in ten years more there will be 30,000,000. Evidently the saturation point is a long way off and perhaps it will not be from the limitation of the pocketbook, but from the limitation of what we are able to take care of on the streets. For example, in 1923, when there were 15,000,000 automobiles, there were approximately only 6,800,000 income tax payers in the United States, indicating that the greater number of automobile owners are not those who pay income taxes. In fact, in fourteen of the states there were four times as many automobiles as income tax payers; and in only one state—Connecticut—did the number of income tax payers equal the number of automobile owners.

Table 1 shows the registration of automobiles by five-year periods from 1895 to date.

Table 1

Automobile Registration By Years

Year	Registration
1895	300
1900	13,824
1905	77,988
1910	468,497
1915	2,445,666
1920	9,231,941
1923	15,092,177
1924 (estimated)	18,000,000

Business Districts. As one illustration of the change in traffic congestion that has come about through the increased use of the automobile, we may refer to its relative carrying capacity per unit of street area as compared to that of the street car. Considering the space required, the street car can handle many more passengers per unit of area occupied than can the automobile. For example, recent traffic counts during the rush hour in Los Angeles, showed that on one of the downtown lines the average street car carried out of the congested district

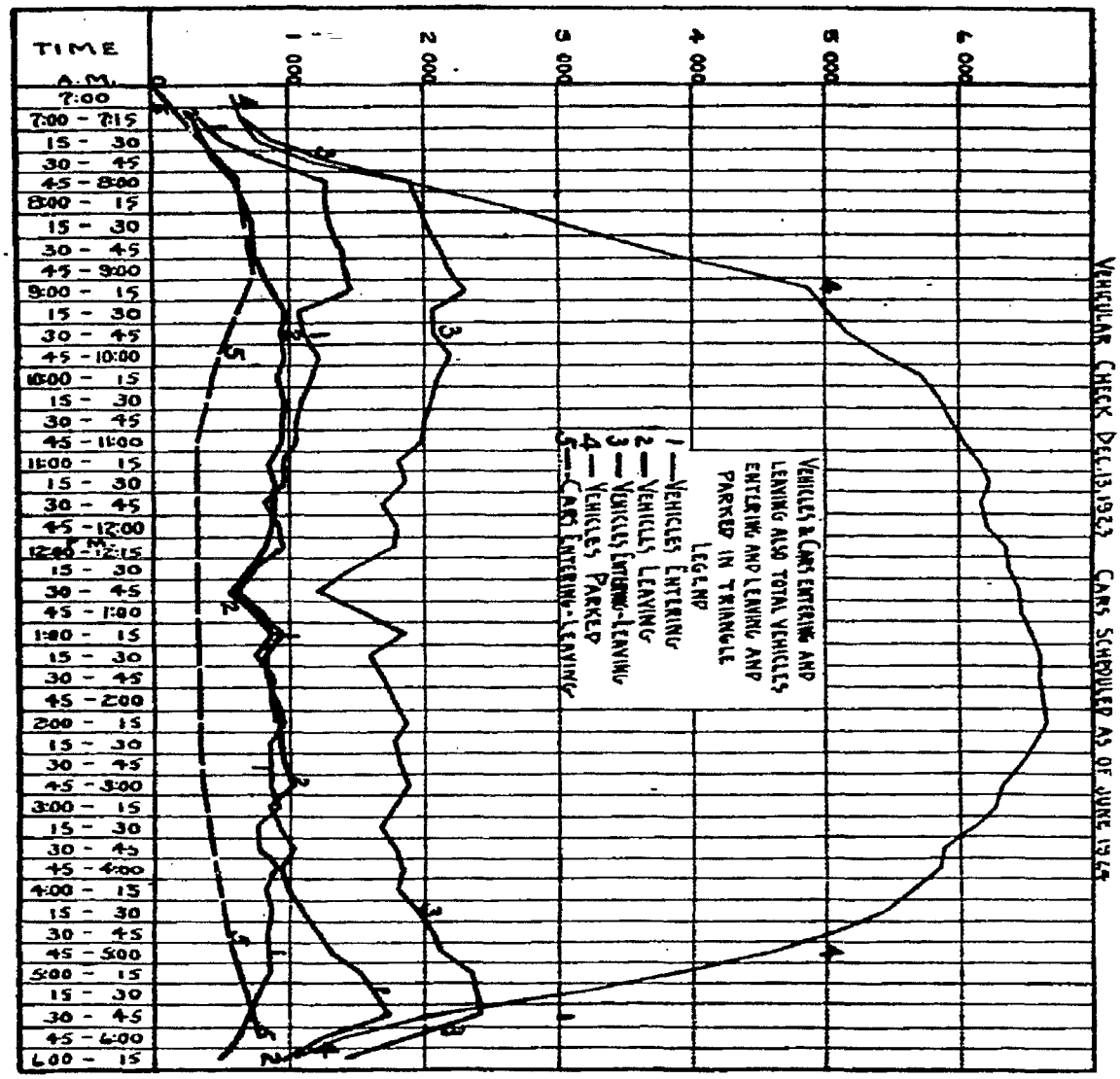


Diagram I.

(This is supplied through the courtesy of the Pittsburgh Railway Company.)

77 persons per trip. The street car takes up about as much space as two and one-half automobiles. The same traffic count showed an average number of 1.67 passengers per automobile. Therefore, per unit of space, the automobiles were carrying only an average of four persons each as compared to 77 persons for the street car.

Along this same line, in Chicago recently, Major Kelker showed that 82,170 vehicles, including both street cars and machines, carried 446,000 persons outbound through the loop district in twelve hours. Of these 10 per cent were street cars and carried 74 per cent of the passengers; the remaining 90 per cent of vehicles carried only 26 per cent of the passengers. Again, a recent count in three cities in the United States showed that 75 per cent of the traffic was carried by street cars, but that 83 per cent of the traffic occupancy of the streets was by private machines.

This factor in the congestion of business districts has brought about the consideration by some of elevated ways for vehicular traffic other than the street car or the rapid transit subway. There has been suggestion of this kind in Pittsburgh and a definite plan proposed for consideration, in connection with the other ideas and studies for the improvement of traffic conditions.

Residence Districts. Residence streets are usually narrow, at least as to the paved portion, and the parking of machines often impedes travel. This, under ordinary circumstances, is not serious, but it sometimes does become so in case of fire. In fact, it has been said that the speed in reaching fires is not as great today with motor apparatus as it was formerly with the horsedrawn vehicle.

Relation to Accidents. Vehicular interference is a recognized cause of accidents and the relation is shown in Table II, which records the total accidental death rate in the United States from 1917 to date, and also the deaths due to automobile accidents during this same period.

Table 2

Total Accidental Death Rate in the United States Compared with Deaths Due to Automobile Accidents, 1917 to 1923.

(Figures Supplied by the U. S. Census Bureau)

Year	Total Accident Death Rate per 100,000 in U. S. Registration Area	Automobile Accident Death Rate per 100,000 in U. S. Registration Area
1917	81.2	9.0
1918	82.5	9.3
1919	72.0	9.4
1920	70.3	10.6
1921	68.7	11.6
1922	71.4	12.8
1923	75.7	14.2

It will be seen that the accident death rate as a whole has decreased from 81.2 per 100,000 population, in 1917, to 75.7, in 1923; but that during this period the automobile accident death rate has increased from 9.0 to 14.2 persons per 100,000. Evidently if the

automobile accident rate had not increased, the decrease in the total rate would have been even more marked; that is, 10.7 instead of 5.5 persons per 100,000. The decrease in total rate as shown has been due to the reduction in railroad fatalities from 11.5 to about 6.0 per 100,000 population; in the reduction of street car fatalities from 3.0 to about 1.6 per 100,000; and in the reduction of accidents due to other miscellaneous causes.

But an important thing to remember is that during the period for which the figures have just been given, the number of automobiles has increased from 5,000,000 to 15,000,000, and because of this the death rate per car, as given in Table III, is a more reliable index of actual conditions. These figures show that, even though the automobile deaths per 100,000 population have increased, the number of deaths per car has gradually but steadily grown less.

Table 3

Death Rate per Car in the United States

(Figures supplied by the National Automobile Chamber of Commerce and the United States Bureau of Census)

Year	Registration of Cars	No. of Cars per 1000 Population	Total No. Auto Deaths	Number Auto Deaths per car	Auto Deaths per 1000 Population
1914	1,711,339	17	4,231	.0025	.043
1915	2,445,664	24	5,928	.0024	.059
1916	3,512,996	34	7,397	.0021	.072
1917	4,983,340	48	9,184	.0019	.089
1918	6,146,617	59	9,672	.0016	.092
1919	7,558,848	71	9,827	.0013	.094
1920	9,231,241	88	11,358	.0012	.106
1921	10,465,995	98	12,500	.0012	.116
1922	12,238,375	113	14,000	.0011	.128
1923	15,092,177	137	15,700	.0010	.142

When considering the records in various localities, there are a number of additional factors which are also important; for example, the population per square mile, the number of persons per machine, the amount of paved streets, etc. These are items of general comparison and in addition certain purely local conditions will have their influence, such as the width of streets, grade crossings, traffic ordinances and enforcement, public education and so on. And it is an established fact that in communities having an active Safety Council the increase in automobile accidents has been materially less than in others. Pittsburgh is a notable example of the latter.

As an illustration, thirteen typical cities have been selected at random and the relation between the number of automobiles per mile of paved street and the number of fatalities per 100,000 population has been plotted as shown on Diagram II. The curve indicated, so far as the general trend of the available data goes, that the number of fatalities increases with the number of automobiles per mile of paved street. However, if other data be plotted, such as population and registration of cars, the indications are that accidents increase with

these factors but decrease with the possible dispersion over a greater mileage of streets.

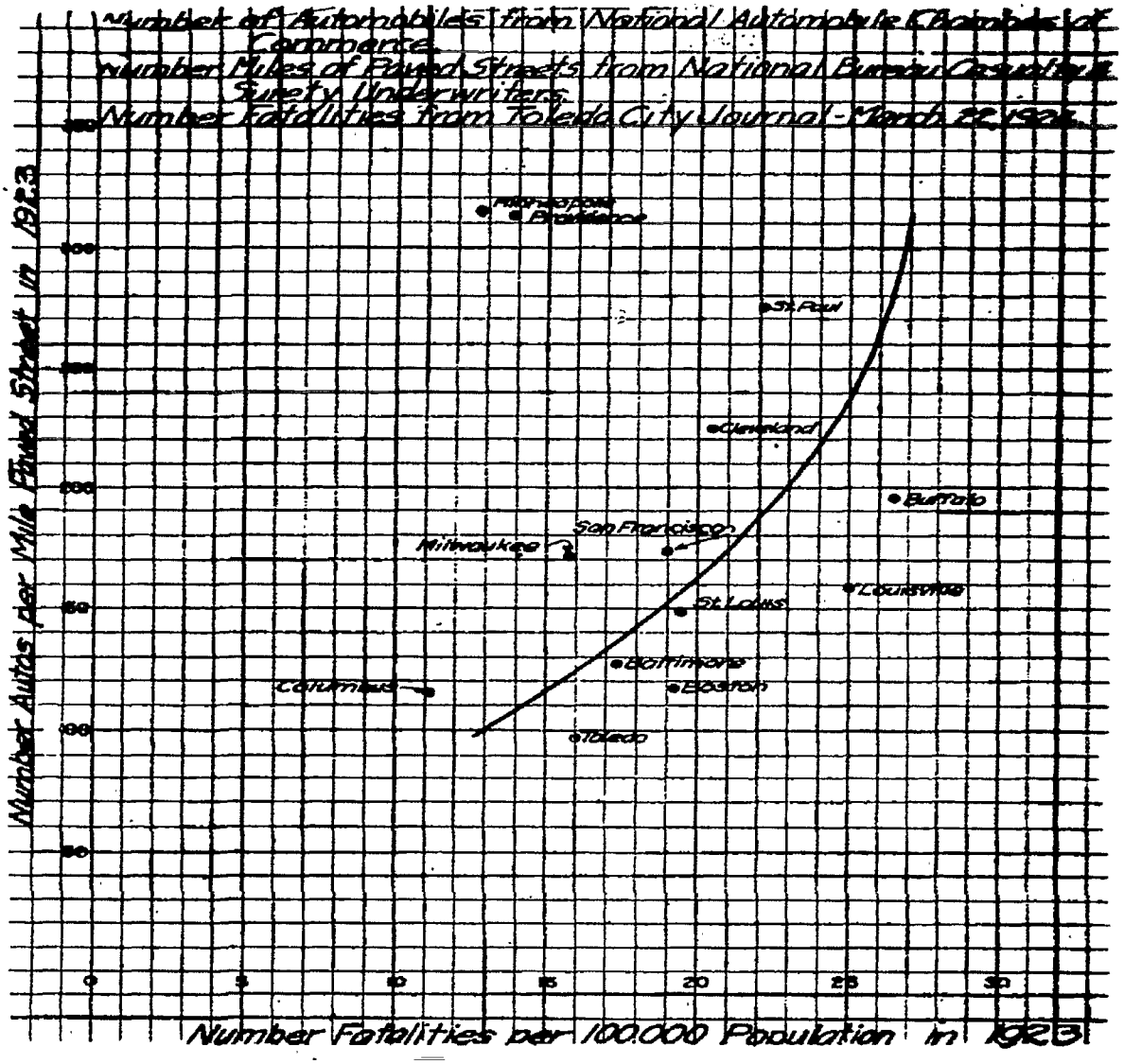


Diagram II.

Traffic Problem and Factors Involved

The foregoing discussion has been for the purpose of visualizing the problem. We are now ready to consider some of the factors involved, and the first is that of traffic control or its systematic direction. The regulation of traffic can do much to alleviate congestion, even under existing physical arrangements; but it is in the improvement of physical conditions that the greatest good can be accomplished. The latter is an engineering and city planning problem. The first

requirement is the collection of reliable data and its intellige tabulation and consideration so that the physical improvements the community can be studied and planned with knowledge of all these factors and their relative importance and application. Su information also is useful and in fact needed in the establishme of regulations.

Some of the information will refer to the number of vehicles; t possible segregation of traffic; the thoroughfares available; the pos bility of improved parking facilities; the traffic regulations; the ne of possible decentralization; the overland highways and their relati to the street systems; the volume of through traffic and the pos bility of its separation from local traffic; and so on. A brief referei will be made to the kind of information needed in each instance a its use.

Number of Vehicles. The traffic count should determine the numl and classification of the various types of vehicles passing along given street in each direction at various periods and the variat throughout the day. Their destination is also important to determi whether the vehicle is simply passing through the districts en ro to its destination or whether it is to stop in the district in questi The number of passengers carried should be determined and, at same time, some knowledge should be had of the pedestrian traf and whether in the wholesale and industrial districts there may interference due to loading and unloading of trucks. As a corollary the traffic count the tributary population should be determined, so t the probable future conditions and volume of traffic may be estimat

This information should be shown graphically so as to be reac visualized; and in addition there should be designated such things the types of districts and their clasification, the conditions as to centralization of industry and the commercial and home building are the steam lines, the street railways, the bus line systems, and the ra transit lines, if there be such. Thus we will have before us the wh transportation system as it exists.

Accident Records. One of the most important indications of inadequ in the traffic facilities is the record of accidents. These should investigated and spotted on a map so that the grouping together the spots will show where there is need of immediate relief.

Highways. This refers to important through streets—usually "Main Street". Commercial interests in the past, and sometimes e now, clamor to have main highway routes pass through the main b ness district of the city. There is no reason or excuse for this. instance, the records in Chicago show that 25 per cent of the vehi entering the Loop District merely pass through and make no except as required by traffic conditions. Similar counts in Pittsbu have shown such traffic to make up about 20 per cent of the tota

Summary. With the data mentioned above, and other peculiarly local information, we are in a position to undertake an intelligent study and analysis of the situation; that is we are in a position to start planning. The traffic experts tell us that there are three factors to consider; the time factor, the street area and the vehicular requirement. It is evident of course that by speeding up to a reasonable extent we may promote the quick passage of vehicles through the city and thus greatly relieve the congestion. This may be done by the reduction of grades or by the construction of intersections with two levels; by the avoiding of grade crossings and things of that kind. These remedies may be just as helpful in relieving congestion as to increase the area or width of the streets; and the more persons per vehicle the less space per capita will be the vehicular requirement. That is, it is evident that commuting by trains, by subways or elevated street cars or any form of rapid transit into the center of the city does not of itself produce congestion or interference, except perhaps as to pedestrians on sidewalks overflowing into the streets. The same number of people brought in by other forms of conveyance produce an interference.

Remedies to be Applied

The remedies which will apply to the problems we have just outlined are of two distinct classes; *first*, those which deal with regulation; and *second*, those which deal with physical construction and the planning for improvement. We might call the first, fitting the traffic to the streets; and the second, fitting the streets to the traffic. It is the latter with which this paper is more directly concerned and reference to the first is because of the relationship; for the city plan has to do not only with what will be built but to the order, sequence and importance of the building. The planner, therefore, must know the effect of regulation on traffic, particularly with reference to what can be accomplished during the intermediate stages of construction.

Regulation of Traffic

The purpose here is to refer only to a few of the more important methods of regulation and to their reason.

Direction of Traffic. Traffic congestion, particularly that due to the confusion of motorists not familiar with the locality, can be lessened by helpful signs which will point out the quickest route available. And even to local drivers it will be helpful to plainly mark new short cuts that are opened and to indicate their destination.

Other means of directing traffic are by the marking of pavements; for example, to indicate safety zones, although such are not usually effective unless standards be included; to indicate cross-walks; to define traffic lanes at intersections; to outline parking spaces, etc. It perhaps should be mentioned that safety zones should be used only where raised platforms cannot be installed. The idea of loading platforms, in most cities, was started by having safety areas on the streets. Later

wooden platforms were substituted and in some cities concrete pla forms are used. Plate I shows a suggested method of constructio where such platforms are built in streets which at present are narrov It is proposed to narrow the sidewalk so as to give vehicles sufficier room to pass between the platform and the curb; and to provide add tional room for pedestrian traffic by arcading the building at the corne That is, the sidewalk would extend under the building at the corner.

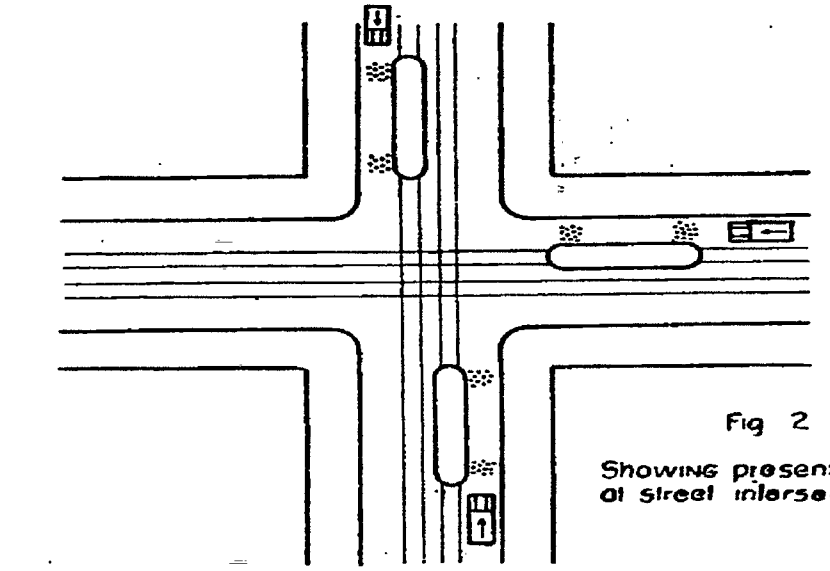


Fig 2

Showing present conditions at street intersection

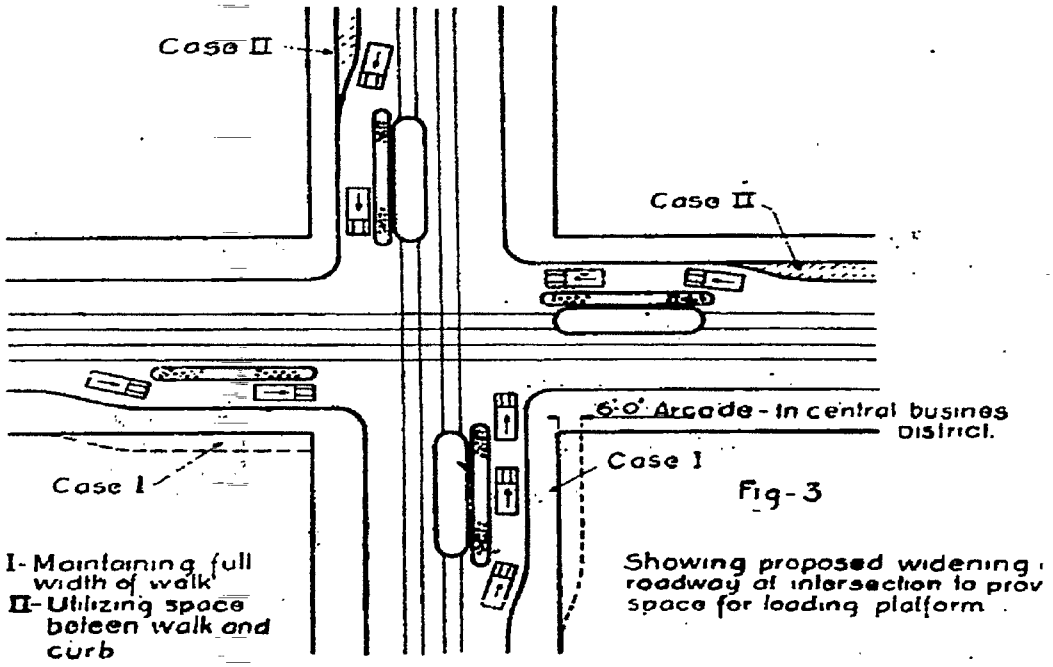


Fig-3

Showing proposed widening roadway at intersection to prov space for loading platform

Case I- Maintaining full width of walk

Case II- Utilizing space beteen walk and curb

Plate I.

Control at Intersections. Certain forms of regulation should control traffic at intersections, either by automatic signals or traffic officers. Stop signs at thoroughfares have been used and can be used continuously, even though thorough re-planning be accomplished. The stopping of traffic from intersecting streets, before entering or crossing through streets, not only tends to relieve congestion but is instrumental in the prevention of accidents.

Parking Regulations. The regulation of parking is perhaps the most troublesome, but its prohibition where it would be conflicting with the free movement of traffic is important. However, parking regulations will be a source of irritation and perhaps somewhat ineffective unless provision is made for convenient storage of cars. This may be done by utilizing the open spaces within and contiguous to the congested district; or by the building of garages with ample elevator service or ramps.

One-Way Streets and Left Turns. Frequently cities have found it to their advantage to eliminate the left-hand turns and many of them have no turns at all. One-way streets generally have been considered as a make-shift and useful only because of inadequate street widths. This perhaps may be a debatable question and it is possible in future that we may lay out street systems on this basis.

The placing of restrictions of this kind on the movement of traffic should be done carefully; and some experimentation will be necessary, because sometimes certain regulations will cause unexpected results and perhaps create congestion at points other than those in question.

Traffic Guides and Segregation. Guides to traffic at intersections and obstructions have proven useful but should always be accompanied by signal lights. Such obstructions can be arranged to reduce the speed of automobiles turning corners and are valuable in keeping the car on the right side of the street.

The segregation of traffic by the designation of the use of streets by different types sometimes has been undertaken. This, however, will not be successful unless ample and efficient facilities are made available and this perhaps is more a matter of design and construction than of regulation.

Regulation of Bus Lines. The use of busy streets by large busses accounts for much of the congestion. The effect can be lessened, however, by the establishment of definite routes and terminal points for loading and unloading where there will not be interference.

Planning and Rebuilding

City Planning Defined. City planning may be defined as "The coordination of comprehensive programs for the advancement and betterment of the facilities for every municipal and public activity". Or, as referred to by the Town Planning Institute of Canada it is—"The scientific and orderly disposition of land and buildings in use

and development, with a view to obviating congestion and securin economic and social efficiency, health and well being".

Purpose. The growth of our larger cities has been the more or les haphazard expanding of small communities through the annexation o contiguous territory. The new subdivisions as laid out usually wer made with the idea of obtaining the greatest number of marketabl lots; and whether or not consideration was given to the needs of th community, there was no method of co-ordination available to brin together the ideas of the different interests. Now we are beginnin to plan for such things, for we have realized that we must look ahead and the real job is, that we shall not repeat the evils of the past an carry them forward into the future. As to that part of the city whic already exists, we must continue to utilize it to make such neede adjustments as may be feasible. In some cases, this may mean th widening of streets, the changing of levels, the separation of grade and so on. In passing, it may be said that the subject of city plan ning comprises all of the municipal activities and goes into ever form of public work.

Zoning. Another feature of importance is zoning, or "The creatio by law of districts in which regulations, differing in different district prohibit injurious or unsuitable uses of structures and land". I other words, zoning gives the plan stability; it determines where th residences shall be, and the stores and industries, and enables sensibl planning of thoroughfares of sufficient width and of the type to me the requirements of the different sections, so that it will not be nece sary to first build, then tear down and rebuild.

We are in a much better condition today to plan than were th people twenty years ago, for we now have the benefit of experien and past mistakes, and particularly as to the inadequacies of ou street and highway system. But even if there had been adequate pla ning thirty years ago, there was no precedent to indicate the phenon enal growth that has taken place in the automobile industry; then the were only 300 automobiles in the United States; today, there a about 18,000,000. Today we feel that we have more information wi which to plan and, even though we may but remotely approach th ideal, we are much better equipped to undertake the job. Plate II an illustration of what changes have taken place; it shows Gra Boulevard surrounding the City of Detroit in 1880, and its relatio to the 1924 city limits.

Methods of Relief for Traffic Congestion

Decentralization. Accidents prevail more in the congested distric and because of this some control of the modern tendency towar centralization of business activities may be helpful. Decentralizati may come about as a natural result, due to the inconvenience of ov concentration and because of the removal of the more independe and fearless lines of business from the congested area. On the oth

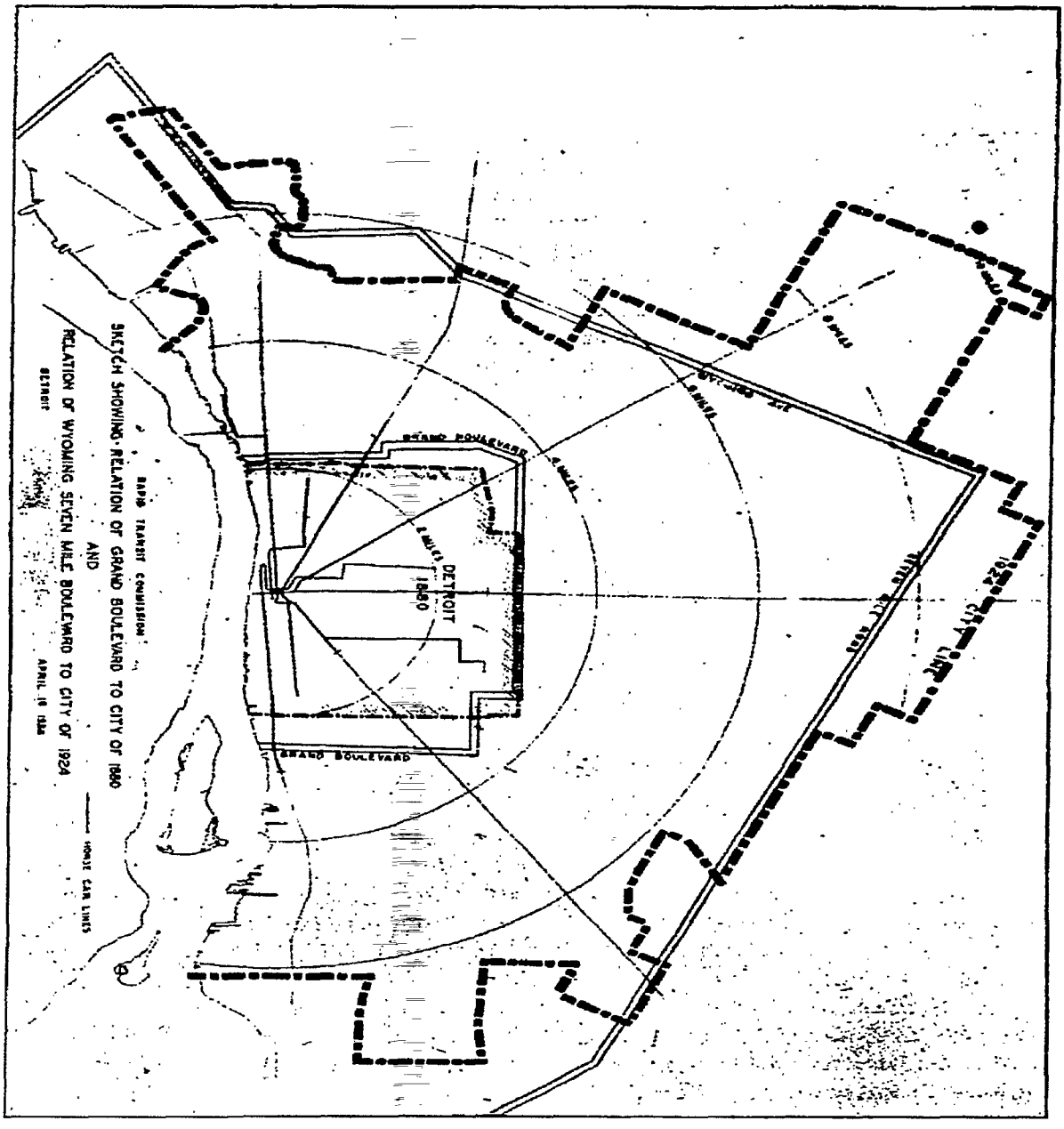


Plate II.

hand, decentralization, if carried too far, may result in the use of motors where otherwise the distance would be covered on foot, and thus the effect, to some extent, might be neutralized.

Provisions for Parking. Reference previously has been made to conditions with regard to parking on the streets. But if the use of the streets for storage is to be limited, or entirely prohibited, other facil-

ities must be provided and this can be done in a number of ways. may be by the utilization of open spaces, either publicly or private controlled; or by the building of multi-story garages. For exampl in one city there are now being built two such garages, with suitab elevators, and having a capacity of 550 cars; in another contracts ha been made for two garages, one having nine stories and a basemer with a capacity for 2,000 cars, and the other eight stories, with capacity for 800 cars; in another city an eight-story garage is bei built, with a capacity for 550 cars.

It is not intended by reference to these examples to convey t belief that such measures are a cure-all for the parking problem, b only to call attention to some of the things that are being done alo this line.

Increased Use of Existing Street System. The carrying capacity the existing street system sometimes may be increased by prop development, such as arranging for the use of a greater number streets as thoroughfares. This sometimes may mean rather extensi changes, such as the widening of streets, the improvement of grad or construction to make available more exits from the business d trict, and thus permit a more uniform speed of vehicles. Again study of the system may show that through traffic may be pass around the central section, whether it be from one part of the c to another, or whether it be through traffic from one city to a neig boring one.

Recreation—Relations to Traffic Accidents. There perhaps has been t little realization in the past as to the relation between the provisio made for recreation in the community and the traffic accidents. Ye ago the only people who talked about parks and recreation were t theorists, the social service workers, the people who were interested children and some who really saw with a sane view that it meant great deal to the future of the people of the country. Now we a having it discussed all over the country by the business men—t people who put their money into utilities and things generally—a it is realized that we must have these recreation grounds for childr and have them removed in such a way that the children are r obligated to cross the busy thoroughfares.

In those cities which are studying the situation, the amuseme halls, the baseball parks, the stadiums, and things of that kind a being planned in such locations that they will not promote and r increase or intensify the very great congestion of traffic in the dow town sections.

Street Areas and Widths. Unfortunately the widening of stree particularly in the business districts where such improvements wo be most beneficial, frequently cannot be done because of the excess cost. Sometimes such improvements, if anticipated, can be provid

struction. This method of looking forward to future street extension is valuable where it legally can be carried out.

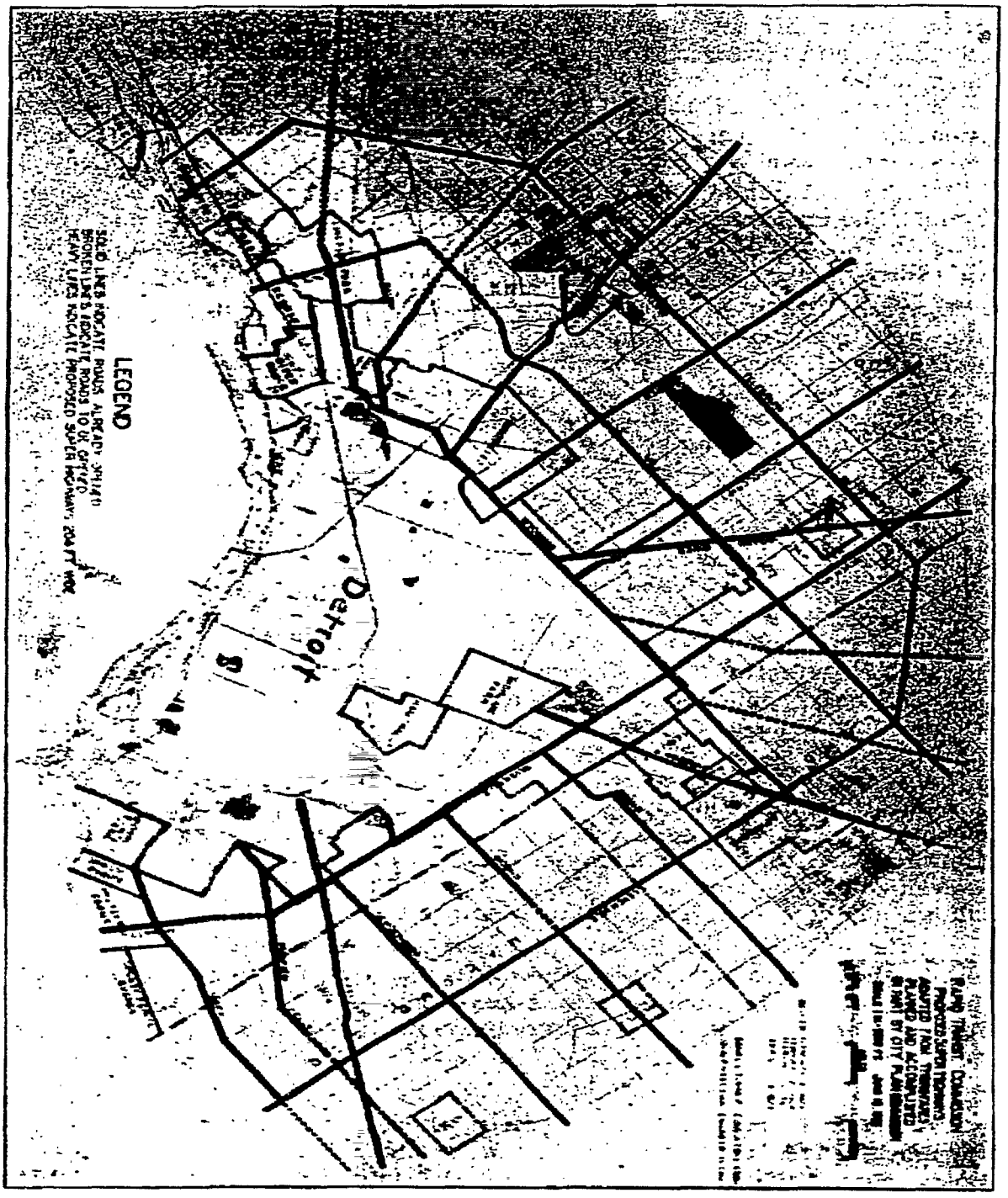


Plate III.

Where the cost of street widening is excessive and land values high, many schemes to avoid the actual pushing back of property lines or building lines have been suggested. Perhaps one of the most pretentious is that proposed at London by Lord Montague for a highway 200 feet in the air with spiral ramps leading to it and a 60-foot roadway. The estimated cost is 36,000,000 pounds, and there will be stores in the towers for revenue.

Rapid transit has been made available in our larger American cities by subways and elevated roads and the usual thing is to elevate the surface cars. However, when we learn, as at Pittsburgh, that the automobiles, including the parked vehicles, occupy seven times as much space as that taken up by the street car, it may be that we are not attacking the problem in the right way; the more effective thing may be to remove the automobiles from the street rather than surface railways.

Plate III shows what is proposed by the Detroit Rapid Transit Commission; highways 204 feet wide are to be reserved in the outlying districts and divided to accommodate four electric railway lines and four lines each of rapidly moving and local automobile traffic, with grade separations at all crossings.

Another example is a scheme worked out by Mr. Harvey W. Corbett for the gradual widening of streets in New York City. Briefly, he proposes first, to raise the sidewalks to the second floor level, thus giving two floors of the buildings for entrance, the lower for trucks and for persons coming in automobiles and the second for pedestrians; elevated sidewalks would cross above the traffic grade. Further development of the scheme is the carrying back of the ground floors sufficiently to permit the unloading of trucks and in addition to require a two-story arcaded section on all buildings. By these steps the capacity of the streets would be magnified eight-fold, and by connecting the second story arcade by cross-walks at intersections, interference and danger would be eliminated, and the capacity of the streets further multiplied. This is a solution which the very wealthy cities can perhaps practice.

We already have examples of the two deck street, such as the South Water Street improvement at Chicago. Similar plans have been proposed at Pittsburgh and a combined elevated structure and subway for rapid transit facilities to remove surface cars in the triangle district. Other proposals are the widening of streets around the so-called triangle district. This plan is shown on Plate IV but is more in the nature of by-passing traffic around the district instead of compelling it to go through, when its destination is some other point.

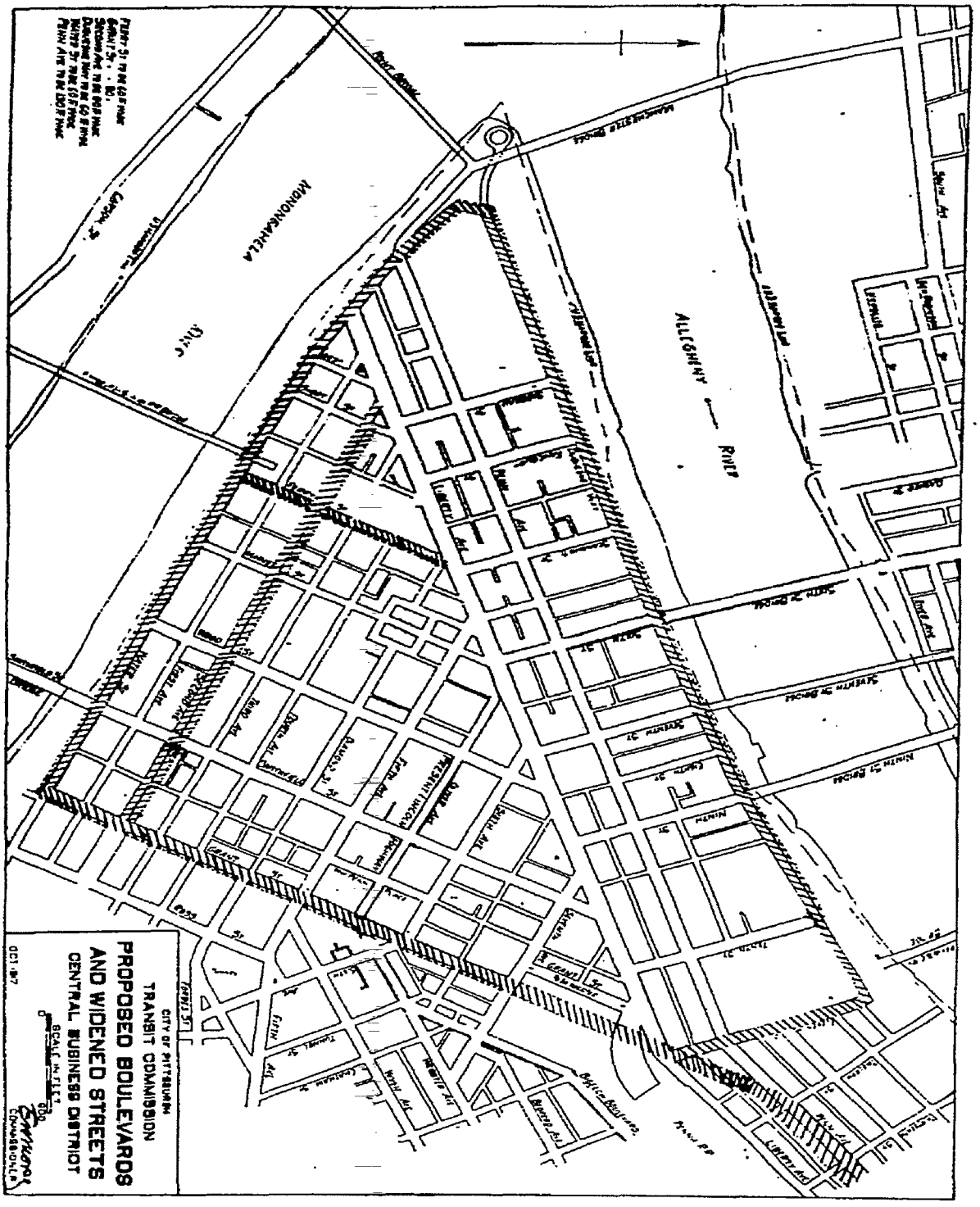

MONONGAHELA
RIVER
ALLEGHENY
RIVER
CITY OF PITTSBURGH
TRANSIT COMMISSION
PROPOSED BOULEVARDS
AND WIDENED STREETS
CENTRAL BUSINESS DISTRICT

Plate IV.

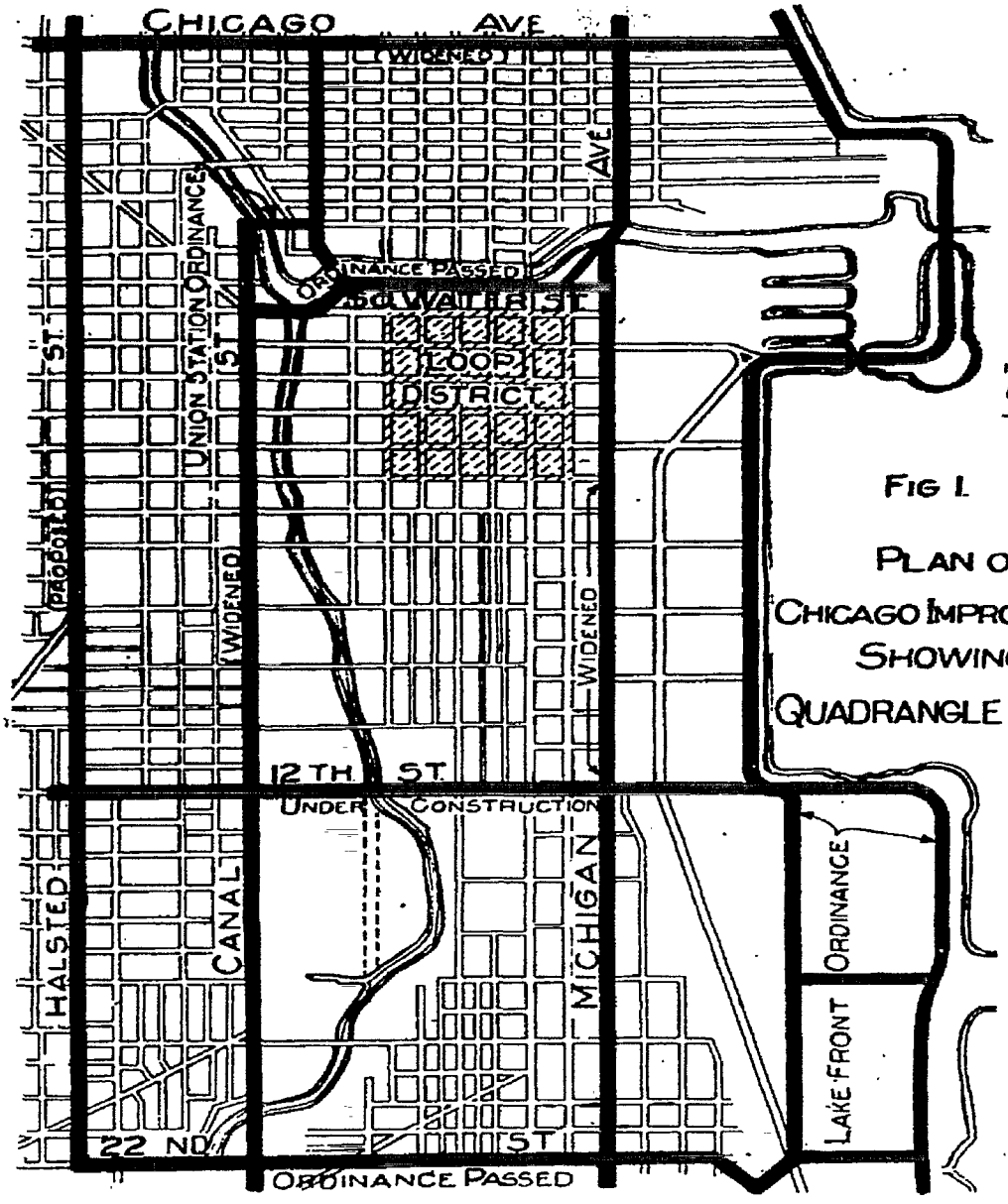


FIG I.

PLAN OF CHICAGO IMPROVEMENTS SHOWING QUADRANGLE STREETS

Plate V.

Through Highways—By-Pass Loops. At the present time, in the majority of instances, the important highways such as the Lincoln Highway the Yellowstone Trail, the National Road, the Dixie Highway, etc. pass through the congested areas of the cities; that is, the store districts and through the main travel thoroughfares which are needed for local business traffic. Many people in the past have thought this a wise thing, that it measured progress to bring everything to pass through, and to let all the visitors see our cities and our stores; an

it is just beginning to be understood that it might be a good thing if some of this traffic could be kept out. The suggestion is that such highways be brought within a few miles of the city and that spur or cross-roads be provided. This is receiving careful study in Pennsylvania, to determine as to the wisdom of relocating the principal highways so as to by-pass the more important cities and yet make them entirely accessible by short connecting roads. Perhaps no state has gone further in this than has Delaware with the Du Pont Highway, which runs north and south throughout the state, but avoids the larger villages and central communities.

The cost of our highways is always a troublesome question and we have two examples of through toll roads. One is the Flat River Road, from Tampa to Palm Beach, which passes through the Everglades and does not enter the communities. The other is an Italian Road, which connects Milan with the Lakes. Both of these are very expensive roads, one because of the piling foundations and the other because of the heavy construction and grading. Both will be for purposes of through travel and nothing else and indicate to us some of the solutions which we may expect in the future.

It is sometimes possible to by-pass all the through traffic, regardless of its direction, by having important wide traffic arteries encircle the congested area. Such a scheme as proposed at Pittsburgh is illustrated on Plate IV and a ismilar project at Chicago is shown on Plate V.

System of Streets—The Ultimate Purpose. The things just outlined are only some of the more important measures for the relief of congestion. The ultimate purpose of such planning is the development of a system of streets, so arranged and of such a type, width and design as to meet all requirements of the several kinds of traffic.

There is much that can be accomplished in the re-planning of our cities as they exist, but past mistakes can be avoided by the application of more modern methods in the planning of our new developments. In these all needed arrangements for traffic conditions are possible in the original layout and their proper planning and co-ordination are the function of the City Plan Commissions and the duty of all interested in civic advance.

Summary

The present traffic conditions may be laid directly to the inadequacies of the streets of the cities, and the overland highways, to meet the progress of concentration and the requirements of the tremendous volume of motor travel. The increase has been so rapid and without precedent that there has been no opportunity either to provide adequate roadways in the beginning, or to make changes in the existing facilities rapidly enough to keep pace with the requirements.

Consequently, numerous expediencies have been developed. These, in a large measure, have to do with the regulation of traffic and are designed to alleviate congestion, at least temporarily, until more per-

manent improvements can be accomplished. Such regulations are palliatives and the province of the traffic expert, but the planners of the physical features must be thoroughly familiar with them; and must know what regulatory measures are available, their purpose and the probable results under varying conditions of application. Some of these are recognized to be only makeshifts but neverthless can be made to do much in improving the situation.

In the meantime study is being given to the larger issues and the collective experiences from many sections of the country gradually are bringing about a better understanding of their probable solution. It is just such conferences as these that will be of material aid in developing a proper program; and it is evident that the effect is marked, for those places which have active safety councils are making progress in the study and solution of the problem.

A few of the regulations that may be effectively used are: the direction of traffic by street signs and the marking of pavements; the control of traffic at important street intersections, either by automatic signal or traffic officer; the stopping of traffic from intersecting streets before entering or crossing through streets; the inauguration of adequate parking regulations and its prohibition where they would conflict with the free movement of traffic; the establishment of one-way streets and requirements as to left turns, and so on.

The placing of restrictions on the free movement of traffic should be done carefully and some experimenting will be necessary, because sometimes certain regulations will cause unexpected difficulties and serious congestion at points other than those in question.

Some of the ways in which permanent results may be accomplished either in the planning for the future or the replanning of things as they exist, are listed below. They are not presented in the order of their importance but merely as suggestions of what can be done.

1. Improvement of intersections by the rounding of corners;

2. Removal of obstructions to view at intersections, through the use of the powers of zoning;

3. Placing of central obstructions at important street intersections to direct travel;

4. Installation of permanent and elevated safety zones, and loading platforms for street cars.

5. Creation of permanent safety isles raised above the pavement surface in the center of wide streets;

6. Provisions for the separation of traffic at intersections;

7. Removal of pedestrian traffic from street crossings, by the building of subways or overhead walks;

8. Widening and straightening of streets where possible;

9. Cutting through of new streets, where the need is such as justify the cost;

10. Segregation of different kinds of traffic, not only by regulation but by the design of appropriate facilities;

11. Building a loop around the central business district;

12. By-passing of through traffic around congested areas, by building of appropriate highways in the outskirts of the city;

13. Construction of rapid transit facilities, either overhead or underground, not only for railways but perhaps for vehicular traffic;

14. Elimination of railway grade crossings;

15. Removal of parked machines from the streets, by providing other facilities, so as to reserve the available width for moving traffic;

16. Provision of playgrounds in greater number and suitably located so that children will not cross thoroughfares.

Some of these border no doubt on the subject of regulation, but they all have their place in the development of the street system and will determine in many instances, the design to be adopted.

The proper planning for the future, the re-adjustment of the existing streets and the further development of traffic regulations can do much towards the promotion of safety on the highways. There are many problems and difficult ones, but the concentrated study is being given to the larger issues; and the collective experience from the many sections of the country gradually is bringing about a better understanding of their probable solution. As a result of the activities of Safety Councils, City Planners and others and through such conferences as this we may look forward hopefully to the accomplishments of the next few years.

DISCUSSION

MR. GEORGE H. HERROLD (St. Paul, Minn.): In our study of the situation in St. Paul, we have given a great deal of attention to the street intersections as we feel that there is where a great deal of our trouble comes from. We find that engineers have been rather adverse, in times gone by, to include a larger radius curb at street intersections, but we have changed this and now our standards are to use the largest possible radius that can be put in that comports with the necessary sidewalk at the corner and the width of the sidewalk. We are trying, wherever possible, to get in a 26-foot radius curb and we are doing that on many streets. We have streets where we are even putting in 40-foot radius curb. Of course, as you enlarge in radius, it makes it necessary, in order to take care of the pedestrians, that an island be put in the center of the street o rat the side of the street car line possibly as a safety zone. I don't think that is necessary on ordinary streets unless you get pretty well up toward the 40-foot radius. The 20-foot and 26-foot radius can be used wherever such a radius can be put in without making provision for the pedestrian.

We have adopted this 26-foot radius as a sort of standard, that is, to use it where it can be used for the simple reason that a study of

the vehicles using our streets shows us that this is the average internal radius of the wheels of the trucks and larger vehicles and busses which use our streets, so it seems to be a normal figure to work toward.

MR. J. H. GOLDIE (Detroit, Mich.): Right along that line, there is another interesting thing that happened in Detroit not long ago. We attempted to bring about prohibition of parking in our downtown areas. The merchants association and the downtown property owners association which controlled the large office buildings were much opposed to it, but they saw that the group working for it meant business. Unknown to us and rather without our cooperation, they got together and drafted for themselves an ordinance which prohibited all parking in the downtown area and on many of the streets leading out from the downtown area between 4:15 and 6:30, to get away from parking during the heavy traffic period. This was done by the Retail Merchants' Association. As a result of that activity and the feeling on the part of other associations of similar character in other cities, at a recent convention of retail merchants' association secretaries in Des Moines, about 90 per cent of the associations represented were in favor of bringing about elimination of downtown parking.

MR. LEWIS E. MACBRAYNE (Boston, Mass.): We have made a recent study of traffic in Boston. It was very carefully made by the department of public works. It was discovered that a large number of men living outside of the City of Boston and employed in the city were leaving their automobiles all day long in the downtown streets, which amounted to an important reduction of the capacity of our streets during the day. It was also discovered that if this increased at the ratio it was going, we would be obliged to make new streets in order to take care of the out-of-town automobiles.

Notice was given that unless the public cooperated they would entirely prohibit such parking. They have now amended their parking rules defining certain streets on which there is no parking or limited parking which has very much improved conditions.

In Kansas City, the city council or commission seems very slow to take action. They already have a condition in a city of 130,000, permitting parking on both of the main streets, with a double line of street cars, that if there were a serious fire, the fire department would be unable to get through. Twice while I was there, there was an alarm of fire, when they could have done nothing at all. There were several hundred cars blocking the way. That condition is due to the shortsightedness of the city council, not understanding the relation of public safety to the business of the merchant.

We don't find that any more in the City of Boston. But only a few years ago, no one expected to stop in front of the shop anyway. He got off a street car and came around the corner to shop. He goes just as far now as he is required to do.

Parking Garages

MR. J. H. GOLDIE (Detroit): This downtown parking garage problem is one that we are facing in Detroit and making some effort to work out. We are now building in the City of Detroit three downtown parking garages. They are being built by a stock company organized not so long ago and financed largely by the downtown office building owners. Some retail merchants are in it.

These three garages are being built and there are several projects under way for large combination office buildings and car storage buildings, with offices around the outside of the building. Some of them are to have the circular ramp, but those are only projected.

Another interesting thing that was suggested through the safety council just about a month ago was that, instead of bringing cars downtown and getting them through our congested areas to get them into storage garages during rush hours, large parking spaces be acquired out on the edge of the city, because we have a large metropolitan population coming into Detroit. Have these large storage spaces on the outer edge of the city where people can drive in on our concrete highways, park their cars there and come downtown on the street cars. Property is very much cheaper there and there would be very little expense in building and still cars could be parked in tremendous numbers.

We made a survey not so long ago in connection with parking and found we had a market we believed was good for approximately 12,000 to 15,000 cars. Now, if that is true, and you bring all those cars downtown into your congested areas, even though you have fairly good parking facilities, you only increase your congestion morning and evening when pedestrian travel is heaviest.

MR. L. F. PALMER (Baltimore, Md.): We have raised platforms in some of our streets in Baltimore. It was asked that these landing platforms be set back a little from the curb line of the building line so as to give fire apparatus space in which to turn in to the curb in a narrow street. We have had much success with landing platforms where the streets are wide enough to permit their use.

CHAIRMAN BARTHOLOMEW: I think that if an island is going to reduce the carrying capacity of the street or block it altogether, it ought never to be put in. Those things ought never to go in except in the wide streets, the purpose being that in wide streets it is difficult for passengers to either get across or get out of and board a car. The fundamental thought behind the design of one of those platforms always should be to maintain the flow of traffic and not reduce the number of lines of vehicular movement that are taking place in that particlar thoroughfare.

REPORT OF THE NOMINATING COMMITTEE

MR. ANDERSON: Your committee has given real serious consideration with reference to the nomination of officers to preside over the Public Safety Section of the National Safety Council for the coming year. We agreed unanimously that Mr. Van Schaack should be retained as the chairman of this section for another year.

The Committee was unanimous in agreeing that Mr. L. H. Palmer, general manager of the United Railways & Electric Company of Baltimore, be nominated for first vice-chairman; that Mr. Walter Boynton of the General Motors Company of Detroit, be nominated for the second vice-chairman; that Colonel Forest Braden, of Louisville, the affable and genial chief of police who is closely connected with the chiefs of the country, be nominated for the third vice-chairman; that a new or fourth vice-chairman position be created to represent the taxi-cab and delivery interests, and that Mr. E. S. Higgins, general manager of the Yellow Cab Company of Philadelphia, be nominated as the fourth vice-chairman. We want to recommend that Mr. Sidney J. Williams, director of the Public Safety Division of the National Safety Council be the new secretary.

Along with those recommendations, we want to submit this one other: That an advisory board be created in the Public Safety Section to be composed of these new officers and such personnel as the chairman might see fit to appoint to represent those groups or industries, both public and otherwise, directly interested in and affected by the great public safety movement of this country.

(A motion to adopt the report of the nominating committee was carried by a unanimous vote.)

CITY PLANNING AS AN AID TO PUBLIC SAFETY

Harland Bartholomew, City Plan Engineer, St. Louis, Missouri

City Planning has been well defined as "the attempt to exert a well-considered control on behalf of the people of a city over the development of their physical environment as a whole". (Frederick Law Olmsted.) This implies orderliness, economy and good appearance in the building of cities.

Orderliness, considered as the opposite of confusion, would seem to be an essential element of safety. An industrial plant where men, materials and machinery operate in more or less confusion is axiomatically less safe than the plant where system and orderliness prevail. The first implies carelessness, the other forethought and deliberate design.

Our cities represent the least efficient and most careless of the things built by man. We pay infinite attention to the design of individual structures—office buildings, hotels, factories, institutional buildings and even homes—but we have blithely ignored the aggregate mass, the city, which must as truly have unity of function as any individual structure, to rightfully fulfill its purpose.

The appalling increase of fatalities. not to mention accidents, upon the streets of cities is due fully as much to improper design or plan of the city as to carelessness of individuals or poor traffic regulation. To cite a single illustration. Five years ago the most dangerous point in St. Louis, i. e., the place where the greatest number of accidents took place, was at Washington and Grand Avenues. Here two busy thoroughfares intersected, but with an offset of about 300 feet. Traffic east and west bound on Washington Avenue was obliged to turn into Grand Avenue and then turn out some 300 feet away. A "cut-off" was made and Washington Avenue widened, effecting an approximate right angle intersection (cost $200,000) and traffic accidents have been tremendously reduced. Good design—orderliness—promoted public safety in this instance. This is but one of many similar undertakings in St. Louis.

Cities Are Results of Haphazard Growth

This simple illustration has an infinitely larger application if we can but visualize the whole problem and not get lost in contemplation of detail. Our cities are more or less planless masses. There has been little or no conscious design—real comprehensive planning. Until there is, how can we untangle the ever growing confusion and thus furnish the foundation for orderliness and public safety? Traffic control, safety education, while important and ever needful, are mere palliatives in comparison with the larger problem of proper city design.

Most cities are the result of haphazard growth—more of accident than design. But with characteristic lack of vision we are prone to accept them as they are and make the best of a bad situation. The automobile has revolutionized street traffic and yet we still attempt to get along with the same rigid set of narrow and imperfectly arranged streets originally laid out to suit the needs of the small village of a different day and age.

Rightfully, some one may ask whether we can afford to pay the price of redesign and readjustment. Those cities which have boldly taken the step, notably Chicago and St. Louis, and even smaller cities such as Memphis, are finding that it is not merely worth the cost but even pays dividends in increased property values, rehabilitation of blighted districts, new enterprises, increased tax returns for the city and, simultaneously, improved traffic conditions and greater public safety. This seems like a large order. Yet, while the limits of this brief statement of the problem do not permit of extended discussion. let us recapitulate a few of the elements of good city planning that should and will have a direct bearing upon public safety.

Elements of Good City Planning

1. City planning implies the development of a system of main thoroughfares upon which the principal traffic movements of the city may take place, with consequent directness of travel, economy and dispatch.

2. This in turn implies a sufficient number of thoroughfares for differentiation of traffic, passenger automobiles, auto trucks and street cars, thus promoting order and presumably increased safety.

3. Residence streets can thus be freed of all but local traffic movement with obvious increase in public safety.

4. A system of wide and well arranged main traffic thoroughfares w permit of more orderly transit systems and bus lines.

5. The main traffic thoroughfares can be equipped with heavier pav ments, better lighting, safety islands and special traffic regulations th will at once both facilitate traffic and promote safety.

6. Railroad grade separations on main traffic streets, being limited number, can be constructed and minor street grade crossings closed.

7. Zoning ordinances can fix sufficient areas for the expansion of co merce, industry and residential development, thereby eliminating a pr lific source of confusion, discomfort, waste and danger.

8. Schools and playgrounds can be located on minor streets in re dence districts where they belong, away from the noise and danger main traffic streets and industries.

9. Building height regulations in zoning ordinances can prevent ov concentration in business districts—probably the most fundamental pr lific source of public danger.

DISCUSSION

MR. LINTZ (Cleveland Safety Council, Cleveland, Ohio): Mr. Know spoke of underground crossings of cross streets. About two yea ago, we sent a man to England and all through Europe to ma a study of traffic. Upon returning, he advised me that a few subwa across streets which were tried out in London were not used at a He found a great many boys playing marbles in them.

MR. SIDNEY J. WILLIAMS (Chicago): I should like to ask your opini one one subject mentioned by Mr. Knowles. I don't know whetl he intended to advocate it or not, but I am referring to the slides t showed the possible development of two and three level streets w arcades, which I believe were developed particularly for New York C The implication is that multiple-level streets are to be developed take care of a very much greater volume of traffic than the ordin street will take care of.

Are there not two sides to that question of whether we want develop the capacity of our streets in that very expensive way, throu multiple levels, and thus make it possible to build still bigger of buildings and more of them and pyramid our congested district? should the real policy rather be not to centralize but to spread a little farther—in short, work in the opposite direction?

CHAIRMAN BARTHOLOMEW: There is only one point of view, in opinion, in answer to your question, and that is the one that you plied. If any given city has a definite set of streets of given wi which are more or less congested, or which will be congested when ownership of automobiles comes up to the point where we may at le

expect it, you can not begin to carry that traffic with that set of streets, I will almost say, no matter how wide they are. Obviously, therefore, if you are going to avoid congestion and avoid public danger, there is only one answer and that is, hold down the building height, spread out the business and that diffuses and spreads the traffic. Multiplying the levels of the streets, in my opinion, invites more traffic and more confusion, because even though those levels may be separated at given points, they have to come together somewhere.

MR. GOLDIE (Detroit): I want to ask you if any cities are contemplating or have put into effect the idea of having as a part of the city administration a traffic commissioner or engineer to unify the ideas of the planning commission and other city departments, and get some action on them. Sometimes city planning commissions, like Mr. Knowles', work on such things and develop some very beautiful plans, plans that are going to reduce traffic accidents and improve the movement of traffic, and then those plans are filed away and nothing happens.

Traffic Commissions

CHAIRMAN BARTHOLOMEW: The question is very proper. Does any one know of any city which is creating a traffic commission with executive officers to coordinate traffic and planning regulations?

MR. HERROLD (St. Paul): There is, in St. Paul, close working between the various departments and the plan commission. For instance, the commissioner of public safety is working closely with the city plan engineer on matters that pertain to his department, such as fire department surveys and traffic surveys, so it is all co-related.

MR. J. A. CLANCY (Public Safety Commission, St. Paul, Minn.): Expecting a large convention, we got together with the retail merchants, with the railroads, and worked out this proposition. We were going to stop, and did prohibit, in the loop district, all traffic of pleasure vehicles. No vehicle was allowed to pull up to the curb unless they left a driver in the seat so that we could move them on at any time that we wished.

Retail merchants, the shippers and the railroads got together and opened up their warehouses at six o'clock in the morning. They had every bit of their traffic in the loop district completed and out of the way at ten o'clock. This included deliveries by bakers and everything else. So the loop district was entirely free of any traffic. Our street cars got through without any hindrance. Our fire department was free to go any place it wished.

That week, with over 20,000 extra automobiles in the City of St. Paul, (and we have narrow streets and a congested loop), we had only two accidents and one of those was caused by a drunken driver in the outskirts of the city. So I think that this system of doing business, that is, getting some of the heavy traffic out of the loop or congested district before your downtown or shopping period of the

day commences, is one of the solutions that we are working towar

MR. KNOWLES: We know of transit or traffic commissioners in number of cities. They are sometimes connected with the poli department and sometimes with the department of public work Perhaps we have a nearer approach to the thing the speaker brougl up in Pittsburgh than any other city.

MR. A. M. BRACY (Tuskaloosa, Ala.): Are there any cities repr sented here of 20,000 or 25,000 population that have parking lav and what are the results? Is there much antagonism toward it i cities of that size?

MR. PATRICK (Nashville, Tenn.): Columbia, Tennessee, is abut 3 miles from Nashville. They have parking restrictions, and the Ci of Nashville is not nearly as hard on the violator as Columbia. Th seem to be very well satisfied with it. You can park for fifteen mi utes, long enough to buy a pair of shoes if you don't want to try all the shoes in the man's house.

MR. WILLIAMS: In Evanston, Illinois, a town of about 40,000, has been found necessary to adopt parking restrictions only on tv or three blocks of one street, where I believe there is a limit of fort five minutes, during the daytime. I don't think it is strictly enforc at that.

I have one or two other things on my mind, some other phases this very important subject. One is the question of under-passa at street corners for pedestrians, and the boys playing marbles London. Many of you know that in Chicago a few years ago, the was a great blare of trumpets in connection with the building of su a passage at Michigan and Randolph, to let people across to the Il nois Central Station, where there are many, many thousands crossi every day. You could play marbles there almost any time you want to, although I never have seen it done. Apparently, the people w not go down a stairway and so around to the other side of an awkwa corner to avoid the hazard of crossing at grade. The subway is pr tically a total loss as it now is. But it will doubtless be used later when the new station is built and the subway is continued at t lower level right into the station. Then it will simply be a case going down the stairs before you cross the street instead of goi down stairs after you cross the street.

There is now under construction at the other Illinois Central dow town station, namely Van Buren Street, a similar under-passa showing that the city authorities and the Illinois Central people se to have faith it will be used there, where, as I have said, it will simply a question of going down stairs before you cross the str rather than after. But I think the experience at Randolph indica that people will not go down and up again on the other side. Th would rather takes chances on the level.

The Parking Problem

CHAIRMAN BARTHOLOMEW: Is the one at Randolph Street wide and inviting?

MR. WILLIAMS: Oh yes! It is very nice, tile-lined and looks like a corridor in the Biltmore Hotel.

I wanted to ask this question of Mr. Lintz of Cleveland, or any one who has had similar experiences. I understand that in Cleveland not long ago, on Euclid Avenue where there is a lot of traffic coming down in the morning and a lot going out at night, parking was prohibited during the rush hours on the busy side. Is that the case, Mr. Lintz, and does it work?

MR. A. H. LINTZ (Cleveland): It works very fine. Parking has been eliminated in the morning from seven-thirty to nine o'clock in coming down. In the evening, it is prohibited from four-thirty to six o'clock. The only difficulty is that it is probably a little harder to enforce it in the evening, for you must find the fellow who owns the car or push it off the street. In the last few months, they have enforced that ordinance pretty much totally. Recently there has been quite a howl because they want to extend it to a number of other main thoroughfares. They want to extend it to all the main thoroughfares and eliminate parking from five to six o'clock downtown, but so far have not gotten away with it.

MR. E. B. LEFFERTS (Los Angeles, Calif.): I just wanted to reply to the man who asked about the community of 20,000. There are a great many communities in Southern California of 15,000 or thereabouts that have parking limitations. They vary from one hour to two hours.

Fullerton, Pomona, Los Angeles, and many of the Beach communities have some parking regulations. So far as we are concerned, we have in the City of Los Angeles, no parking in our congested district on the main thoroughfares between four and six-fifteen, which seems to work out very well.

In San Francisco, at the entrance to the Ferry Building, they have an overhead crossing. A great many people use it. There is a large open space there, with quite a congestion of automobile and street car traffic, and as a matter of time saving, people go over the area on a bridge rather than dodge through the traffic. I wanted to ask if in any of these tunnels, ramps have been used, and if they would not be more of an inducement to the use of the tunnels than the use of a stairway.

CHAIRMAN BARTHOLOMEW: Does any one know of a pedestrian tunnel with a ramp?

MR. J. E. THOMPSON (Cleveland, Ohio): We have one in Cleveland on Edgewater Boulevard. It crosses Edgewater Boulevard to take people from the street cars over to the bath houses for recreation.

About a third of the people use the subway and two-thirds go over the top.

CAPTAIN LEE (St. Louis, Mo.): I am glad to say that in St. Louis it has been found very effective for about four months to limit traffic on our congested streets, those in the immediate downtown district. There is no parking from seven-thirty to ten in the morning and none from four-thirty until seven in the evening. It has worked out wonderfully well there. There has been no objection on the part of the merchants and it has opened up the traffic lanes so that the street cars and busses in those streets may get through quickly now.

MR. D. E. EVANS (Valparaiso, Calif.): We have a town of about 40,000 or 45,000. In some places we have no parking and other places unlimited parking. On our main thoroughfares and some of our main side streets, from eight in the morning until six at night, there is a one-hour parking limit. Our greatest trouble with the one-hour parking rules, and it seems to me you hear it quite often, is that a woman will go into one of the stores, shop around a while and pretty soon decide that her hour is pretty nearly up and go out and get in her car and drive down the street about 100 or 200 feet. It is just simply adding to your traffic hazard without alleviating your parking conditions because somebody else takes the place she left. I was just wondering if that has been the general experience in towns where they have limited parking.

CHAIRMAN BARTHOLOMEW: Pretty soon you will get so congested that she will not be able to find that other space.

MR. ROUNDS (Detroit): With reference to the question Mr. William asked, it may be interesting to know that on fourteen of our streets in Detroit, the streets that lead to the outside, there is no parking between four-fifteen and six-fifteen. In the month of August, we added to our treasury the sum of $5,028 in fines from the fellows who forgot there was such a thing in existence. (Laughter.)

Distribution of Traffic

MAJOR ALLEN (Memphis, Tenn.): I think that unless you have had experience in both city planning and traffic regulation, you don't get the difference. Memphis has just been through a siege of both. City planning really is to provide an orderly proper way for traffic to move about the street. In Memphis, we had all of our traffic coming in on one street and distributing along one street. Our city planning work has added five new boulevards feeding into the downtown section and we have, by altering the downtown streets, spread out from a one street town to about a four street town.

Proper planning permitted our traffic to spread out over a greater area and it is not nearly so congested. It facilitated movement around the city, enabling us to get somewhere, and that really is the city planning problem. But it increased the necessity of regulation and

fold because it added a tremendous number of additional corners at which accidents could happen.

So, as I see the problem, the city planners job is really to make a place for the traffic to go, the police job is to regulate that traffic on the street, and the safety council is interested in seeing that the plan makes a safe design and the regulation is such as to handle the traffic in a safe way. These two things have a very definite relationship, and in answering that question raised awhile ago, I may say that in the City of Memphis, we have an engineer and one who is at the head of the police department and between the two of us, we do get those two problems together. We work them out, I think, in rather a satisfactory way.

MR. GOLDIE: I wonder if any experience can be given here on regulating the automobiles around apartment houses. We have in Detroit several very narrow streets, upon which there are built, almost solid, large apartment houses containing from thirty-eight to perhaps one hundred and fifty or two hundred apartments, almost every tenant of which owns an automobile.

The apartment owners have made no provisions whatever for automobiles. The result is that these narrow streets for blocks in the vicinity of these apartments are blocked with parked cars, especially at night. I venture to say that if there is a bad fire in any of those apartments during the night, which is the worst kind that could happen, it would be absolutely impossible for the fire department to get through those streets. I think that is a very important thing because it affects not only the people on the streets but the families asleep in those apartments.

MR. J. H. DYE (Pittsburgh, Pa.): We have just completed in our city an apartment building which has the garages in the basement. They take care of every car owner who has an apartment in that building. We are just completing another apartment with the same condition. There are no cars on the street at all owned by people who have apartments in that building. They are taking care of the problem in that way. It was done voluntary. The apartments rent at from $250 upward.

MR. GOLDIE: We have them renting at from $50 upward. That is a different proposition, and we have not a few but dozens of them, one after the other right along the street. Now, I think, as a suggestion to our city planners, you should try, in planning, to embody in your plans something in the way of a compulsory law to make builders of apartments provide the garage space, I don't think it is fair to the public to attempt to regulate it by police regulations, because you have to double the police force to handle it. I think the apartment house owners should be compelled to provide some place, and I think it is a very important item to consider in city planning and zoning.

MR. GEORGE DEIBERT (Atlanta, Ga.): We have no real restrictions on parking in our residence district, but the apartment houses in the

past year are all providing garage space, most of them undergroun We have one that was completed the first of this month, the enti court of which is concrete and steel and that always helps.

MR. J. H. DYE (Pittsburgh): We have other apartments in the Cit of Pittsburgh that you do not have to pay that amount for. In th Shady Side district, we have a number of them which provide the parking space enclosures. All of the tenement houses being built a the present time are taking care of the automobile condition. Tho that were built five, eight or ten years ago did not do that becau they did not foresee the conditions.

We have all kinds of regulations in Pittsburgh. We have oth streets on which it is allowed to park during the night time, but th whole trouble is to enforce those parking regulations. Just as th gentleman over here said awhile ago, we have streets, where you a allowed to park for one hour at a time, but what are you going do when that man parks one hour and drives out and another m comes in and parks for another hour. We have continuous parking o those streets on which we have an ordinance prohibiting parking f more than an hour. We are getting about $18,000 a month from th automobile owners in the City of Pittsburgh for parking alone, b that does not solve the problem. There is still parking and we a still getting the money.

MR. WILLIAMS: In our Kansas City safety survey we were surpris to learn that 21 per cent of the traffic fatalities occurred in 5½ per ce of the area, that being the business district, which does not che with the often heard statement that accidents are not more freque in the congested district. But if you try to correlate the automob death rate with the density of population, it doesn't work out at a We took a large number of cities, for which the automobile death ra was available, and divided them into three classes according to t density of population, the number of persons per acre; the avera death rate was practically the same in each of the three groups.

MR. E. J. REEDER (National Safety Council, Chicago): We also ma a survey of Cincinnati, and in line with the figures that Mr. Willia gave for Kansas City, I just want to quote our survey to the effect th 33 per cent of the fatal traffic accidents during the entire period about 20 months, occurred in 4½ per cent of the area of the city, whi included the business section.

MR. HILL (Worcester, Mass.): I don't remember of hearing anythi as to the relation of the value of one-way streets in traffic handli I don't know whether you are planning to consider that of any val although I have read a great many articles in recent years, whi discussed it a great deal, and I was wondering if there was any val in the system.

MR. DYE (Pittsburgh): We have quite a number of one-way stre and they are a great success. Fifteen years ago, before we start

the one-way streets, it would take a teamster an hour or an hour and a half to get from the Union Station to the warehouse district, a distance of about fifteen squares. He can now get there in fifteen minutes. The one-way street system is the only way we can move traffic in Pittsburgh with any satisfaction.

CHAIRMAN BARNHOLDSEW: I think the answer to that one-way street problem is this, and it is the answer to all traffic regulations as I see it. Once there is a city plan whereby the physical make-up of the city is known and the general trend of the traffic movements can be discovered, then a traffic regulation system which will include such things as one-way streets would evolve out of that.

THURSDAY AFTERNOON SESSION

CHAIRMAN DUBLIN: This session is given over to a report of the Committee on Public Accident Statistics, and also to a rather interesting program on an allied subject, namely, the control of public accidents.

PUBLIC ACCIDENTS IN THE UNITED STATES

Report of the Committee on Public Accident Statistics, National Safety Council, for the year 1924

I FACTS ON ACCIDENT PREVALENCE

The accident problem continues to be an outstanding one in the life of the American people today. We estimate that there were 84,000 lives lost in 1923 as the result of accidents in continental United States. This was 7,500 more than the year before. Whatever slight let-up there may have been in the accident death rate in recent years, has been more than made up by the increase in population. The number of accidental deaths in the United States is now each year equal to the whole population of some of our larger cities, such as Savannah, Ga., or Evansville, Ind. How excessive this number is, is shown by a comparison of our 1922 accident rate (696 deaths per million of population) with that of England and Wales (321 per million of population). Because of our higher accident death rate, we lose from 35,000 to 40,000 more citizens than we would if the British death rates prevailed in this country. Reflection this disparaging comparison should lead every citizen interested in the welfare of his country to support vigorously every movement for the prevention of accidents.

America's death-toll from accidents amounted last year to 1,453 per week, or 209 per day! Automobile accidents and injuries head the list with 262 deaths per week and 37 deaths per day in continental United States. Then come falls with 254 deaths per week and 36 per day! Drownings take 124 of our citizens each week, on the average, and 18 per day! There are 128 killed each week in railroad accidents, or 18 per day! And so, we could list the lamentable facts of destruction of valuable lives; a frightful price for carelessness, apathy and deficient knowledge!

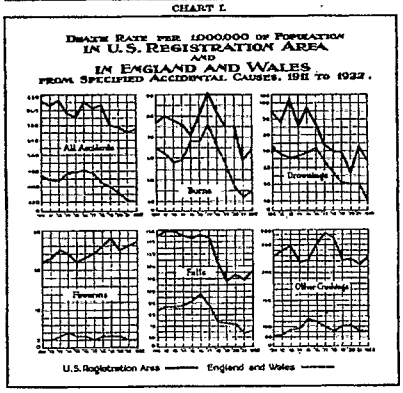
In the following table, we show the available facts for broad, fatal-accident groups in continental United States.

TABLE 1.

ESTIMATED FATAL ACCIDENTS IN CONTINENTAL UNITED STATES, 1923 AND PRIOR YEARS

Cause of Accidental Death	Estimated deaths in:				
	1923	1922	1921	1920	1911
All fatal accidents	83,772	76,364	75,545	75,932	79,756
Accidental burns	7,204	6,966	6,348	6,666	7,214
Accidental drowning	8,539	8,272	7,273	6,992	5,986
Accidental falls	13,992	13,378	12,992	13,187	14,606
Traumatism by machines	2,826	2,154	1,911	2,049	1,797
Railroad accidents	5,018	4,964	4,961	5,063	11,773
Automobile accidents	13,715	13,064	11,968	11,547	2,241
Street-car accidents	1,771	1,718	1,796	2,134	2,946

CHART I.



Our public accident hazard

We have noted that automobile accidents and injuries lead the list of fatalities. In 1923, these accidents accounted for 18.8 per cent of the total accident fatalities; in 1911 the percentage of these automobile injuries in total accidents was 2.6! In fact, the automobile accident death rate in 1922 was more than five times the rate in 1911. Just when this sharp upward trend of the death-toll for automobile injuries will stop, no one knows. We are undoubtedly confronted with a grave situation when the death date for just one source of hazard races away and shows no sign of diminution. The most frequent cause of fatal injury shows a sharper increase within 10 years in its death rate than has ever been recorded for any other single cause of death in the history of our vital statistics! Manifestly, the chief concern of the accident prevention movement at the present time is the intimate study of the causes and the means of control of automobile accidents. **This is not an academic question for the statistical scholar, but an emergent issue which every citizen, every legislator, and every government official must face and successfully surmount.**

The following table shows the course of mortality for the chief public accidents in the United States Registration Area from 1911 to 1922:

TABLE 2.

DEATHS PER 100,000 OF POPULATION IN UNITED STATES REGISTRATION AREA, 1911 TO 1922

AUTOMOBILE AND OTHER PUBLIC ACCIDENT FATALITIES

Year	Automobile accidents	Street-car accidents	Railroad accidents	Injuries by other vehicles
1922	12.5	1.6	6.1	1.8
1921	11.5	1.6	6.0	1.9
1920	10.4	2.0	7.3	1.9
1919	9.4	2.2	7.4	2.3
1918	9.3	2.9	10.6	2.8
1917	9.0	3.0	11.5	3.1
1916	7.3	2.5	11.4	3.3
1915	5.9	2.3	9.9	3.5
1914	4.3	2.5	10.7	3.7
1913	3.9	3.2	13.0	3.8
1912	2.9	3.0	13.6	3.7
1911	2.2	3.2	13.0	3.8

While there is room for further improvement in the railroad accident death rate (and there is much promise for real results in the campaign for the control of railroad grade crossings and occupational accidents) the major emphasis rests upon automobile fatalities. The street-car and railroad death-toll shows a gratifying decrease in ratio to population; our chief concern should be with the comparatively new and increasing hazard of the automobile.

Automobile accidents in 135 American cities, 1923

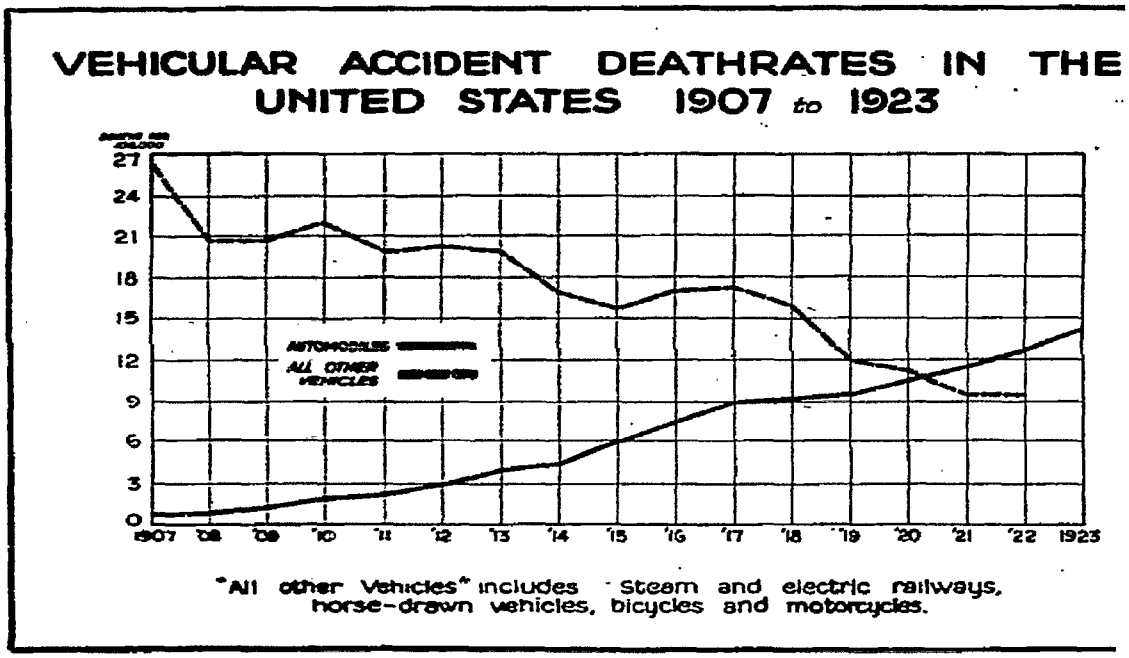
Mr. Herbert P. Stellwagen, of our committee, and manager of the automobile department of the National Bureau of Casualty and Surety Underwriters, New York City, has contributed an analysis of highway fatalities during 1923 and 1922 in 135 American cities. The essence of his report is shown below. His more detailed tables are given in the

appendix to this report. The cities which contributed data for analys are scattered over the entire country and range in size from 25,000 pop lation upward. The population of the entire number as of July 1, 192 was 30,128,555.

The 1923 automobile death rate for the 135 cities was 13.4 per ce higher than the 1922 death rate for the same cities. It seems reasonab to assume that the rate of increase in automobile fatalities for the cities was no greater than that in rural districts throughout the countr In fact, it may be true that the increase for the cities studied was a l less than the increase in other localities because a number of the larg cities have successfully applied safety measures tending to reduce au mobile accidents. The application of the 13.4 per cent factor of increa to the 1922 countrywide death rate of 12.5 per 100,000 population p duces a 1923 countrywide death rate of 14.2. This death rate multipli into the population of the United States as of July 1, 1923, estimated 110,663,502 by the Bureau of Census—produces a total of 15,700 deat These figures do not include deaths sustained in collisions between au mobiles and heavier vehicles such as railroad trains and trolley cars. estimate that the inclusion of these deaths would increase the total fr 8 to 10 per cent so that the total number of deaths directly attributal to the use of automobiles during 1923 was probably in excess of 17,0 (See Chart III.).

The trend in the vehicular accident death rates for the United Sta is shown in Chart II.

CHART II.



As will be observed from Chart IV., the automobile death r based on the number of automobiles registered has steadily decli

CHART III.

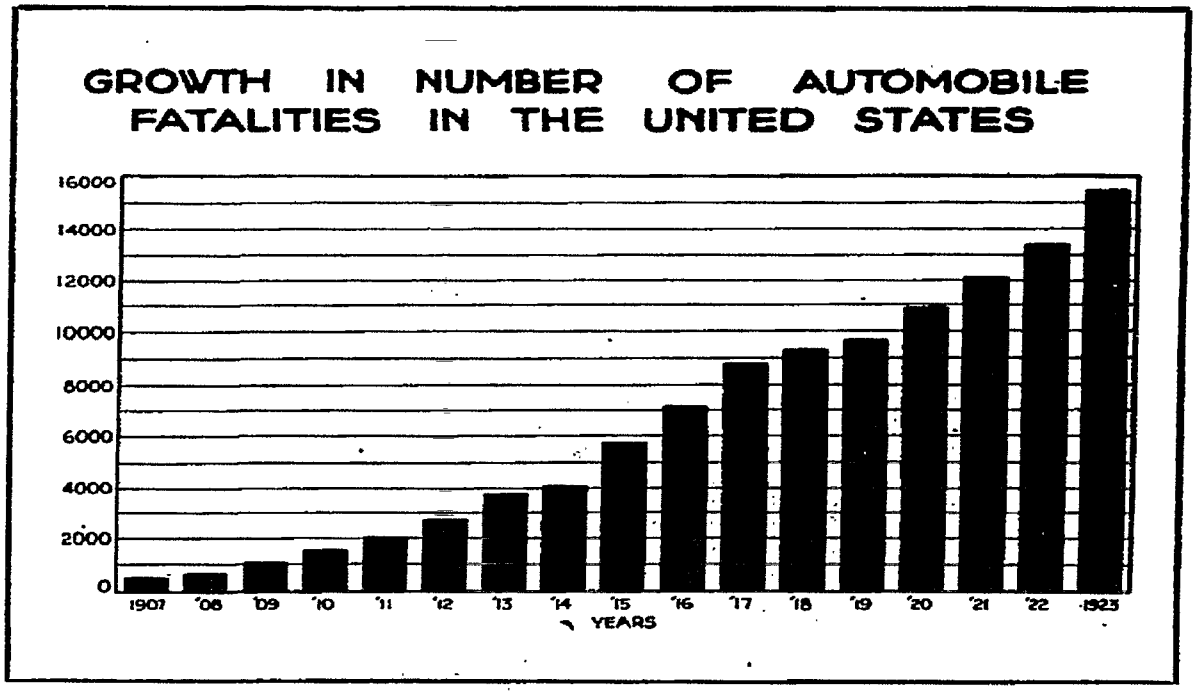
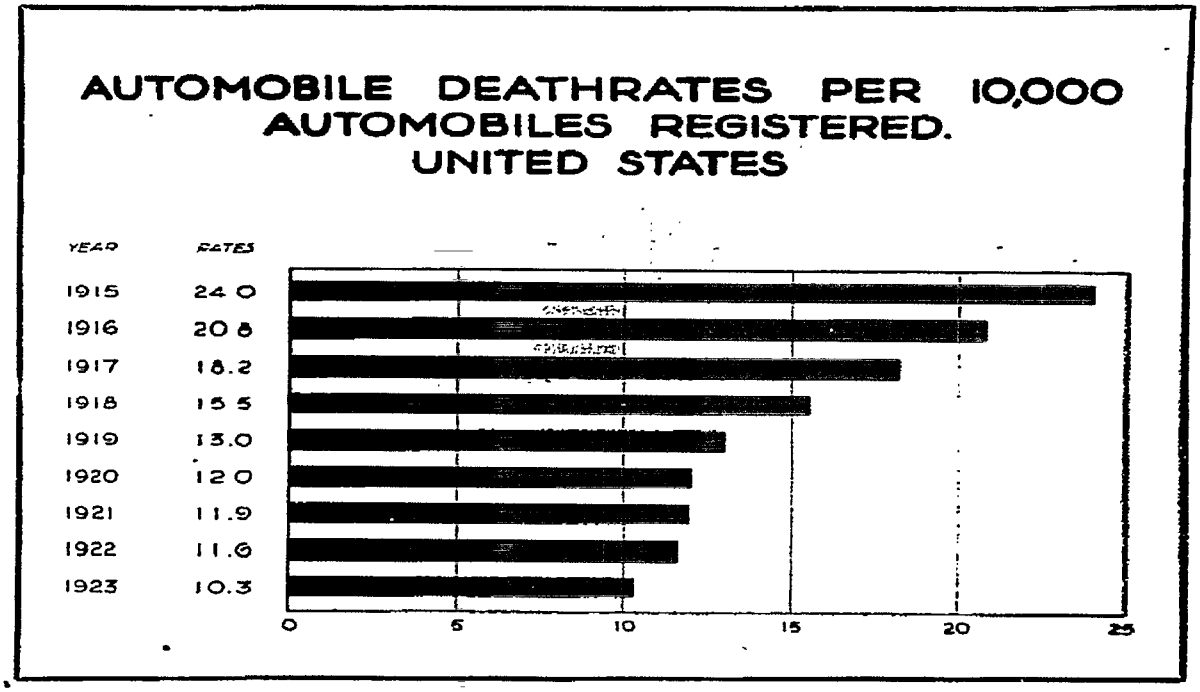


CHART IV.



for example, represent the accident cost resulting from the operation of automobiles in that city, and the low rates in the rural communities in the South and Far West reflect the very low accident cost resulting from conditions in those communities. Insurance companies have determined that the cost of accidents—and thus the insurance premium—is controlled by the frequency of accident in a community, calculated on the basis of the automobiles insured. Where the frequency of accident so calculated is low, then the cost of insurance is low and, conversely, where the number of accidents in relation to the number of cars operated is large, then the cost of insurance is high.

In the following table appear the number of accidents, including both fatal and non-fatal, per 100 cars insured in certain of the larger cities, together with the cost of liability insurance on an average car of the private passenger type.

TABLE 3.

City	Number of Personal Injuries per 100 Cars Insured	Average Annual Premium for Private Passenger Car
New York City, N. Y.	19.5	$109
Buffalo, N. Y.	13.6	57
Philadelphia, Pa.	12.9	55
Boston, Mass.	11.7	50
Chicago, Ill.	7.3	40
Newark, N. J.	5.9	32
Detroit, Mich.	4.2	30
Los Angeles, Cal.	3.0	23

II. PREVENTION OF PUBLIC ACCIDENTS

The railroad accident problem has received the undivided attention of railway executives, the Interstate Commerce Commission and the regulatory commissions of the states. Tremendous strides have been made during the past two decades in controlling accident and injury to railway personnel and to passengers. Street railway accidents are under control by public utility corporations. Accidents arising out of the operation of horse-drawn vehicles and bicycles no longer assume importance in the public records. There remain, however, the increasing number of injuries and fatalities from automobile accidents.

Preventing automobile accidents

For nearly ten years, the National Safety Council has been disseminating information on the automobile accident problem and has through its committee on public accident statistics, and through its Public Safety Division, endeavored in every way to arouse public interest and constructive action in the preventive aspects of the problem.

The attitude of the Council toward the prevention of automobile accidents may be summarized as follows:

1. Secure the facts on the prevalence of injuries and fatalities: The Council's committee on public accidents has each year since its organization, reported the best of available data and has encouraged uniform record-keeping and publication practice. To this end, the committee has drafted and made available for distribution to state and city officials a

set of uniform accident reporting blanks.* That these forms can utilized by cities, and that this mode of record-keeping leads to accide prevention, is shown by the experience of Grand Rapids, Mich., in whi city the system is now being used. We may quote the experience Colonel James Sinke, director of public safety of that city:

> "The forms recommended by the Council are a great help to us in compiling our data on automobile accidents. The statistics are useful in many ways, one of which is that, when we have inquiries from citizens regarding accidents, we are able to refer to these facts without delay. These statistics make it possible to compare our traffic accident situation with those of other cities, and by charting these accidents, we are able to make easy comparison from month to month of our own situation. I use these statistics in connection with other reports obtained from our weather bureau, and with our accident pin-map, to determine the kind, and frequency of accidents in certain districts and intersections throughout the city. From the information, we apply whatever corrective measures, in our judgment, seem necessary. I have found that this works very successfully, and *it has made it possible to show a great reduction in our automobile fatalities over previous periods.*"

Colonel Sinke's experience could be duplicated in other cities if Council's forms were to be adopted.

2. Make accident spot-maps: A number of cities plot their accid statistics on spot-maps and this leads, as Colonel Sinke has pointed to a knowledge of critical local situations. In our report for 1 "The Warning of Public Accidents," we gave a detailed discussion of spot-map problem. This year, we urge more municipalities to maint such maps, to keep them up-to-date and to organize their local program of control on the basis of the showing of these maps.

3. Maintain maps on traffic movement: In our 1923 report, Mr. G. Kelcey, an experienced traffic engineer, showed how to develop tra movement and density maps and also gave solutions for a numbe "key" problems. This year, Mr. Kelcey has contributed a statement his experience with the accident data of a number of cities and ma constructive recommendations with respect to accident record syste (See Appendix A.)

4. Adopt uniform statistical tables for the publication of automo accident data: Mr. Herbert P. Stellwagen and Mr. E. W. Kopf of committee have prepared a set of simple, effective tables for the us cities and states. The facts displayed in this manner for the sev jurisdictions will facilitate comparison of the extent of the traffic acci problem in the several areas and will also provide material for test progress in the control of these accidents. The model tables are gi in Appendix B of this report (page 854).

5. Encourage uniform state legislation for traffic accident report The Committee has cooperated in the drafting of state legislation

*SEE: *"The Trend of Public Accidents," 1922 Report of the Committee Public Accident Statistics, National Safety Council.*

traffic accident reporting. In New York State, the committee lent its cooperation in the drafting of the accident reporting feature of the new Highway and Automobile Law and assisted in the preparation of the reporting forms and statistical tables. Copies of the New York State law, and of the reporting forms, may be obtained upon application to the State Motor Vehicle Commissioner, Albany, New York. It is hoped that the provisions of the New York State Law will be enacted in other jurisdictions.

6. Establish a registration area for public accidents in the United States: In our 1922 and 1923 reports, we urged the establishment within the National Safety Council of a bureau to encourage uniform legislation on accident occurrence, to introduce standard reporting blanks, to develop tabulation practice and to collect and publish the data which result from such effort by the cities and states. It was thought that if an experimental procedure of this kind were conducted for a number of years, it would serve as a point of departure for action by the House and Senate of the United States for a federal registration area for public accidents. That such a registration area for the reporting of public accidents in the United States is a feasible undertaking is indicated very clearly by the rapid development of effective legislation in a number of states which provide for the recording of traffic accidents as an essential part of the administrative machinery. In recent years, both Massachusetts and Connecticut have made definite efforts to base their programme on the facts of the automobile situation and have collected and tabulated interesting information. They have published detailed tables showing the course of the fatality record over a number of years and what is perhaps more interesting, have made an attempt at classifying the cause of automobile accidents. These are presented as Appendix Tables 4, 10 and 12. New York State, under its most recent legislation, plans to organize a statistical bureau within the office of the Motor Vehicle Commissioner, which will tabulate the accidents very much along the same lines in an attempt to classify the underlying causes. When this movement spreads to a larger number of states, as it undoubtedly will in the course of the next few years, there will be a large enough experience to justify the organization of such a registration area for public accidents.

Support for continuance of work

Your chairman had an opportunity to present an outline of the committee's plan to the Health and Accident Underwriters Conference at its meeting in Chicago, to the Association of Life Insurance Presidents, the American Life Convention, and the National Automobile Chamber of Commerce, hoping in this way to obtain a sufficient fund from these groups to finance a bureau under the auspices of the National Safety Council for the tabulation and publication of accident reports in various centers of the country. At this time, he can only report progress. It will take time to convince the insurance officials and the automobile industry that such financial support is justified by possible benefits to them. The committee believes that, ultimately, this will be demonstrated

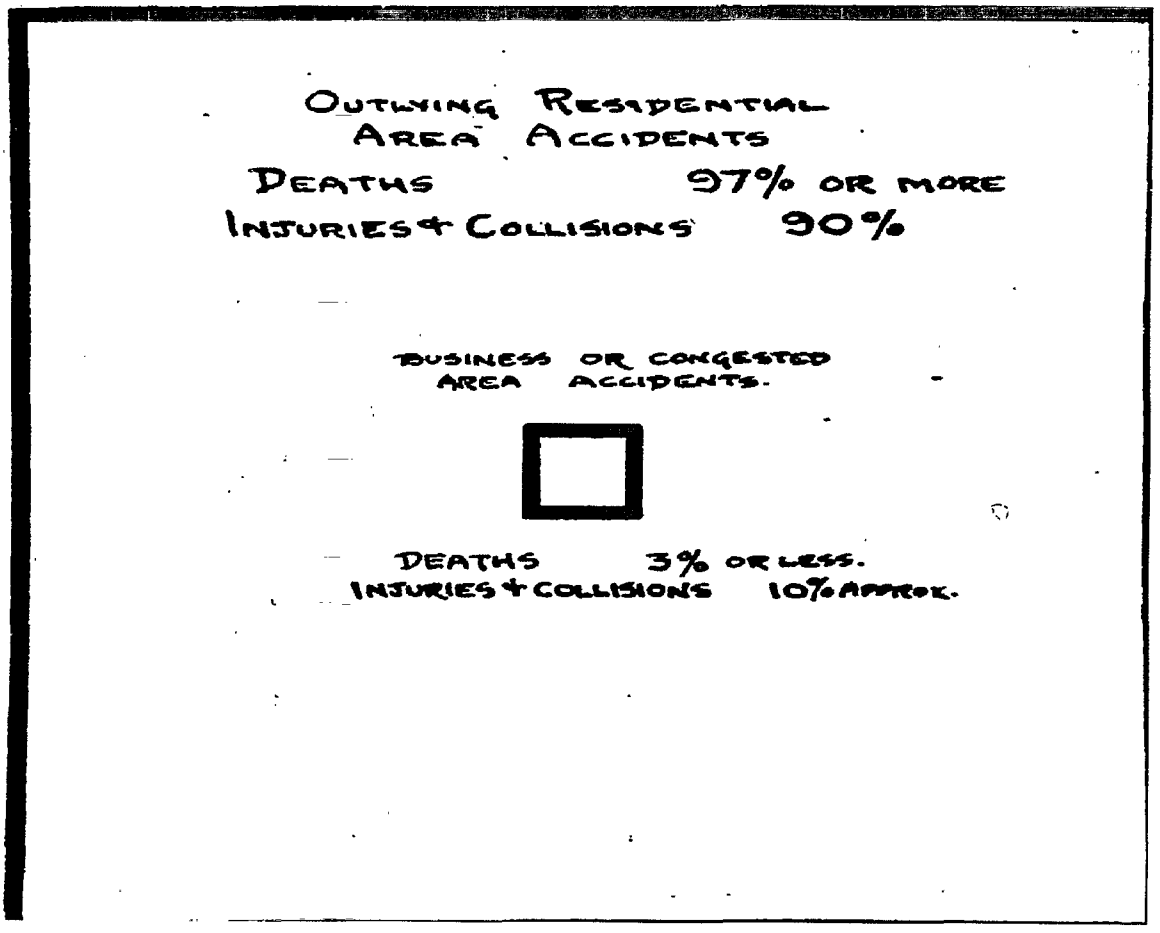
and that these interested parties will cooperate with the Nationa Safety Council in some such manner as outlined. In the meanwhile we recommend that the Safety Council assign from its own curren funds and facilities such assistance as is possible for the management o a section whose business it will be to popularize record-keeping as out lined by the committee and to tabulate the results from those section which are now using the standard blanks. No activity of the Counci will bring larger results in the national Safety Movement.

Appendix A

FURTHER COMMENTS ON TRAFFIC ACCIDENT PREVENTION

George Guy Kelcey, Manager, Traffic Engineering Division, American Gas Accumulator Company, Elizabeth, New Jersey

A study of accidents covering many cities and towns indicates that, i general, most accidents do not occur in business or congested area



nor even along heavily traveled streets. Furthermore, congested area accidents are usually of minor consequence. Where there is congestion or a considerable volume of fast traffic, drivers and pedestrians are careful and children do not play in the streets. Drivers are less watchful after they get off heavily traveled streets.

Traffic regulation and control has been confined almost entirely to congested areas and to heavily traveled streets. From an accident standpoint this control must be extended to cover other points at which accidents are frequent.

In the future the change from congestion to speed will be taken into consideration in dealing with traffic problems. As traffic congestion dies down, traffic speed and the letting down of watchfulness increases. This change from congestion to speed is illustrated as one goes from business to residential areas. It can also be observed in business areas after the rush hours when traffic volume decreases and speed increases. Any analysis of the traffic problem should consider these changes from congestion to speed in order that figures used shall tell their proper story. Night time accidents in business areas usually have different causes than accidents which occur during rush hours.

Accident high points

A study of accidents in any municipality always brings out certain points at which accidents are frequent. This is borne out by the following data which show a large proportion of accidents in various cities to be at a small number of high points.

City with Population of						
600,000	28%	of all accidents	occurred at	64	traffic points.
450,000	37%	of all accidents	occurred at	84	traffic points.
200,000	26%	of all accidents	occurred at	33	traffic points.
100,000	46%	of all accidents	occurred at	57	traffic points.

When a careful analysis shows that most accidents occur at a small number of high points, traffic officials have a basis for effective remedial action.

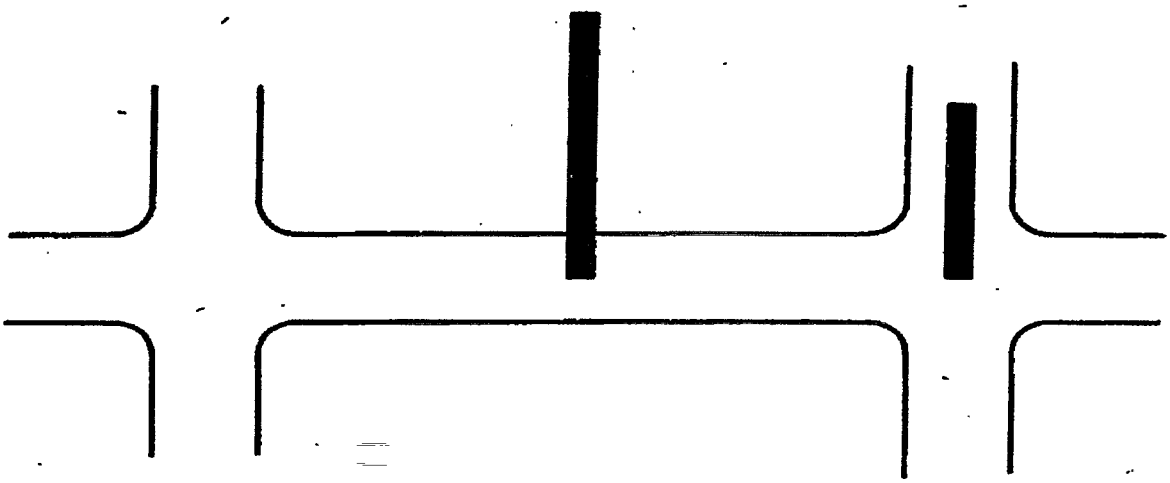
The best method of finding the high points of the accident problem is first, complete traffic data and then a traffic pin map. Pins indicating the type of accident by their color should be inserted in a large wall map of the city to show the place of occurrence. An accident pin map of this sort immediately calls attention to the high points by the bunching up of pins at such places. These clusters of pins are the signal for a careful investigation of the traffic conditions at each such point and the application of corrective measures. There is no more valuable aid in a traffic department than a well kept pin map of this sort.

Accidents at Intersections and in the middle of the block

More accidents occur at street intersections than elsewhere. This statement, however, hardly gives a true picture of the situation.

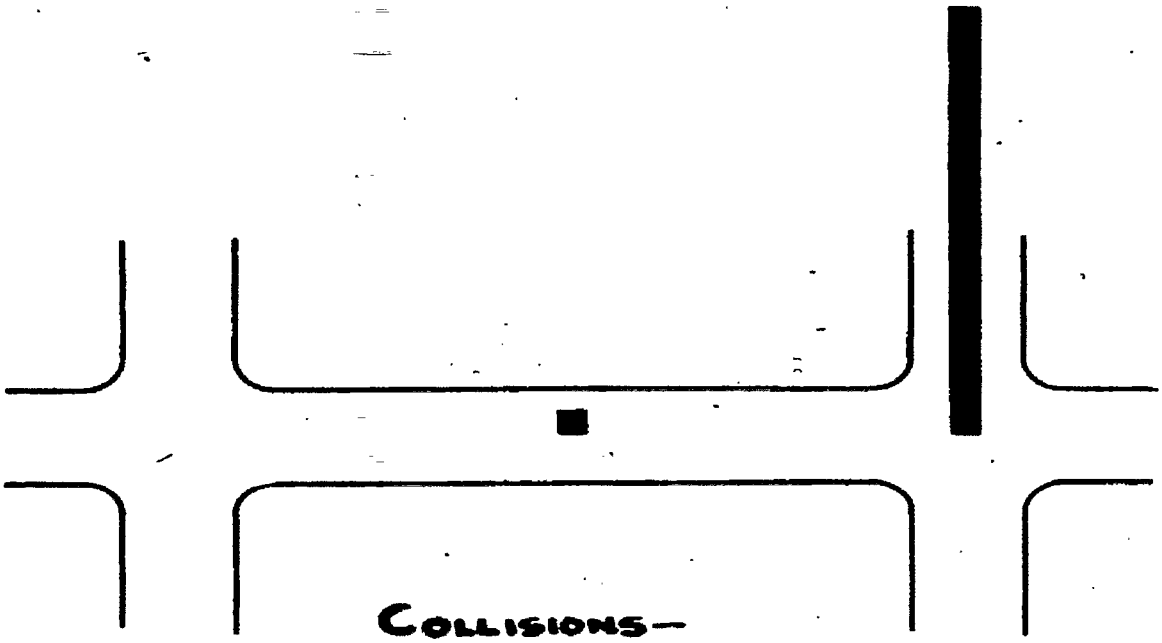
Practically all collisions occur at street intersections. About three-fourths of these collisions result in property damage only. The remainder cause injury or death to passengers.

Over half of injuries and deaths due to traffic appear to be in the



DEATH AND INJURY ACCIDENTS

60% BETWEEN BLOCKS
40% AT INTERSECTIONS.



COLLISIONS—
PROPERTY DAMAGE ACCIDENTS

5% BETWEEN BLOCKS
95% AT INTERSECTIONS

middle of the block. The majority of injuries and deaths appear to be pedestrians and most of these are obviously "jay walkers".

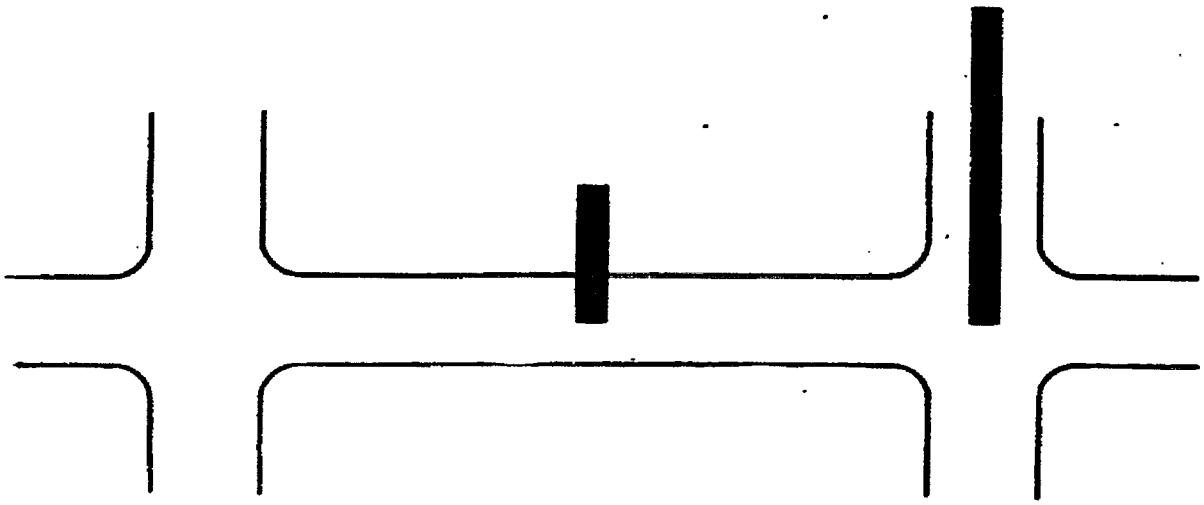
The charts, which appear on the next page, show various types of accidents according to location of occurrence in the block.

Remedies

The charts following definitely suggest two divisions of the problem of accident prevention. The first is education of the pedestrian and of children and laws with teeth in them which will prevent "jay walking". If no children played in the streets and if there were no "jay walkers", traffic injuries and deaths would probably show an immediate and a very large reduction.

The second is the treatment of street intersections to prevent accidents.

As an example of what can be done in the first case, one need only check up the splendid result of safety campaigns and the great value of continuous public safety education. Both of these have been successfully applied in a number of cities.



AVERAGE ALL ACCIDENTS.

30% BETWEEN BLOCKS

70% AT INTERSECTIONS.

Rochester, N. Y., can be taken as an example of what can be done with street intersections. In Rochester, three of every four accidents were at street intersections. During recent years their records indicate that this has been reduced and that only one accident in two is now at street intersections. This represents a reduction of nearly 30 percent. Put another way, only .046 percent of Rochester's accidents in 1923 were at a large number of dangerous intersections which formerly claimed a large proportion of their accidents and which are now treated with traffic signals or standards. An abundance of proof is available in such cities as Pittsburgh, Trenton, Buffalo and many others

to establish the value of traffic signals at street intersections provided they are properly used. The problem reduces to one of keeping traffic in proper channels and making wrong movement of traffic impossible.

If there were no left turns, accidents should be materially reduced. This suggests possibilities at very busy corners of some cities. As an example, reports from Detroit indicate that accidents were reduced 46 percent at 13 busy corners by eliminating left hand turns.

Darkness encourages accidents

Data available indicate that from one-fourth to one-third of all accidents occur at night. Since there are fewer vehicles on the streets at night it can be assumed that more accidents occur after dark in proportion to the number of vehicles in operation. A careful investigation conducted by the National Lamp Works, in the interests of good lighting, indicates that 17.6 percent more accidents occur after dark in proportion to the number of vehicles on the street. This points to the necessity for accident prevention which will be effective during hours of darkness as well as in the day time.

Traffic economics

A very important phase of the traffic problem has been until recently very generally overlooked. This had to do with the economic aspects of the problem.

The Department of Motor Vehicles of Connecticut, in cooperation with insurance companies, recently published a statement to the effect that the average insurance claim for injury for a traffic accident is $360; the average claim for property damage is $64 for each car involved.

No value has been definitely placed on a human life, but it is usually figured at $10,000.

Various authorities have stated different figures for the annual cost of traffic accidents. These estimates vary from $15 to $30 per capita. Undoubtedly $15 is a low estimate, yet it is certainly great enough to justify the best brains and attention that can be given to the problem.

The cost of traffic delays is enormous. Any effort to reduce this annual loss would yield enormous dividends. The Merchants Association of New York stated in February, 1924, that one-half of the time of a truck while in transit is consumed in street delays. They place the annual loss in New York City to *business traffic only* at $16 per capita. A New York traffic official places this *for all traffic* at $1,250,000 for each business day, or over $60 per capita per year for the city alone. In London, under date of July 30, 1923, a statement was made before the House of Commons that the cost of traffic delays in that city was $100,000,000 a year.

The problem of getting traffic through is, from an economic standpoint, fully as important as that of preventing traffic accidents. Both must be done. Traffic is such a tremendous thing that the mind cannot comprehend all of its variables. One must resort to accurate data on the subject and the proper use of that data will point the way to the correction of the difficulties. Without such data, treatment of the traffic

It is frequently stated that if one has no car these economic figures mean nothing to him. It is to be remembered, however, that one pays for the doctor and repair bills of the butcher and the baker and in buying any merchandise we pay for the manufacturers' and sellers' automobile insurance and his other costs of transportation.

Annual losses should be capitalized. An annual loss of $60,000 represents the return or the loss of return on a 6 percent basis on $1,000,000.

Appendix B

SUGGESTIONS FOR MODEL TABLES ON AUTOMOBILE ACCIDENTS

Herbert P. Stellwagen and Edwin W. Kopf

Automobile accidents are tabulated for the primary purpose of securing a background, or starting point, for accident prevention work. Before corrective measures can be applied, it is necessary to ascertain the faults to be corrected, and any community which aims to reduce its automobile accident rate must first inquire into the facts of its accident situation.

There are many facts about automobile accidents which are interesting, and perhaps valuable from the standpoint of newspaper publicity, but which are not pertinent to the problem of accident reduction. It is quite necessary, therefore, that any tabulation of automobile accident data confine itself to useful essentials, and that accident tables be kept free from a multitude of details which have no bearing on the accident problem.

There are probably five things that ought to be studied:

1. Type of accident.
2. Cause or responsibility.
3. Place where, and when.
4. Injured person.
5. Driver and his automobile.

These points may be amplified a bit as follows:

1. *Type of Accident:* The data called for under this heading should be enough to tell just what happened. After all, there are only a few types of automobile accidents, such as collision of an automobile with pedestrian, collision of one motor vehicle with another moving vehicle, collision of a motor vehicle with a stationary object, and a non-collision accident. It is often of importance to tabulate the number of adults and the number of children in the "collision with pedestrian" type of accident.

2. *Cause or Responsibility:* This is perhaps the most important classification of the five enumerated because it indicates what action need be taken to reduce the accident rate. An analysis of cause determines what legislation if any is required to correct existing evils, or what

phases of existing legislation ought to be stressed to alleviate cond itions. It is important to determine whether the accidents are caused l the motorist's recklessness or carelessness, or whether they are caus by the recklessness or carelessness of the pedestrian.* Tabulation shou be made of the accidents attributable to defects in the highways or the physical lay-out of streets, and also of the accidents due to tl mechanical features of the automobile itself.

3. *Place Where and When:* Of principal importance under this clas fication is the tabulation of intersection and non-intersection accident The gathering of statistics on the places of occurrence aids in the prepar tion of a spot map which in turn is useful in showing up the dang points in a city.

4. *Injured Person:* The tabulation of the nature and extent of injuri received may not be altogether essential for the solution of the accide problem, but is quite necessary, nevertheless, for ascertaining the seriou ness of the automobile accident situation. If possible, tabulation mig also be made of the nationality, age, and apparent education of the i jured person, with the idea of finding out what educational measur need be emphasized.

5. *Data on the Driver and the Automobile:* Information should be tab lated concerning the age, experience, and apparent education of tl driver, and then some tabulation should be made of the type of ca (trucks, private cars, taxicabs, etc.) involved in the accident.

In the annex to this part of the report, we show certain tables whi have been tried out in the analysis of several thousand reported accident It is suggested that these tables, with the codes, will be of service municipal and state statisticians having charge of automobile accide compilation.

MODEL TABLE A

Automobile Accidents According to Nature of Injury

Nature of Injury	Code	Number	Percent c Total
All accidents			100.0
Total fatal:			
Killed instantly	01		
Died as result of injuries	02		
Total non-fatal:			
Fracture of skull	10		
Fracture of spine	11		
Fracture of major member	12		
Other fractures	13		
Concussion of brain only	20		
Severe general shock with contusions and lacerations	21		
Slight shake-up and shock	22		
Internal injuries	30		
General contusions and bruises	40		
Sprains	50		
Other	60		

*In this connection see the table for Connecticut accidents during 19

MODEL TABLE B
Sex and Age of Persons Injured or Killed in Automobile Accidents

Severity of Accident; Age	Sex	
	Males	Females
Killed instantly or died as result of injuries:		
All ages		
Under 5		
5 to 9		
10 to 14		
15 to 24		
25 to 44		
45 and over		
Non-fatal injuries:		
All ages		
Under 5		
5 to 9		
10 to 14		
15 to 24		
25 to 44		
45 and over		

MODEL TABLE C
Type of Automobile Accident*

Type of Accident	Code	Number of Accidents Involving Injury*			Accidents Involving Property Damage		
		Total	Resulting Fatally	Non-fatal	Total	With Injury or Death	Without Injury or Death
Collision with Pedestrian:							
Crossing street at crosswalk	01						
Crossing street not at crosswalk	02						
Walking along road	03						
At work on roadway	04						
On sidewalk	05						
Boarding or leaving streetcar	06						
Standing in streetcar safety zone	07						
At play in street	08						
Suddenly running into street	09						
Others of this class	10						
Collision with Moving Motor Vehicle:							
Head on	20						
Rear end	21						
Front against side	22						
Backing	23						
Collision with Other Moving Vehicle:							
Railroad train	30						
Streetcar	31						
Horse-drawn vehicle	32						
Bicycle	33						
Pushcart	34						
Collision with Stationary Object:							
Parked vehicle	40						
Railroad crossing gates	41						
Pole, tree, hydrant, bridge, and other stationary objects	42						
Non-collision Accident:							
Auto over-turning	50						
Running into ditch or water	51						
Occupant jumping from moving vehicle	52						
Cranking	53						
Other types of accidents							

*Footnote: Includes accidents also involving property damage.

MODEL TABLE D

Circumstances Attending Occurrence of Automobile Accident

Conditions Precedent to Occurrence of Automobile Accidents	Code	Number of Accidents			Property Damage Only
		Total	Resulting Fatally	Non-fatal	
A. The Motorist:					
Exceeding speed limit fixed for section in which accident occurred	01				
Moving faster than prevailing traffic in vicinity of accident	02				
On wrong side of road	03				
Motorist striking other vehicle did not have right of way	04				
Cutting in	05				
Passing standing street car, no safety zone	06				
Passing standing street car, safety zone	07				
Passing on curve	08				
Passing on hill	09				
Passing wrong side of vehicle	10				
Signal not given	11				
Backing into other vehicle or pedestrian	12				
Cutting corner sharply	13				
Car ran away—brakes not set	14				
Car ran away—cranked in gear	15				
Car parked on curve or hill	16				
Car ran off roadway	17				
Car ran over safety zone	18				
Personal Characteristics					
Motorist was deaf	19				
Motorist's vision defective	20				
Motorist had epilepsy or other nervous disorder	21				
Paralyzed in arm or leg	22				
Other physical defect	23				
Motorist was intoxicated	24				
Motorist confused by traffic	25				
B. The Pedestrian:					
What was pedestrian doing?					
Waiting for or getting on or off street car, safety zone	26				
Same, no safety zone	27				
Getting on or off other vehicle	28				
Crossing at intersection, with signal	29				
Same, against signal	30				
Same, no signal	31				
Standing on safety isle	32				
Pedestrian contributing to cause of accident:					
Crossing, not at intersection	33				
Going into street, not at intersection	34				
Walking, running, playing in street	35				
At work in roadway	36				
Riding or hitching on vehicle	37				
Not on roadway	38				
Not known	39				
Personal Characteristics					
Pedestrian was intoxicated	40				
Pedestrian had physical defect	41				
Pedestrian confused by traffic	42				
View obstructed (by umbrella, etc.)	43				
C. Other Users of Highway — (Bicyclist, Pushcart Man, etc.):					
Bicyclist fell off vehicle in path of automobile	44				
Bicyclist, pushcart man, teamster, etc., on wrong side of road	45				
Violated traffic ordinance	46				
Motorman of trolley car did not give signal	47				
Motorman did not stop at crossing	48				
D. The Automobile:					
Brakes defective	49				
Steering gear defective	50				

MODEL TABLE D (Continued)

Other defect in equipment	51				
Glaring headlights	52				
Headlamps not burning (one or both)	53				
Tail lamp not burning or obscured	54				
No chains on wet or slippery day	55				
E. The Road:					
Defect in roadway	56				
Obstruction in road not properly marked or lighted	57				
Highway under repair	58				
F. Miscellaneous:					
(If collision between automobile and railroad train).					
Gateman was not on duty	59				
Gates were not closed	60				
Danger signal not given	61				
Other Miscellaneous:					
Insect (bee, etc.) annoying or biting driver	62				
ccupant jumping on or off moving vehicle	63				
Apparently unavoidable skidding	64				
Cause unavoidable	65				
G. Cause Not Known	66				

MODEL TABLE E
Automobile Accidents and Traffic Conditions

Conditions	Code	Number of Accidents			Property Damage Only
		Total	Resulting Fatally	Non-fatal	
Total accidents					
Business section	1				
Residential (tenement)	2				
Residential (other)	3				
Congested trunk line highway	4				
Suburban street	5				
Rural road	6				
Small village or town	7				

MODEL TABLE F
Automobile Accidents and Road Topography

Road Condition	Code	Number of Accidents			Property Damage Only
		Total	Resulting Fatally	Non-fatal	
Total accidents					
Straight level road	1				
Straight road, bad up-grade	2				
Curve	3				
Curve with bad up-grade	4				
Curve with bad down-grade	5				
Congested trunk line highway	6				
Street intersection	7				
Railroad crossing	8				

MODEL TABLE G
Automobile Accidents and Road Surface

Road Surface	Code	Number of Accidents			Property Damage Only
		Total	Resulting Fatally	Non-fatal	
Total accidents					
Road—					
Wet	1				
Dry	2				
Mud	3				
Snow	4				
Ice	5				

MODEL TABLE H

Automobile Accidents and Weather and Light Conditions

Weather and Light Conditions	Code	Number of Accidents			Property Damage Only
		Total	Resulting Fatally	Non-fatal	
Weather:					
Total accidents					
Fog	1				
Mist	2				
Rain	3				
Snow	4				
Sleet	5				
Cloudy	6				
Clear	7				
Light:					
Total accidents					
Light	1				
Dusk	2				
Dark	3				

MODEL TABLE I

Automobile Accidents and Hour and Day of Occurrence

Hour of Occurrence	Number of Accidents			Property Damage Only
	Total	Resulting Fatally	Non-fatal	
Total accidents				
12 to 1 A. M.				
1 to 6 A. M.				
6 to 7 A. M.				
7 to 8 A. M.				
8 to 9 A. M.				
9 to 10 A. M.				
10 to 11 A. M.				
11 to 12 A. M.				
12 M. to 1 P. M.				
1 to 2 P. M.				
2 to 3 P. M.				
3 to 4 P. M.				
4 to 5 P. M.				
5 to 6 P. M.				
6 to 7 P. M.				
7 to 8 P. M.				
8 to 9 P. M.				
9 to 10 P. M.				
10 to 11 P. M.				
11 to 12 P. M.				
Day of Occurrence				
Total accidents				
Sunday				
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				

MODEL TABLE J

Description of Drivers Involved in Automobile Accidents

Item	Number	Percent of Total
Total drivers		100.0
Driver's Sex:		
Male		
Female		
Driver's Age:		
Under 16		
16 to 24		
25 to 54		
55 and over		
Driver's Apparent Education:		
Unable to speak English		
Unable to read English		
Grammar school education		
High school or higher education		
Driving Experience:		
Less than 3 months		
3 months, less than 6 months		
6 months, less than 1 year		
1 year, less than 2 years		
2 years, less than 10 years		
10 years or more		

MODEL TABLE K

Type of Car, Speed at Time of Accident and Defects (Car Involved in Accident)

Item	Number	Percent
Type of Car:		
Total cars		100.0
Private passenger		
Truck or commercial		
Taxi-cab		
Jitney		
Bus		
Motorcycle		
Speed at Time of Accident:		
Total cars		
Slow (0 to 12 miles)		
Medium (12 to 25 miles)		
Fast (25 miles or more)		
Vehicle standing		
Not known		
Defects in Car:		
Total cars		
Brakes		
Steering mechanism		
Glaring headlight		
No headlights		
No taillight		

Appendix Tables

TABLE 1

Estimate of Fatal Accidents in the United States, 1921 and 1922 Compared with 1911

Type of Accident	Death rates per 100,000. United States Registration Area			Estimated deaths in Continental United States**					
				1922		1921		1911	
	1922*	1921*	1911	Number	Per cent of total	Number	Per cent of total	Number	Per cent of total
Total accidents†	69.8	68.2	84.6	76255	100.0	73542	100.0	79255	100.0
Poisoning by food	.9	1.0	.8	983	1.3	1078	1.5	749	.9
Other acute poisonings	1.7	1.8	2.4	1857	2.4	1941	2.6	2248	2.8
Conflagration	1.2	1.0	1.5	1311	1.7	1078	1.5	1405	1.8
Burns	6.4	5.9	7.7	6992	9.2	6362	8.7	7214	9.1
Absorption of irrespirable or poisonous gases	3.3	3.1	3.6	3605	4.7	3343	4.5	3373	4.3
Accidental drowning	6.4	7.3	9.4	6992	9.2	7872	10.7	8806	11.1
Traumatism by firearms	2.7	2.6	2.2	2950	3.9	2804	3.8	2061	2.6
Traumatism by cutting or piercing instruments	.6	.5	.2	655	.9	539	.7	187	.2
Traumatism by fall	12.1	11.4	15.0	13219	17.3	12293	16.7	14052	17.7
Traumatism in mines	1.9	2.0	3.8	2076	2.7	2157	2.9	3560	4.5
Traumatism in quarries	.1	.1	.2	109	.1	108	.1	187	.2
Traumatism by machines	2.0	1.8	2.1	2185	2.9	1941	2.6	1967	2.5
Traumatism by other crushing	22.7	21.5	22.9	24799	32.5	23184	31.5	21453	27.1
Railroad accidents and injuries	6.1	5.9	13.0	6664	8.7	6362	8.7	12179	15.4
Street car accidents and injuries	1.6	1.6	3.2	1748	2.3	1725	2.3	2998	3.8
Automobile accidents and injuries	12.5	11.4	2.2	13656	17.9	12293	16.7	2061	2.6
Injuries by other vehicles	1.8	1.9	3.8	1966	2.6	2049	2.8	3560	4.5
Aeroplane accidents	.2	.1	....	218	.3	108	.1	....	....
Landslide; other crushing	.6	.6	.8	655	.9	647	.9	749	.9
Injuries by animals	.7	.8	.9	765	1.0	863	1.2	843	1.1
Excessive cold	.2	.1	.3	218	.3	108	.1	281	.4
Excessive heat	.4	1.1	5.3	437	.6	1186	1.6	4065	6.3
Lightning	.5	.5	.4	540	.7	539	.7	375	.5
Other accidental electric shocks	.9	.8	.9	983	1.3	863	1.2	843	1.1
Fractures—cause not specified	.8	.6	.6	874	1.1	647	.9	562	.7
Other external violence	4.3	4.3	4.2	4698	6.3	4637	6.3	3935	5.0

*Registration States.
**Estimated mid-year population of continental United States: 1922, 109,248,393; 1921, 107,833,285; 1911, 93,682,189.
†Includes injuries where accidental, suicide or homicidal nature of injury was not specified.

TABLE 6

Death Rate per 100,000 from Principal Types of Accidents by Age Periods, 1922
United States Registration States and Metropolitan Life Insurance Company, Industrial Department

Age Period	All accidents		Burns		Drowning		Falls		Railroad accidents		Stree car accidents		Auto accidents	
	U. S. Reg. States	M. L. I. Co. Ind'l	U. S. Reg. States	M. L. I. Co. Ind'l	U. S. Reg. States	M. L. I. Co. Ind'l	U. S. Reg. States	M. L. I. Co. Ind'l	U. S. Reg. States	M. L. I. Co. Ind'l	U. S. Reg. States	M. L. I. Co. Ind'l	U. S. Reg. States	M. L. I. Co. Ind'l
All ages*...	62.4	58.0	5.9	6.1	6.5	7.3	7.3	7.3	6.0	4.1	1.5	1.8	12.3	13.6
1 to 4...	75.0	74.3	29.6	28.1	7.3	6.1	5.1	6.1	1.0	1.0	1.1	1.9	9.9	14.7
5 to 9...	47.3	54.8	7.8	7.5	6.2	9.3	2.9	2.8	1.6	1.2	.8	1.0	18.2	23.6
10 to 14...	35.1	41.0	1.8	1.9	8.0	11.5	2.3	2.4	2.0	2.0	.4	.9	8.8	12.7
15 to 19...	51.4	48.8	1.9	1.5	11.9	13.4	2.6	2.0	5.2	5.1	.8	1.1	8.5	8.6
20 to 24...	54.5	45.1	2.7	2.4	8.3	8.8	2.8	2.1	7.6	4.8	.9	1.0	10.3	9.5
25 to 34...	52.9	42.4	2.6	2.4	5.3	4.5	4.1	3.3	6.9	4.5	1.4	1.7	9.7	9.3
35 to 44...	60.7	50.4	2.6	2.7	4.8	4.5	6.3	6.3	8.6	5.5	1.9	1.9	10.4	8.9
45 to 54...	71.9	64.4	3.4	4.6	4.8	4.0	10.0	9.4	8.9	6.2	2.3	2.5	13.1	12.9
55 to 64...	95.0	94.6	4.8	6.8	4.7	2.0	17.9	21.6	9.1	7.8	3.2	4.9	19.0	18.9
65 to 74...	162.4	174.3	6.5	13.9	4.3	2.8	55.1	60.4	11.7	11.4	5.0	6.6	29.6	29.7
75 and over	494.7	423.0	24.6	27.8	5.0	4.3	329.5	245.7	14.3	8.5	7.1	10.7	36.1	40.6

*1 to 74 for U. S. Reg. States; 1 and over for M. L. I. Co. Ind'l Dept

TABLE 7

Tendencies of Accident Mortality in United States Registration Area* and Among Wage-earners Insured in Metropolitan Life Insurance Company, Industrial Department, 1911 to 1922

Type of Accident	Death rate per 100,000				Percent decline (—), or increase (+), 1922-1911		Uniform annual decrement (—) or increment (+), 1922-1911	
	U. S. Reg. Area*		M. L. I. Co. Ind'l		U.S.Reg. Area	M.L.I. Co. Ind'l	U.S.Reg. Area	M.L.I. Co. Ind'l
	1922**	1911	1922	1911				
Total accidents	62.4	76.7	58.0	77.4	—18.6	—25.1	—1.414	—1.709
Poisoning by food	.8	.7	.5	1.2	+14.3	—58.3	+.008	—.073
Other acute poisonings	1.7	2.2	1.6	2.2	—22.7	—27.3	—.043	—.054
Conflagration	1.1	1.3	1.1	1.3	—15.4	—15.4	—.032	—.038
Burns	5.9	7.3	6.1	8.8	—19.2	—30.7	—.113	—.205
Absorption of irrespirable or poisonous gases	2.3	2.6	2.4	2.3	—11.5	+ 4.3	—.033	—.026
Accidental drowning	6.5	9.5	7.3	10.2	—31.6	—28.4	—.340	—.361
Traumatism by firearms	2.7	2.3	1.8	1.7	+17.4	+ 5.9	+.035	+.014
Traumatism by cutting or piercing instruments	.5	.2	.1	.1	+150.0	.....	+.022	—.006
Traumatism by fall	7.3	10.8	7.3	13.2	—32.4	—44.7	—.445	—.660
Traumatism in mines	1.9	3.9	.9	1.3	—51.3	—30.8	—.156	—.014
Traumatism in quarries	.1	.2	.1	.1	—50.0	.....	—.013	+.001
Traumatism by machines	2.0	2.2	1.6	1.8	— 9.1	—11.1	—.004	—.024
Traumatism by other crushing	22.4	22.8	21.6	19.3	— 1.8	+11.9	—.123	+.190
Railroad accidents	6.0	13.0	4.1	9.5	—53.8	—56.8	—.705	—.493
Street car accidents	1.5	3.2	1.8	3.6	—53.1	—50.0	—.140	—.164
Automobile accidents	12.3	2.2	13.6	2.3	+459.1	+491.3	+.934	+1.058
Injuries by other vehicles	1.7	3.7	1.7	3.1	—54.1	—45.2	—.211	—.171
Landslide; other crushing	.6	.8	.3	.8	—25.0	—62.5	—.014	—.039
Injuries by animals	.7	.8	.2	.6	—12.5	—66.7	—.014	—.031
Excessive heat	.3	3.9	.4	6.7	—92.3	—94.0	—.174	—.313
Lightning	.5	.4	.2	.2	+25.0	.....	+.011	—.001
Other accidental electric shocks	.9	.9	.8	.8	.....	.....	—.003	.....
Other accidental violence	4.8	4.6	3.9	5.6	+ 4.3	—30.4	+.012	—.117

*At ages 1 to 74 years; thus calculated to make rates comparable with those for insured group.

**Registration States.

TABLE 8

Deaths per 1,000 Automobiles Registered in 1923, Showing the Range in Death Rates from the Highest to the Lowest

	City	Death rate per 1,000 Automobiles		City	Death rate per 1,000 Automobiles
1.	Fall River, Mass	3.50	21.	Knoxville, Tenn	1.21
2.	Erie, Pa	3.26	22.	Cleveland, Ohio	1.20
3.	Trenton, N. J	2.89	23.	Albany, N. Y	1.09
4.	Jersey City, N. J	2.61	24.	Minneapolis, Minn	1.07
5.	New York City	2.60	25.	Springfield, Mass	1.03
6.	Reading, Pa	2.48	26.	Milwaukee, Wis	.99
7.	Toledo, Ohio	2.25	27.	Fort Wayne, Ind	.95
8.	Chicago, Ill	2.20	28.	Grand Rapids, Mich	.92
9.	Cincinnati, Ohio	1.92	29.	Los Angeles, Cal	.90
10.	Boston, Mass	1.88	30.	Oklahoma City, Okla	.89
11.	Birmingham, Ala	1.76	31.	Washington, D. C	.85
12.	New Haven, Conn	1.70	32.	Indianapolis, Ind	.76
13.	Baltimore, Md	1.66	33.	Denver, Colo	.73
14.	Schenectady, N. Y	1.63	34.	San Diego, Cal	.69
15.	Buffalo, N. Y	1.63	35.	Des Moines, Iowa	.69
16.	Lowell, Mass	1.61	36.	Dayton, Ohio	.67
17.	St. Louis, Mo	1.53	37.	New Bedford, Mass	.61
18.	Columbus, Ohio	1.40	38.	Worcester, Mass	.59
19.	Jacksonville, Fla	1.40	39.	Spokane, Wash	.48

TABLE 9

Death Rates per 100,000 from Automobile Accidents and Injuries By Sex and Broad Age Periods, 1911 to 1922, United States Registration Area*

Sex; Age Period	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911
Males:												
All ages	18.5	16.7	15.2	13.8	13.8	13.6	11.3	9.0	6.6	6.0	4.4	3.4
Ages 1 to 74	18.2	16.6	15.1	13.7	13.7	13.6	11.4	9.0	6.6	6.0	4.4	3.4
1 to 4	12.5	12.5	11.3	10.1	9.2	7.7	6.2	4.5	3.1	3.1	3.0	1.6
5 to 9	25.4	24.6	23.8	23.4	19.6	17.8	14.9	12.8	9.7	9.8	6.7	5.2
10 to 14	14.0	14.1	15.3	13.0	13.7	10.8	9.5	8.7	7.2	6.2	4.1	3.4
15 to 19	12.6	10.3	11.6	10.1	10.8	8.5	7.4	6.0	4.2	3.4	2.7	2.0
20 to 24	16.6	14.1	12.8	10.8	8.9	14.3	11.5	7.6	5.2	4.9	3.0	2.3
25 to 34	15.9	13.7	13.0	10.5	10.1	11.8	10.4	7.2	5.1	5.1	3.2	2.8
35 to 44	16.3	15.7	12.1	11.8	13.0	14.0	10.7	8.6	6.4	5.8	5.0	3.1
45 to 54	19.2	17.2	14.0	12.4	15.7	16.2	12.2	11.4	8.2	6.7	5.4	4.4
55 to 64	25.4	22.2	19.6	19.0	21.0	19.5	17.6	13.9	10.5	9.1	7.4	5.9
65 to 74	41.0	36.4	30.0	28.4	26.8	22.3	20.8	17.8	13.3	11.2	7.9	7.5
75 and over	59.1	45.2	42.1	36.4	31.7	29.0	23.8	21.5	13.0	12.4	8.1	6.1
Females:												
All ages	6.3	5.8	5.2	4.7	4.3	4.0	3.1	2.6	1.8	1.7	1.3	.9
Ages 1 to 74	6.2	5.7	5.2	4.7	4.2	4.0	3.0	2.6	1.8	1.7	1.3	.9
1 to 4	7.1	6.9	6.6	5.8	5.0	4.6	3.6	3.2	2.4	1.8	1.4	.6
5 to 9	10.8	10.1	9.3	8.8	7.2	7.0	4.5	4.5	3.0	3.1	2.9	1.6
10 to 14	3.4	3.3	2.6	2.8	2.9	2.5	2.1	1.3	1.2	1.3	1.1	.6
15 to 19	4.5	3.6	4.0	2.8	2.8	2.8	2.1	1.5	1.1	.9	.9	.4
20 to 24	4.4	2.8	3.1	3.2	3.1	2.8	2.4	1.8	1.5	1.4	1.0	.7
25 to 34	3.5	3.2	2.9	2.7	2.5	2.6	1.9	1.6	1.1	1.4	.6	.6
35 to 44	4.1	3.8	3.2	3.4	2.8	3.3	2.4	2.1	1.6	1.2	1.0	.8
45 to 54	6.1	6.5	5.7	5.1	4.8	3.9	3.6	3.4	1.9	1.7	1.3	1.6
55 to 64	11.8	10.9	9.6	8.3	7.8	6.3	5.1	5.0	3.2	3.0	2.1	1.8
65 to 74	17.7	17.3	13.5	10.1	8.9	9.6	6.5	5.4	4.3	3.6	2.6	1.8
75 and over	17.5	15.9	14.1	13.2	11.7	9.1	6.6	6.4	4.1	4.4	3.3	2.0

*For 1920, 1921 and 1922, U. S. Registration States.

TABLE 10

Automobile Fatality Record of Massachusetts, 1910 to 1923

Year	Automobile registration	Persons killed in automobile accidents	Persons killed		Cars per person killed
			Per 100,000 population	Per 1,000 cars registered	
1923	577,883	578	14.4	1.0	1,000
1922	461,513	522	13.1	1.1	884
1921	372,790	544	13.9	1.5	685
1920	319,774	481	12.4	1.5	665
1919	260,881	582	15.2	2.2	448
1918	206,359	499	13.2	2.4	414
1917	185,339	438	11.8	2.4	423
1916	147,522	315	8.6	2.1	468
1915	112,153	294	8.1	2.6	381
1914	85,407	229	6.4	2.7	373
1913	69,787	188	5.3	2.7	371
1912	55,166	142	4.1	2.6	388
1911	42,565	110	3.2	2.6	387
1910	34,718	77	2.3	2.2	451

TABLE 11

Age Distribution of Principal Types of Accidents in United States, 192

Age Periods	All accidents	Traumatism by fall	Automobile accidents	Burns	Railroad accidents	Accidental drowning	Absorption of irrespirable or poisonous gases	Traumatism firear
All Ages...	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.
Under 5...	12.3	5.0	7.3	44.4	1.7	10.6	26.2	4.
5 to 9...	7.2	2.5	15.4	12.9	2.8	10.2	1.6	7.
10 to 14...	5.0	1.8	6.9	2.8	3.3	12.3	1.5	13.
15 to 24...	12.9	3.8	12.8	6.2	18.1	26.9	7.3	32.
25 to 34...	12.5	5.5	12.8	6.6	18.9	13.5	10.7	16.
35 to 44...	12.0	7.2	11.5	5.7	19.7	10.4	12.7	11.
45 to 54...	10.7	8.6	10.9	5.6	15.4	7.9	12.3	8.
55 to 64...	9.0	9.7	10.0	4.9	10.0	4.8	11.8	3.
65 to 74...	8.0	15.6	8.1	5.1	6.7	2.3	9.0	1.
75 and over	10.5	40.2	4.3	5.7	3.5	1.1	6.9	

TABLE 12

Motor Vehicle Accidents in Connecticut, January 1 to July 31, 1924

Cause of Accident	Number	Percent.
Total accidents	10,264	100.0
Recklessness of Motorists	5,929	57.8
Failure to grant right of way	1,493	14.5
Inattention	1,331	13.0
Skidding	917	8.9
Driving wrong side of road	386	3.8
Failure to signal	294	2.9
Inexperience	279	2.7
Other	1,229	12.0
Carelessness of Child Pedestrian	382	3.7
Crossing street	143	1.4
Playing in street	96	.9
Other	143	1.4
Carelessness of Adult Pedestrian	777	7.6
Crossing street	485	4.7
Stepping from behind	181	1.8
Intoxication	50	.5
Other	61	.6
Carelessness of Contributor	1,083	10.6
Motormen	312	3.0
Unknown operator	253	2.5
Other	518	5.0
Equipment	537	5.2
Defective steering apparatus	122	1.2
Obscured vision	95	.9
Defective brakes	82	.8
Glaring headlights	78	.8
Other	160	1.6
Miscellaneous conditions	180	1.8
Accidents reported resulting in damage of less than ten dollars	1,376	13.4

TABLE 13

Railroad Accidents in the United States
(Reports of Interstate Commerce Commission)

Year	Total number of accidents	Fatal Railroad Accidents			
		Passengers killed	All employees killed	Other persons killed	Total persons killed
1918	194,553	521	3,829	5,644	9,994
1919	169,848	310	2,454	4,716	7,480
1920	198,959	255	2,898	4,334	7,487
1921	140,077	236	1,702	4,567	6,505
1922	154,656	230	1,878	4,693	6,801
Percentage distribution of 1922 fatal accidents		3.4	27.6	69.0	100.0

TABLE 14

Traffic Fatalities in 121 American Cities*
(Aggregate Population 1923, 28,019,039)

Vehicle	Number of deaths		Death rate per 100,000 population		Per cent increase 1923 rate over 1921
	1923	1922	1923	1922	
Automobile	5,275	4,575	18.8	16.6	13.2
Steam Railroad	1,248	905	4.5	3.3	36.4
Street Railway	925	665	3.3	2.4	37.5
Other vehicles	353	333	1.3	1.2	8.3
All vehicles	7,801	6,478	27.9	23.5	18.8

*All except 14 of the cities in Table 18.

TABLE 15

Deaths from Automobile Accidents per 100,000 Population for 1923 in 58 American Cities of 100,000 Population and Over, Showing the Range in Death Rates from the Highest to the Lowest

	City	Death rate per 100,000 population		City	Death rate per 100,000 population
1.	Erie, Pa	36.4	30.	Grand Rapids, Mich	17.1
2.	Los Angeles, Cal	35.6	31.	Des Moines, Iowa	17.0
3.	Camden, N. J	33.8	32.	Bridgeport, Conn	16.7
4.	Cincinnati, Ohio	30.3	33.	New Orleans, La	16.6
5.	Buffalo, N. Y	26.5	34.	Baltimore, Md	16.5
6.	Detroit, Mich	25.8	35.	New York City	15.9
7.	Birmingham, Ala	25.5	36.	Philadelphia, Pa	15.8
8.	Wilmington, Del	25.5	37.	Denver, Colo	15.6
9.	Trenton, N. J	25.1	38.	Rochester, N. Y	15.3
10.	Scranton, Pa	24.9	39.	Salt Lake City, Utah	15.1
11.	Newark, N. J	23.5	40.	Minneapolis, Minn	14.9
12.	Pittsburgh, Pa	23.0	41.	Milwaukee, Wis	14.9
13.	Reading, Pa	22.5	42.	Springfield, Mass	14.6
14.	Cleveland, Ohio	22.4	43.	Dayton, Ohio	13.9
15.	Albany, N. Y	22.2	44.	Tacoma, Wash	13.8
16.	Toledo, Ohio	22.0	45.	Indianapolis, Ind	13.7
17.	Hartford, Conn	21.7	46.	Cambridge, Mass	13.5
18.	Providence, R. I	21.4	47.	Spokane, Wash	13.4
19.	Columbus, Ohio	21.4	48.	Lowell, Mass	13.0
20.	Jacksonville, Fla	21.0	49.	Flint, Mich	11.9
21.	St. Louis, Mo	20.7	50.	Jersey City, N. J	11.3
22.	Nashville, Tenn	20.6	51.	San Antonio, Texas	9.8
23.	Chicago, Ill	20.2	52.	Houston, Texas	9.7
24.	Washington, D. C	19.9	53.	Elizabeth, N. J	8.7
25.	San Francisco, Cal	18.8	54.	Fort Worth, Texas	7.0
26.	Oklahoma City, Okla	17.8	55.	Worcester, Mass	6.3
27.	Fall River, Mass	17.4	56.	New Bedford, Mass	6.2
28.	New Haven, Conn	17.3	57.	Yonkers, N. Y	4.7
29.	Boston, Mass	17.1	58.	Norfolk, Va	3.1

TABLE 16

Public Accidents Classified According to Detail of Hazard and Age Experience of Metropolitan Life Insurance Company, Industrial Department, 1923

Age Period	Percentage in detailed hazard class						Percentage in specified age group					
	Total public accidents	Transportation	Sport and recreation	Pedestrian use of streets	Use of public buildings	Other public accidents	Total public accidents	Transportation	Sport and recreation	Pedestrian use of streets	Use of public buildings	Other public accidents
ages—1 and over	100.0	20.0	10.3	44.3	2.0	22.8	100.0	100.0	100.0	100.0	100.0	100.0
ıder 15	100.0	8.9	12.4	56.6	1.1	21.0	37.8	16.2	45.5	48.3	20.0	34.8
15 to 64	100.0	30.1	10.0	32.4	2.6	24.9	55.8	81.4	54.2	40.8	71.8	61.0
15 to 24	100.0	30.4	22.4	18.6	2.2	26.4	17.7	26.2	38.7	7.5	18.8	20.5
25 to 34	100.0	37.0	8.7	22.8	2.8	28.7	11.9	21.4	10.1	6.2	16.5	15.0
35 to 44	100.0	32.8	3.9	36.7	2.6	24.0	9.3	14.8	3.5	7.7	11.8	9.8
45 to 54	100.0	29.7	2.1	43.6	1.8	22.8	8.1	11.7	1.6	8.0	7.1	8.1
55 to 64	100.0	17.5	.3	58.5	4.2	19.5	8.7	7.4	.2	11.4	17.6	7.4
and over	100.0	7.5	.4	74.6	2.6	14.9	6.5	2.3	.2	10.9	8.2	4.2

TABLE 17

Public Accidents Classified According to Detail of Hazard and Type of Accident Experience of Metropolitan Life Insurance Company, Industrial Department, 1923

Type of Accident	Percentage in detailed hazard class						Percentage for each type of accident					
	Total public accidents	Transportation	Sport and recreation	Pedestrian use of streets	Use of public buildings	Other public accidents	Total public accidents	Transportation	Sport and recreation	Pedestrian use of streets	Use of public buildings	Other public accidents
All public accidents	100.0	20.6	10.3	44.3	2.0	22.8	100.0	100.0	100.0	100.0	100.0	100.0
Absorption of poisonous gases	100.0	.....	.....	.....	50.0	50.0	.....	.....	.....	.....	1.2	.1
Drowning	100.0	.7	37.8	.3	.3	61.0	18.0	.6	66.2	.1	2.4	48.3
Falls	100.0	.5	15.4	34.3	18.4	31.3	4.8	.1	7.3	3.8	43.5	6.7
Railroad accidents	100.0	29.3	.2	60.7	.....	9.7	10.7	15.2	.2	14.7	.....	4.6
Street car accidents	100.0	34.2	.....	60.3	.....	5.6	5.6	9.3	.....	7.7	.....	1.4
Automobile accidents	100.0	26.8	.2	60.1	.....	12.9	50.5	65.5	.9	68.6	.....	28.6
Injuries by other vehicles	100.0	45.7	4.9	40.9	.....	8.5	4.0	8.8	1.9	3.6	.....	1.5
Other public accidents	100.0	1.5	38.0	11.0	17.1	32.3	6.3	.5	23.5	1.6	52.9	9.0

TABLE 18

Automobile Fatalities in 142 American Cities, 1923 and 1922
(Total Population 1923, 31,758,892)

City	Number of Deaths				Total death rate per 100,000 population	
	1923			1922		
	Under 15 Years	15 Years and Over	Total	Total	1923	1922
Albany, N. Y.	3	23	26	15	22.2	12.9
Albuquerque, N. M.	0	0	0	0	.....	.....
Anderson, Ind	1	3	4	2	12.4	6.3
Atlanta, Ga.	.....	.....	53	54	23.8	24.7
Aurora, Ill.	0	2	2	2	5.2	5.3
Baltimore, Md.	38	90	128	122	16.5	16.0
Berkeley, Cal.	2	3	5	13	7.9	21.2
Binghamton, N. Y.	6	13	19	16	25.9	22.4
Birmingham, Ala.	10	40	50	31	25.5	16.2
Bridgeport, Conn.	6	18	24	27	16.7	18.8
Brockton, Mass.	6	7	13	12	18.7	17.7
Boston, Mass.	49	83	132	121	17.1	15.8
Buffalo, N. Y.	46	96	142	106	26.5	20.1
Cambridge, Mass.	10	5	15	13	13.5	11.7
Camden, N. J.	10	32	42	30	33.8	24.6
Chicago, Ill.	.....	.....	583	626	20.2	22.1
Cincinnati, Ohio	.....	.....	123	78	30.3	19.3
Cleveland, Ohio	52	147	199	147	22.4	17.2
Clifton, N. J.	1	0	1	0	3.2	.....
Columbus, Ohio	12	44	56	39	21.4	15.3
Cranston, R. I.	0	0	0	0	.....	.....
Dayton, Ohio	3	20	23	29	13.9	17.9
Des Moines, Iowa	.....	.....	24	23	17.0	16.8
Denver, Colo.	11	30	41	58	15.6	21.7
Detroit, Mich.	88	169	257	168	25.8	16.9
East Cleveland, Ohio	1	1	2	2	5.9	6.3
Easton, Pa.	.....	.....	17	13	47.6	37.0
Elizabeth, N. J.	2	7	9	12	8.7	11.8
Erie, Pa.	5	36	41	22	36.4	20.1
Evanston, Ill.	7	8	15	10	36.2	27.4
Fall River, Mass.	2	19	21	12	17.4	9.9
Flint, Mich.	3	11	14	21	11.9	18.8
Fond du Lac, Wis.	1	7	8	1	31.9	4.1
Fort Wayne, Ind.	5	14	19	9	20.3	9.8
Fort Worth, Texas	.....	.....	10	16	7.0	13.2
Galveston, Texas	0	5	5	6	10.7	13.0
Grand Rapids, Mich.	7	18	25	23	17.1	16.0
Great Falls, Mont.	0	3	3	2	10.7	7.5
Green Bay, Wis.	4	5	9	6	27.2	18.5
Greenville, S. C.	5	7	12	6	46.6	24.0
Hartford, Conn.	10	20	30	22	21.7	15.9
Haverhill, Mass.	4	2	6	9	10.4	15.9
Houston, Texas	4	11	15	19	9.7	12.7
Indianapolis, Ind.	10	37	47	54	13.7	16.1
Jackson, Mich.	0	7	7	9	12.9	17.1
Jacksonville, Fla.	8	13	21	17	21.0	17.4
Jamestown, N. Y.	4	4	8	4	19.2	9.8
Jersey City, N. J.	.....	.....	35	25	11.3	8.3
Joliet, Ill.	5	16	21	14	52.8	35.8
Kalamazoo, Mich.	2	7	9	11	17.4	21.7
Kansas City, Mo.	.....	.....	88	63	25.0	18.3
Kearny, N. J.	3	4	7	2	23.6	6.9
Kenosha, Wis.	2	2	4	4	8.6	8.9
Knoxville, Tenn.	.....	.....	15	21	16.9	24.8
Kokomo, Ind.	0	5	5	0	14.5	.....
Lawrence, Mass.	9	10	19	12	19.5	12.4
Lewiston, Me.	.....	1	1	2	3.0	6.0
Lima, Ohio	2	7	9	4	20.1	9.1
Lincoln, Neb.	3	8	11	10	18.7	17.4
Long Beach, Cal.	7	15	22	17	31.8	26.0
Lorain, Ohio	4	10	14	6	34.6	15.3
Los Angeles, Cal.	25	212	237	180	35.6	28.4
Louisville	.....	.....	34	42	13.2	16.4
Lowell, Mass.	7	8	15	6	13.0	5.3

(Continued on next page)

TABLE 18—(Continued)

Automobile Fatalities in 142 American Cities, 1923 and 1922
(Total Population 1923, 31,758,892)

City	Number of Deaths				Total death rate per 100,000 population	
	1923			1922		
	Under 15 Years	15 Years and Over	Total	Total	1923	1922
Lynchburg, Va.	1	9	10	4	33.0	13.2
Macon, Ga.	3	3	6	5	9.1	9.0
Madison, Wis.	1	5	6	10	14.1	24.2
Manchester, N. H.	5	5	10	2	12.3	2.5
Memphis			47	42	27.6	25.0
Miami, Fla.			22	14	57.5	39.2
Milwaukee, Wis.			72	61	14.9	12.8
Minneapolis, Minn.	7	54	61	71	14.9	17.7
Moline, Ill.	2	3	5	5	15.3	15.5
Muskegon, Mich.	2	3	5	2	12.3	5.1
Muskogee, Okla.	0	2	2	1	6.4	3.2
Nashville, Tenn.			25	21	20.6	17.5
Newark, N. J.	51	52	103	78	23.5	18.1
New Bedford, Mass.	3	5	8	19	6.2	14.9
New Britain, Conn.	2	2	4	7	6.2	11.1
Newburgh, N. Y.	1	1	2	3	6.6	9.7
New Haven, Conn.	9	21	30	34	17.3	20.0
New Orleans, La.			67	40	16.6	10.0
Newport, R. I.	1	4	5	1	15.9	3.2
Newport News, Va.	0	0	0	1		2.8
New Rochelle, N. Y.			8	6	20.6	15.7
New York City	424	521	945	870	15.9	14.9
Norfolk, Va.			5	11	3.1	8.8
Norwood, Ohio	1	2	3	2	10.7	7.4
Oak Park, Ill.	4	8	12	14	25.4	31.0
Oklahoma City, Okla.	3	15	18	4	17.8	4.1
Omaha			38	24	18.6	12.0
Pasadena, Cal.	4	11	15	7	28.1	13.5
Passaic, N. J.	5	9	14	5	20.9	7.6
Perth Amboy, N. J.	3	4	7	3	15.5	6.8
Petersburgh, Va.	0	7	7	5	20.4	14.9
Philadelphia, Pa.	107	197	304	265	15.8	14.0
Pittsburgh, Pa.			139	125	23.0	20.6
Portland, Me.	4	8	12	7	16.4	9.7
Portsmouth, Va.	1	4	5	8	8.7	14.2
Poughkeepsie, N. Y.	3	1	4	2	10.6	5.4
Providence, R. I.	9	43	52	52	21.4	21.6
Pueblo, Colo.	1	6	7	2	16.1	4.6
Quincy, Ill.	0	1	1	2	2.7	5.3
Quincy, Mass.	5	7	12	8	22.5	15.4
Reading, Pa.	9	16	25	13	22.5	11.8
Reno, Nev.	0	1	1	4	8.0	32.5
Richmond			27	20	14.9	15.0
Roanoke, Va.	6	9	15	3	27.0	5.5
Rochester, N. Y.	11	36	47	52	15.3	16.7
Rockford, Ill.			8	5	11.0	7.1
Sacramento, Cal.	7	23	30	27	42.9	39.2
Saginaw, Mich.			14	11	20.1	16.0
St. Louis, Mo.			166	136	20.7	17.1
St. Paul.			58	36	24.0	15.0
Salt Lake City, Utah	7	12	19	23	15.1	18.6
San Antonio, Texas	2	16	18	28	9.8	15.7
San Diego, Cal.			18	31	20.7	37.1
San Francisco, Cal.	19	82	101	115	18.8	21.7
Schenectady, N. Y.	7	14	21	14	22.3	15.1
Scranton, Pa.	16	19	35	19	24.9	13.6
Sheboygan, Wis.	0	2	2	3	6.1	9.6
Shreveport, La.			10	2	18.3	4.2
Sioux City, Iowa	6	6	12	3	15.1	3.9
Somerville, Mass.			13	10	13.2	10.3
South Bend, Ind.	3	9	12	9	15.6	12.0
Spokane, Wash.	2	12	14	9	13.4	8.6
Springfield, Mass.	7	14	21	14	14.6	10.0
Steubenville, Ohio	2	4	6	10	19.5	33.3

(Continued on next page)

TABLE 18—(Continued)

Automobile Fatalities in 142 American Cities, 1923 and 1922
(Total Population 1923, 31,758,892)

City	Number of Deaths				Total death rate per 100,000 population	
	1923			1922		
	Under 15 Years	15 Years and over	Total	Total	1923	1922
Tacoma, Wash.	4	10	14	10	13.8	10.0
Tampa, Fla.	1	13	14	11	25.0	20.1
Toledo, Ohio	14	45	59	42	22.0	16.1
Topeka, Kan.	2	5	7	12	13.3	23.1
Trenton, N. J.	.....	.....	32	28	25.1	22.4
Waco, Texas	1	2	3	4	7.2	9.8
Washington, D. C.	27	60	87	63	19.9	14.4
Watertown, N. Y.	0	5	5	4	15.2	12.3
West Hoboken, N. J.	1	1	2	2	4.8	4.8
Wheeling, W. Va.	4	13	17	14	30.2	24.9
Wilmington, Del.	.....	.....	30	15	25.5	13.0
Winston-Salem, N. C.	2	12	14	9	24.9	16.7
Worcester, Mass.	7	5	12	26	6.3	13.8
Yonkers, N. Y.	.....	.....	5	13	4.7	12.3
Total	1334*	2824*	5599	4858	18.6	16.4

*Totals for only those cities that reported their fatalities by age groups.

ESTABLISHING A MOTOR VEHICLE BUREAU FOR THE STATE OF NEW YORK

Mark Graves, State Tax Commissioner, Albany, N. Y.

It was not until the governor of our state placed me on the tax cor mission last year that I had official connection with the automobi problem. One of the things that the governor said to me, shortly aft I was inducted into office, was that he wished to have a study made find out what was the trouble in New York concerning the motor vehic problem. The task was not a small one.

We discovered, before very long, that our state had been grossly neg gent in its handling of this very vital problem. We found that, for or reason or another, the state had neglected to do that which it ought have done in order to make our streets and highways safe for trave We ascertained what our sister states, Massachusetts, Connecticut ar New Jersey, had accomplished and we became convinced that our pla was at fault in three main respects.

First, we did not require that all drivers of motor vehicles be license Second, we did not endow any central state authority with power to su pend and revoke licenses when once granted. The only authority our state, prior to July 1 of this year, to revoke a license was th courts. We believe it is axiomatic that the power which confers grants licenses should have the authority to suspend or revoke the The third respect in which we found our plan at fault was that our la required no systematic plan of reporting accidents. We had no statistic we had no authority to require reports which would enable us to compi statistics.

We went before the legislature with those general thoughts in mind and the result was that we had enacted this year a new motor vehicle law. It cures the defects which I have mentioned and some minor ones. We don't claim that our law is perfect; we hope to polish it up during the forthcoming session of the legislature.

Requirements of New Law

Now, our new law does these three main things:

First, it requires that on and after October 1, 1924, no person may lawfully operate a machine in New York State unless he is a licensed driver, and in order to obtain a license, one must be at least 18 years of age.

Second, it endows the motor vehicle commissioner, who is a deputy in the state tax department, with authority to suspend and revoke licenses for cause.

Third, we have what we think is rather a comprehensive scheme for reporting accidents. If any of you men happen to be interested in that class of legislation, I think you might well copy our plans, not necessarily the words of our statute but the general context. This was the thought we had in mind; instead of writing into the statute, as is frequently done, the form of report or the items which must be reported, we wrote into our statute that there should be reported such information as the motor vehicle commissioner called for. He was given authority to devise a form of report and is required to distribute those forms of report throughout the state to police departments and city clerks in towns and village clerks.

This law of ours became effective on July 1. Naturally, we had a lot of work to do. I shall not trouble you about that. Our first concern was to find space; we had to have more office space. We had to buy equipment; we had to hire people; we had to train people; we had to get up blanks, and we were given three months in which to do this work and license an indefinite number of operators which we estimated to be one and one quarter million.

I had a telegram from the office this morning saying that at the close of business we had issued licenses, or had the applications in the office for licenses, for about a million people. That work is all mechanical. If you have been in public life, you know the difficulties one has in doing business because of the red tape side to the transaction of public affairs. Just the mechanical work of handling this is quite considerable, but I did not come here to tell you about that. That is our particular trouble.

During these three months, while we have been engaged primarily in this problem of getting the drivers under license, we have not neglected other phases of our activities. We have created an inspection staff—we call them inspectors because that is the title used in the statute. They are special police officers. We are setting up such a staff, consisting of 150 men. We have in our employ now, 100. We have been giving courses in training for a period of three weeks. We selected our men with care. Those of you who are engaged in public life know the diffi-

word on the subject. We intend to use it and when faults are developed, I am sure that this committee and our own statisticians will decide what changes are to be made.

Will Give Council's Model Tables Fair Test

We intend to follow this program of tables which you have seen depicted on the screen. We think that we will give them a fair test in New York because we have a tenth of all the people of the country, nearly that percentage of the automobiles of the nation, and I venture to say that more than a tenth of the fatal and non-fatal automobile accidents occur within the borders of the State of New York. We are going to give this plan a practical test and I hope that each of you gentlemen as represent states or as represent cities can and will see your way clear to fall in line, because statistics are valuable principally to the extent that you have something else to compare them with. If you think that you can get up for your state or your city some better tables or some better classifications, granting that you can, when you have prepared them you may have nothing to compare them with.

While we are attempting in New York State to discharge in a progressive way our duties with respect to the regulation and control of automobiles, we recognize that we cannot be successful in that unless we have the support of the manufacturing industry, first. I appreciate full well that the automobile industry, as such, has done much, through its research and engineering departments, to promote safety, but I doubt if they have done all they can or all they should. We hope through our statistical program to ascertain whether or not they have and to find out what mechanical defects in cars may be corrected.

We believe that the automobile trade, I mean the retailers of automobiles, has a high sense of responsibility, and if there are representatives of such organizations here, I wish to urge you to have it adopted as a part of the code of ethics of the trade that automobiles shall not be sold and turned over to people until they are competent to drive. You have a moral responsibility in that respect. It is dangerous and I believe the seller of an automobile is morally responsible if he turns over to an inexperienced, uneducated driver, without proper education and instructions, such an engine of destruction.

Lastly, we hope and expect to receive aid from civic organizations of this kind, as we have in the past. I am hopeful of seeing safety councils more common in the cities of the State of New York. I believe much good can come from their efforts and that the arm of the state will be greatly strengthened by way of them.

COLLECTION AND USE OF ACCIDENT REPORTS BY THE POLICE DEPARTMENT

Col. James Sinke, Director of Public Safety, Grand Rapids, Mich.

The National Safety Council, and the Grand Rapids Safety Council manager, R. C. Haven, have amply demonstrated to me the inestimable

value of your organization to our city and to every community where its influences may expand.

I have been directed by the Mayor of our city to express to you appreciation of the value of your work and the best wishes of Gr Rapids for your success in promoting and coordinating public saf education, regulation and legislation throughout the land.

With us, the educational and law enforcing agencies of the coun lies the responsibility for the continuation of the present orgy of needl senseless, unjustifiable, heartrending slaughter of thousands of innoc children and adults each year. The solution requires the united ef of all the law enforcement and educational agencies of our comm backed up by aggressive action by good men and women that most heedless shall realize that the demands of humanity must be obe

The collection of facts regarding automobile accidents and the c pilation of records to determine their causes is a necessary prelimin to the correction of the present defects, both the physical condit and the mental attitude of the public. Unless the public mind is current with the thought of those in control of the corrective agen the most sincere efforts must fail.

We can learn many valuable lessons from other life conserving agen who have used statistics for years to sell their plans to the public. medical profession is an outstanding example. It has struggled cessantly to bring the public to a realization of the needs for sanitat sterilization, isolation, vaccination and innoculation to prevent the spr of disease and has used statistics to prove the value of its recomme tions. The result is apparent in every community. The expectanc life has been lengthened to such an extent that their recommendat have become standard practice throughout the country.

Now comes the automobile to destroy many lives that have been t conserved and it is our job through education to eliminate the dan created by its use.

Get the facts, present them to the public in the proper manner and public will support the necessary action to eliminate the causes.

In Grand Rapids we are improving our statistical records and are u them for educational purposes, and as a basis for the adoption of be policies and regulations. Work on our present system began during summer of 1923, using the available police records as a basis. We using the National Safety Council report forms. The system has b improved as experience has shown the advisibility of elaboration certain details and as more complete data has become available thr the accumulation of facts.

Sources of Information

Police officers are taught in the police training school the need reports on all accidents witnessed by them and are furnished with b forms for making their reports. Firemen and other city employees also furnished these forms.

The street railway company is co-operating with us and is furnishing us with reports of all collisions between automobiles and street cars, on these same forms.

The traffic squad and commercial drivers club of the local Safety Council is also a source of much information and their reports are made on these forms.

Publicity through the newspapers has acquainted the public with the fact that accident records are being kept and investigations being made. This has resulted in many citizens reporting accidents to the police.

We have detailed two police officers as accident investigators who investigate all serious and semi-serious accidents and all accidents where complaint is made by one of the principals. The preliminary report of the accident is verified and necessary additional facts obtained to make the final report complete. Where the final report shows gross negligence on the part of a driver, the investigator obtains a warrant and takes the case before the court.

Compilation of Information

To a clerk is assigned the duty of compiling the accident records. Daily reports of all accidents are forwarded to the clerk who starts the final report form, makes a daily classification of accidents as to their nature, location, name, address, sex, age and degree of injury to pedestrian, driver or other occupants of cars, completed in further detail as information is furnished by police investigators. Final report forms are closed when investigation is completed.

A pin map showing location of accidents and whether a death, injury or a simple collision resulted, is posted daily from these reports.

A monthly consolidation of all accidents is made, showing number killed, injured, and simple collisions, with ages of pedestrians and drivers.

A chart in graph is brought up to date each month showing number of fatalities and injuries, arrests made for running violations, total rain or snow precipitation, average weather, indicating street conditions and visibility and number of automobile registrations.

From the final report forms are tabulated the various causes for accident, average age of drivers, hours of the day when most accidents occur, whether certain drivers are frequent violators and such other information as tends to assist in showing why, when and where accidents occur.

The pin map above referred to shows at a glance that our accident frequency is greatest in the congested districts. A survey by police and firemen has just been completed to determine the number of cars going into and out of the business district during the evening rush hours. One purpose of this survey is to determine the relation of accident frequency to congestion of auto traffic, pedestrians and street cars as a means of applying a remedy. Another purpose is to determine regulation and development of additional arteries, and other features not directly related to accident statistics.

What Accident Reports Reveal

In addition to the information shown by use of the pin map and th graphic chart, there is a great amount of other information easil obtainable from the final report forms. We get reports of all casualtie except possibly some minor injuries. We get from the street railwa company, all collisions involving street cars, but it is safe to assum that we do not get more than 50 per cent of the minor collisions betwee automobiles. To illustrate I will quote some figures that are authenti facts showing existing conditions on our Grand Rapids streets coverin the period from January 1 to August 31, 1924.

The following figures are in total for the above mentioned period. Th figures are kept in detail on our office records:

	Pedestrian	Bicycle	Motorcycle	Automobile	St. Car	Wagon	Railroad	Stationary Object	Total
Collisions.....	21	14	6	445	626	6	2	13	1133
Injuries.....	104	17	9	34	10	1	11	9	195
Fatalities.....	8	0	0	1	0	0	0	0	0
Total.....	133	31	15	480	636	7	13	22	1337
Percent of Total.....	.10	.02	.01	.36	.48	.½	.01	.01½	100%

Of this total out of town cars numbered 237 or 17¾ per cent.

While but 10 per cent of the total collisions involve pedestrians, le us analyze the consequences. Of the total injuries the pedestrian cor tributes 53⅓ per cent and of the fatalities he contributes 88.8 per cen Investigations into these collisions between automobiles and pedestrian shows that in the great majority of instances the pedestrian is eithe entirely to blame or that contributory negligence on his part makes i unfair to place the blame upon the motorist.

If there has been any doubt in your mind of the value of accurat records consider the psychological value of presenting these facts as have illustrated in the case of the pedestrian, in educational campaign in schools, newspapers, etc., and in securing better legislative regulatio

Taking 500 accident reports as a basis, the following facts ar illuminating:

Of all persons killed or injured, considering the ages by five yea periods, the greatest number occur between the ages of 20 to 25 year Considering only the pedestrians in a like case the greatest number occu between the ages of 5 to 10 years.

Tabulations of ages of drivers involved in accidents, dividing the age into five year periods, show that most accidents occur to drivers betwee

In considering the hours of the day when most accidents occur, it is found as might be expected, that the highest accident frequency occurs during the heavy traffic period between the hours of 5 and 6 P. M. The next higher peak occurs between 7 and 8 in the evening. In the morning, it is found that most accidents occur at 11:30 and 1:00 o'clock noon. There is another period around 9:00 A. M. and from 2:30 to 3:30 P. M. when accidents are quite numerous.

Next let us consider where these accidents occur. Out of 490 accidents, 342, or 70 per cent, occurred at street intersections; 302 or 62 per cent occurred in business districts where congestion is greatest.

Causes of Accidents

In seeking for the causes of these accidents let us give the motorist every benefit of the doubt and see if the causes were to some extent at least, beyond his control. Was it wet pavements? Seventy-two per cent of the accidents occurred on dry pavements. Eighty per cent occurred while visibility was good. Therefore, weather condition was not the major cause. Poor physical condition was the cause of 25 per cent of these accidents and this includes skidding, poor brakes, defect in vehicle, defect in roadway, poor street lighting and abnormal traffic congestion; of these, defective roadways influenced but 7.6 per cent of the accidents.

Of our total of 500 accidents, 351 were the fault of the motorist was the major factor, 243 or 57 per cent were caused by improper turning, inattention and unjustifiable carelessness. Speeding, confusion, intoxication, ignorance of ordinances, physical incompetency and a few other miscellaneous causes make up the balance.

Where fault of the pedestrian was the major factor, as seemed to be the case in 79 out of 125 instances or 63 per cent of this class we find that 45 or 57 per cent were caused by jaywalking and darting out from behind other vehicles.

Figures are dry reading and when listened to are soon forgotten. I will not burden you with further details. The story they tell is extremely interesting and educational to the student of accident causes and furnishes the powder that shoots the shell that explodes the lethargy of an indifferent public.

To me the need for accident records seems so obvious that no city should delay in obtaining complete and detailed information on this most important subject. I believe the police department is the proper agency for the collection and tabulation of this information. If there is a city in which a community safety council is located, where these records are not kept, and suitable personnel detailed for this purpose to insure complete information, that community council can perfom a great service by winning the respect and confidence of the officials of that city to a degree where they can succeed in having such a system put into effect.

We use our accident records constantly to justify the need for the regulatory measures we are adopting and expanding. I can hold up the record for the past year and three fourths showing the constant reduction

of auto accident fatalities on our city streets and fearlessly announc to any group of citizens that our methods are getting results; that w are reducing the death rate in defiance of the automobile increase an feel convinced that I can justify our actions in the adoption of regulator measures for the conservation of life, which cause stands preeminen among all the most worthy activities for the good of humanity.

I do not claim much of originality in the methods we are using, neithe do I claim that we are superior to many cities that I know do compil excellent statistical records. I am pleased however, with our achiev ments thus far and have ambitions to accomplish still better and mor complete records as time and the collection of material will permit.

Co-operation

For whatever success we have thus far attained in the collection c ideas that make our statistical records possible I owe much to the man cities which have answered my inquiries on this subject, the magazine that publish articles explaining methods and illlustrate charts and table to the willing assistance of the National Safety Council and, last but nc least, to Major Haven, manager of the Grand Rapids Safety Counci who stands ever ready to give his time and counsel to assist in makin our public safety activities a success.

Another factor above all these, without which success would not b possible, is the spirit of confidence and encouragement of our city man ger and the elected city commissioners who are in sympathy with an encourage the safety department's activities in the reduction of the stre accident rate.

Referring to the co-operative spirit that prevails in our city would nc be complete without mentioning the newspapers which are alway willing to give us a square deal and which frequently publish favorabl comment on what we are doing. There are also several organizatior that I might mention, that help put our ideas across to the public.

The collection and presentation of facts is the necessary ground wor for enlisting the support of the agencies that make possible safety educ tion and regulation in our cities, states and nation. First get the fact then apply intelligent analysis to determine the proper correctiv measures. Present these facts with a solution to the proper officia and to the public and you will be applying the fundamentals that wi break down the resistance of antagonism and indifference.

More power to the National Safety Council if it can sell the ide broadcast of careful collection and complete analysis of accident record

ACCIDENT FACTS AS A BASIS FOR PREVENTIVE MEASURES

R. C. Haven, Manager, Grand Rapids Safety Council.

Before going into the details of some of the important things resulti from our investigations, I wish first of all, to emphasize that the inves gation of our automobile accidents by the police has enabled us to bri

to justice many ordinance violators who otherwise might go unpunished. Secondly, an opportunity is had to impress upon the less flagrant offenders, the seriousness of the accident and his or her obligation. Thirdly, such investigations establish a basis upon which civic action may be taken by the innocent party involved. These three factors are, in our opinion, of vast importance. Incidentally, if we were trying to justify the cost of an investigation bureau of this kind the foregoing reasons, we believe, would suffice.

Colonel Sinke stated that every automobile accident of a serious or semi-serious nature is investigated and in order that you may get our actual figures, I will quote from the report of Investigating Officer Walter Potter, of accidents investigated from January 19 to August 27, 1924:

Total accidents Jan. 1 to Aug. 27, 1924	1268
Total completed investigations	451
Investigations pending action	85
Arrests following investigations, Juvenile Court	6
Fined in Police Court	25
Fined in Traffic Bureau	15
Dismissed	6
Pending in Police Court	6
Total	58

Please bear in mind that until just recently we have had but one investigating officer, who for obvious reasons has brought into court for action, only the most serious cases, and those in which were established a positive basis for prosecution. The lost cases you will note have been few, and the convictions are having a wholesome effect on our accident frequency.

These investigations. however, have resulted in many other things of a more tangible nature being done. Among the most important of these is the use of white paint in large quantities. Our records show that most of our automobile collisions occur at street intersections. Therefore, in concentrating on these points, we adopted the simple but effective method of marking the intersections in a manner which establishes definite traffic lanes. This marking consists of a hollow, diamond-shaped figure of white lines, 4 inches wide. The points of the diamond are located at the intersection of the curb line and street center line. A line of the same width is painted for a distance of about 25 feet down the center of the street approaching the intersection. When negotiating an intersection, the motorist is supposed to and usually does, keep to the right of these lines which have a tendency to eliminate cutting the corners, the cause of so many collisions.

Another thing the analysis of traffic accidents revealed was the necessity of establishing "through traffic" on major thoroughfares. These provide arteries for rapid and safe travel from the business section to outlying points;—also protect routes of travel from one extremity

of the city to another, avoiding the congested district as much as possible. At the approach to these through-traffic streets and from 20 to 40 feet distant from the property line is placed a sign marked, "Stop, Through Traffic Street." This sign is mounted on a three-inch gas pipe standard and is eight feet from the ground. Here again, paint is used. The standard is painted with black and white sections 10 inches high. The resultant barber pole effect is, of course, to attract the eye of the motorist and greatly assist those unfamiliar with the location of our through traffic streets. Directly opposite these sign posts, at right angles to the curb and running across the street, are also painted three white lines, six inches in width and about 24 inches apart. These are intended as an additional guide or reminder to motorists. Our through traffic streets of which we now have 14, have greatly facilitated the moving of traffic. They have also had a good effect on holding down the speeders on cross streets.

"Stop" Corners

As another direct result of our accident experience, we have in addition to our through traffic streets designated certain street intersections as "stop" corners. At the approach to these points the "stop" sign and three white lines also are placed.

Many of our streets at the approaches to dangerous points bear the usual markings, "Slow," "School," "Railroad Crossing," etc. It is readily seen, therefore, that we keep our painting crew busy. Paint is comparatively inexpensive and we find that it gets results.

It goes without saying, of course, that the silent commands of these signs, white lines and words of caution, become much more effective when backed up by our active and efficient law-enforcing body. In addition to the 15 regular uniformed motorcycle men who patrol our streets 24 hours a day, the members of the special traffic squad of the Grand Rapids Safety Council, 34 in number, are constantly educating the driving public through personal contact. It is interesting to note that during the eight months of this year, the motorcycle police made 3,666 arrests including speeders, intoxicated drivers and other flagrant violators. Our special traffic squad handled 4,665 cases last year with only 50 arrests.

Again the collection and analysis of accident reports has proven the need of additional motorcycle police. It has caused these men to be given special assignments and has resulted in the placing of all patrolmen on traffic duty at busy intersections during rush hours as well as the placing of firemen in charge of traffic at corners not too distant from the engine house—all of which has resulted in speeding up traffic with a decrease of accident frequency at these points.

The brake-testing campaign now being carried on in our city is also the direct result of knowledge gained through accident investigation. A number of squads made up of two officers using motorcycle with side car are patrolling our streets and stopping motorists at random. An automobile traveling at 20 miles per hour must be capable of stopping

within a distance of 37 feet. A sticker is placed upon the windshield of all cars having good brakes. When brakes are found defective the driver is ordered to have them fixed and report later to our traffic department.

The effect upon the public of the advance notice in the newspapers of this campaign is both interesting and gratifying. When the campaign was inaugurated last year many people protested to the director of public safety. This year, there is practically no criticism offered and the drivers of a large number of cars stopped, have smilingly told the officer that his call had been anticipated and that he would find their brakes in good condition. The long-looked for day when the public shall have been aroused to the point when they will demand of the safety departments and safety councils that accidents be stopped has not yet arrived, but it is easy to sense the feeling of the public that that time is not far distant.

Because of the facts revealed in the analysis of accidents we very often find it necesary and do not hesitate to amend our traffic ordinances to suit changed conditions.

The positive knowledge of accidents to children gained through accident investigation, warranted Colonel Sinke to detail a uniformed police officer for duty in our schools. When we made the request a year ago for an officer, he satisfied himself primarily by consulting his records that our request was justified. Incidentally, out of our population of about 154,000 people we have an enrollment of 36,000 people and a total of 84 schools and colleges. These institutions comprise 5 public high schools, 39 grade schools, one vocational school, one school for delinquent boys, 17 Catholic, nine Christian Reformed, one Christian Reformed high school, two Lutheran, one Jewish, one Seventh Day Adventist and four private schools. There are two business colleges and one theological seminary.

The analysis of fatal accidents to school children has been used as a basis for staging each accident for reproduction purposes. Photographs and stereopticon slides are being made and will be shown in the schools by Officer Stopples. This is just another way of more forceably bringing home to the children the need of vigilance on their part. To those acquainted with accident prevention work among school children and the safety activities carried on by them, the value of a uniformed officer detailed to the schools is obvious.

In the foregoing I have attempted primarily to show you that accident facts are actually being used for providing corrective measures by our safety department. These same facts plus the corrective measures taken furnish most excellent publicity material for the safety council manager. We all know that the best way to reach the greatest number of people in the shortest space of time is through the daily papers, and that in most cases the papers consider up-to-date and authentic accident figures of sufficient news value to give them space. This holds true with the smaller community papers and in our case with several monthly magazines in addition. Doubtful figures are never attractive to an audience but actual local facts are always interesting so that here again

the manager is armed with the proper ammunition when addressing the many and varied groups of people who call upon him from time to time. I will not attempt further to go into the details of publicity or the spreading of safety propaganda by council managers as this is a big subject in itself.

Estreated Bail

This paper would be incomplete if I did not briefly mention the plan of estreated bail inaugurated in our city by Colonel Sinke. While our council was not instrumental in having the plan adopted, any safety council or organization carrying on the work may well afford to sponsor the plan in their city with the assurance that it will help to promote friendly relations between the council and its usually over-worked police judge. And, therein, lies the justification for injecting the matter into this paper.

We found that the sending of ordinary speed cases, violators of through-traffic regulations and many other similar traffic offenses to police court was not only cluttering the court with a lot of extra work but was also frequently requiring one-half day of the motorist's time that might be saved if a more rapid method of handling these violations could be found. Consequently, the men in our traffic bureau have been designated deputy city treasurers for the purpose of this work and accepting bail from these violators. The fines are $10.00 for speed cases or passing a standing street car and $3.00 for minor offenses. Flagrant cases of speeding or reckless driving or failing to stop in case of an accident are still sent to police court.

The receipt for money received from fines, is made in triplicate;—one copy is given to the offender, one copy is sent to the city treasurer and one is kept on file in the traffic bureau. This receipt explains to the offender that in case he does not wish trial in police court, his failure to appear at the time specified will cause the forfeiture of bail. The plan is extremely simple and has not required any special city legislation. It has to a degree, solved the uniform fine question and is proving highly satisfactody to our police court officials and to the motorists themselves, who are saved the mortification of appearing with drunks and other criminals before the police court judge, and that of having a criminal record made of their case. It is unnecessary for the arresting officer to appear at a witness except in court cases. Colonel Sinke believes that it is working satisfactorily from the standpoint of traffic control because the fine is sufficient that no one wishes to pay it if they can avoid doing so, and knowing as they do that flagrant cases will be referred to the court. It has been our experience that cases referred to the court were heavily fined by the judge.

We might state that in the estreatment process, these cases are referred to the judge in the morning who calls out the names of those persons whose bail has been accepted the day before and if they are not present in court the bail is declared estreated and the money becomes the revenue of the city.

The authority for our action in accepting bail in our police traffic bureau will be found in Act 332, Michigan Public Acts of 1919, which provided that among others, our city treasurers are permitted to accept bail moneys. Of course, if your state does not provide such authority your first step would be to have such a law enacted. In those states where such a law prevails the judges or attorneys are familiar with it and it would only require their co-operation and that of the city treasurer and the police department to make the plan effective.

We, as a safety council, believe with Colonel Sinke that the job of collecting accident information should be handled by the police department and not by the safety council. There are a number of basic reasons for this. In Grand Rapids the safety council, like other councils we know of, has made no provision in its budget to take care of an item of this kind. Even with funds to proceed with the public would probably be reluctant to recognize a council as the official source of information. In the third place, most every police department is required to keep a record of accidents, in which case there would be a needless duplication of work. On the other hand police departments usually have or can find the necessary funds to carry on this work and the information given out by the department is always considered official. Another reason is that an officer of the law is armed with sufficient authority to elicit information from the public which, in many cases, would not be obtained by a staff member of the safety council. As Colonel Sinke has previously stated we feel that in this connection the council can perform a greater service by seeing to it that a department of this kind is established in the police department.

Importance of Traffic Problem to Police

Just one more word with regard to the relations between the local councils and their police department which is so vital to the success of the work. In a few cities these two departments have not reached that common ground upon which both may meet and work for the safety of the community. In other words there are, I believe, some council managers who still think they can get along without the aid of the police department. It would seem, however, that since law enforcement and educational methods must go hand in hand, no safety council can succeed if opposed or even working out of harmony with the police department. On the other hand, there are those police chiefs who fail to recognize that their biggest problem today is traffic. Let those who doubt this fact refer to their copy of the proceedings of the Congress of the International Association of Police Chiefs recently held in Montreal. Their newly-elected president, Superintendent of Police A. A. Carroll of Grand Rapids recently made the statement in my hearing that among the other important matters considered at Montreal, the burning question which confronted the police chiefs all over the country was traffic. Yet some police officials cannot or will not concede this fact. They fail to realize also that strict traffic regulation is absolutely necessary if we are to successfully cope with the accident situation; that the success of their

undertaking in this regard depends largely upon the attitude of the public; and lastly that the safety council, by the very nature of its organization with its unusually splendid points of contact with clubs, other organizations and the newspapers, can do more than any other organization to convince the public that they should heartily support their police department in its traffic law enforcement program. It is a mistaken idea on the part of both parties that they can succeed in putting the accident prevention work across in their community without the cooperation of the other.

The director of public safety, having charge of our police, fire and other departments, and our safety council are working as a unit. There are few important meetings of our council that he does not attend. He is one of the guiding hands in our work. On the other hand he very frequently lays before our special traffic squad or executive committee such problems as seem to require their reaction. The work of his department in preventing accidents as we both view it is 99 per cent law enforcement and one per cent educational. The work of the Grand Rapids Safety Council is 99 per cent educational and one per cent law enforcement. It is upon this basis that the work is being so harmoniously carried on in Grand Rapids.

RECORDS AND SPOT MAPS IN LOUISVILLE

Col. Forrest Braden, Chief of Police, Louisville, Ky.

In establishing our record bureau, simplicity was deemed a primary requirement. The report blank on which accidents are reported by members of the police force was devised with this point in view; it has been followed throughout.

All reports received at headquarters are prepared for indexing and filing according to a code number. The series of code numbers is, of course, arbitrary, and once set it may not be changed, although it may be extended without any confusion.

Our code is arranged to fit the proper legal classification of all law violations. Group 1 covers all "offenses against the person"; group 2, "offenses against the habitation or property"; group 3, "offenses against public health and safety"; group 4, "offenses against public peace," and so on to group 10, "accidents."

Eeach group is divided so as to provide a distinctive file number for each kind of offense and still identify it as to its proper legal classification. For example, group 5, "offenses against public justice and authority" is divided so that 5-1 is "impersonating an officer," 5-2 "harboring or aiding a felon," 5-3, "false swearing," 5-4 "perjury," etc.

Group 10 covers accidents of all kinds, the first eight divisions accommodating all automobile accidents: 10-1, Auto and Auto; 10-2, Auto and Bicycle; 10-3, Auto and Motorcycle; 10-4, Auto and Wagon; 10-5, Auto and Street Car; 10-6, Auto and Train; 10-7, Auto and Pedestrian; 10-8, Auto and Miscellaneous.

A report received is first given its code number; then its serial number by numbering machine. Serial numbers start with 1 at the beginning of the fiscal year and run throughout the year, reports being numbered consecutively, regardless of subject. (This number is used for filing purposes only.)

Next the report is posted in the master index, a 5x8 card being used for this purpose on which provision is made to index 15 reports. They naturally are posted in date order, as they are received daily. As the same kind of card is used to index all classes of reports, hold-ups, burglaries, assaults, etc., the words "victim and offender," do not always, particularly with reference to accidents, retain their strict meaning. When a card is filled (both sides) another is started. During a month 65 accidents of the 10-7 class would fill four cards and a fifth partially. These, for convenience, are numbered 1, 2, 3 and so on, in each class throughout the year.

Reports, other than auto accidents, here go to the file; no further cross indexing has been found necessary. Each auto accident is further recorded as follows; a 3x5, plain white card is prepared for each person known to have figured in, or to have witnessed the accident. The least possible data is noted on this card, name, address, kind of accident (auto-auto, auto-wagon, etc.) and file number. A similar card is prepared showing the location of accident, kind of accident and file number. The name cards are, of course, filed alphabetically, the location cards by location; throughout the fiscal year.

Efficiency of System

By this system, any report wanted, regardless of age, can be drawn from the file in 30 to 35 seconds, by putting the clerk in possession of one fact—either the name of a person involved, the location of, or the approximate date and kind of accident. Two or more of these points makes the search an almost instantaneous matter. And what is just as important, if a report is not on file, the clerk is able to say definitely and at once, "The accident did not come to the attention of any member of the police department," rather than, after a delay, "I can't find such a report."

The matter of intelligent accident prevention through a study of reliable statistics comes next.

Our master card tells us in a matter of seconds the number of accidents of a given class that have occurred during the month, year or other period; the number of completed cards multiplied by 15, plus the number of reports enterede on the last card. The number of injuries and fatalities is also obtainable in a matter of minutes, the number of persons killed being marked in red ink in the date column, just above the date. An injury which results in death, after a lapse of time, is caught by a monthly check of the coroner's records, and card notations are corrected.

We also use a work sheet prepared to automatically analyze traffic accidents of the various kinds, according to street intersection and hour. It is merely a large sheet ruled with 25 columns and 75 cross lines. First

column is headed "location," the second "12 midnight," the next "1 A. M.," and so on through "11 P. M." Each accident report, prior to filing, i posted in the column, by serial, headed by the hour at which the acciden occurred and on line showing the intersection or approximate intersection of street. This, of course, gives the peak hours and the dangerous inter sections. It then becomes the traffic chief's job to learn "why?"

Another item we are now covering; listing cars which figure in fata accidents according to license plates; this county; other counties foreign.

Use of Spot Maps

Supplementing these records, we have used spot maps, but the use o these spot maps has been more for the purpose of visualizing condition than as a matter of records. Although these maps have helped us t see the situation, they have not been as complete, nor as thoroug as we desire. At the present time, we are planning a much large and more complete map for the purpose of visualizing conditions i greater detail. So much for our record keeping. Here is what our record have shown;

AUTO FATALITIES 1923 AND 1924

1st 9 Mos.	Total Fatal	Under 6 Yrs.	6 to 15 Yrs.	Over 15 Yrs.	At Inter.	Bet. Inter.	Auto vs. Auto	Auto vs. Ped.	Mis
1923.....	39	19		20	29	10	2	33	4
1924.....	31	6	6	19	14	17	2	24	5

At intersections we had 12 fatal automobile pedestrian accidents an between intersections 12. That is fifty-fifty the way the thing stand: Auto versus auto, we have had two, one at seven o'clock in the mornin and one at five o'clock in the evening.

We have gotten nothing out of time. We are studying this tim business very carefully and it has disclosed nothing to us. We ar going to keep on checking. Up to this time last year we had on accident to every 1,000 automobiles and up to this time this year w have had one fatal accident to every 1,540 of them. We are progressin some but we are a long way from the record that your friends in Gran Rapids have made. We hope to continue to show an improvement.

Educational work in the school means the saving of the lives of scho children. These figures also show us that this year one half of th children killed were under school age, which means, if it means an thing, that there is as much work to be done in the home as there is i the school. One very satisfactory thing disclosed by the time recor is that no school children have been killed this year between th hours of 11 A. M. and 3 P. M., the hours when children are being di missed from school and necessarily are on the streets on their wa home. We use every available policeman to guard the dangerous cros ings during these hours.

An Example of Louisville's Report System

Just a word as to our method of handling traffic violations. Offic Charles Smith finds a car parked within 20 feet of a fire hydrant, whic

is a law violation. He hangs a card on the steering wheel of the car, tears off the stub end of the card which he fills out and turns in to the traffic bureau. Just to jim the works a little, we will assume that John Doe fails to bring in his tag and plead "guilty." As a result, through checking of the daily tickler system, a warrant is taken out for John, sent to the police district in which he lives, and he is summoned to appear in Ordinance Court. In this court, he is fined $5.00.

At this time, two records have been made of the case. One, the original tag signed by the officer, who reported the car by the license number. This card is filled in with all information, including the disposition of the case, the violation, and filed by license number. The tag card is 3x5. Then the same information is filed by name alphabetically. At the time of the disposition of the case, it being John's first offense, a master card is made out in John's name. This card is 5x8. More than one year later an officer found an automobile parked within 25 feet of the center of the entrance of a public building. He placed the same kind of a tag on the steering wheel tore off the bottom and made report on license No. 188420 for the year of 1924. In checking up the license number, it was discovered that this car belongs to the same John Doe. John, having failed to answer once before, and having learned the result, which means being brought into Ordinance Court, on this occasion promptly brings this tag to the traffic bureau and pays the fine of $5.00. This money is received by the police department, and the officer in charge of the traffic office at the time, makes out a receipt in duplicate. The original of the receipt is given to John Doe and the carbon duplicate is retained in the traffic office. At the same time, John Doe signs a power of attorney giving the prosecuting attorney authority to enter his appearance in Ordinance Court and plead guilty to the violation of which he is accused. The stub of the tag is filed by the license number, and disposition of the case is filed alphabetically under John's name, containing all information, and entered immediately on John's master card.

At this time, the 1924 license number is noted on the master card. This happens in August, 1924, and in September, 1924, an officer stops the same car for not observing a boulevard stop. He fills out and gives the owner of the car, John Williams, a card and turns another card in to the traffic bureau. John Williams brings his tag in, goes through the procedure of paying his fine, is given his receipt, signs power of attorney, and the transaction is recorded under the name of John Williams, alphabetically, and the stub card is filed under the license number, which starts John Williams' record on a master card. This transaction in our records discloses, through a check of the license number file, that John Williams bought the car of John Doe on August 28, 1924, in the State of Kentucky, the license number being transferred with the car. A notation of this transaction is made on John Doe's card, showing that he has disposed of the car to John Williams, and the same notation is made regarding the purchase of the car from John Doe on the card of John Williams.

There is one other type card used by this department, in connection with traffic violations, a light testing station card. There is no penalty attached, but when the fault has been corrected, a disposition card is filed alphabetically as well as the stub card filed by license number and the whole transaction is noted on John Williams' master card. You will see that in time we will compile a complete history of the violations committed by the driver of the car, giving full information as to time, place, nature of violation, and disposition of the case.

Saving of Time

We find that this method brings 95 per cent of the violators into the traffic office where the case is settled and very little time lost by the officers in court. The money collected as fines, the power of attorney, and the arrest slip in each case is delivered to the clerk of the Police Court on each Ordinance Court day. We handle many more cases by this method and save thousands of hours of officers' time in court. There you have our record system and our method of prosecuting cases against traffic violators.

In the cases of speeders and drunken drivers, they are, of course, arrested on the spot, and are shown no consideration in the matter of convenience to them or convenience to police officers, although such offense is added to a master card.

Many speakers, well qualified, have covered from all angles, this fight for greater public safety, but I want to add a thought from the viewpoint of a police official.

The police occupy a position in the limelight in the fight for law enforcement. Their mistakes and weaknesses occupy the front pages of the daily press. Their successes and virtues receive scant praise. The number of their critics is comparable to an accurate census. This is as it must be, as their duties bring them in closer personal touch with the public than does the work of the other agents charged with the administration of law. A general impression exists in the public mind that the enforcement of law rests entirely with the police. As a result of this impression, the police are often held responsible for conditions over which they have but partial control. Their business is to preserve the public peace and apprehend offenders. After the apprehension of the offenders, the machinery passes into the hands of the prosecutors, the judges, the juries, the prison authorities, and the chief executive of the state. The police are but one of the many agencies through which the administration of law operates and the effectiveness of the police cannot be judged apart from the other agencies. If the prosecutor does not prosecute vigorously, intelligently and honestly, if legal procedure makes for delay and uncertainty, if the court is indifferent, or open to unworthy influence in its decisions, the end for which the police are striving is, in a great many instances, unattainable.

Your association knows the powerlessness so often exhibited by the

of certain and immediate punishment, the growing harm of the sentimental, maudlin method of presenting jury cases, the dangerous growth of the practice of delay through technicalities that are so unimportant that they appear ridiculous, and the apparent tendency of the bench to give so much more weight to that part of the Constitution which protects the rights of the individual criminal as against the part supposed to protect the rights of the law-abiding, decent citizen.

Selfishness at Root of Traffic Problem

We all know that lack of consideration for the rights of others, that lack of respect for law—pure selfishness, is behind most of the troubles experienced in salving traffic needs and traffic regulations. Selfishness of the individual automobile owner in regard to the right of way and parking privileges, the selfishness of the merchant, afraid of changes in laws; the selfishness of the office holder, afraid of loss of votes; the selfishness of the pedestrain, the street car patron, who does not want to walk farther than the nearest corner, all add to the difficulties of our problem. You people are on the right track. You are gathering facts. You will find most of your opposition is based on opinions only. Marshal your facts and watch these opinions change when faced with facts.

It is a sad commentary on our system of government that private organizations and individuals have to lead in these things you people are doing, all of which could be done to a great extent by public officials. It simply means that our national, state and municipal governments fail to function in a great many matters.

Use your police force. But first, study your police force and its problems. Learn that your work is a specialization of only a small part of police work. There are a thousand things police have to do beside the things in which you are interested.

Learn what you have a right to ask of your police. Approach your police chief with the assumption that he is just as much interested in the general good of the community as you. Show him you are interested with him in working for the safety of the community as a whole.

Don't approach him in the manner of knowing more about his business than he. Don't create the impression that you think everything you are doing is more important than anything he has to do. Don't be careless with facts. Don't make rash statements or draw half-baked conclusions. Know your stuff. Then sell it.

You need the police and the police need you. Your police may not know this, but you know it. If the head of your police force realizes your value, then all you need is co-operation. If the head of your police force is dumb, educate him. If he has not the ability and facilities with which to work, aid him, and apply your own knowledge and experience to his problems. If he has a one track mind, travelling a narrow guage political road, with his eye on nothing but the next election, try to widen his

perspective. If you can't broaden him out, try to organize enough weight to flatten him out.

A police force, with its intimate knowledge of every condition in every part of the city can be invaluable to you. Find a way to use your police.

DISCUSSION

MR. STEWART (St. Louis): How many men do you have in your department and how many are devoted to traffic work?

COLONEL BRADEN: We have 350 men right now and that is from top to bottom. We have 30 men in the school. The law allows us 429 but we have never been able to get up to that number yet. We are using 100 more men in other work besides patrolling. We only have seven motor vehicle men and 72 men in entire traffic squad. I would like to have 40 motor vehicle men if I could find them.

JUDGE LEVI HALL (Traffic Court, Minneapolis, Minn.): I would like to inquire whether any state or municipality compels the report of accidents by private operators regardless of their nature. The reason I ask this question is that so frequently the police officers or the local authorities hear nothing of perhaps 50 percent of our accidents involving property damage, and I was wondering if any municipality or state compelled a private operator to report an accident under penalty of a fine or imprisonment.

MR. E. B. LEFFERTS (Automobile Club of Southern California, Los Angeles): We have a state law that compels the operator to report within 24 hours to the nearest sheriff or police official in the county, an accident in which a person has been injured regardless of the seriousness of that injury. That is state wide, supplemented in our case in Los Angeles by the city ordinance.

MR. L. E. MACBRAYNE (Boston, Mass.): I may say that Massachusetts also has a law requiring that all personal injury cases be reported.

We have found for three or four years that April is the peak month in the spring and that coincides with the volume of driving. Our second peak month was very clearly defined, December being more dangerous than October due to the open winter, and the spring period flattened out more. May was as dangerous as April but there is a peak whenever we get a great many cars out driven more for pleasure than just business.

Accidents occur not on cloudy days but on clear days, not on bad roads but on good roads under apparently perfect conditions. The factor is speed, inexperience, inattention and drunken driving. We base our whole effort on accurate knowledge of the trend of accidents throughout the commonwealth.

CHAIRMAN DUBLIN: There are perhaps half a dozen cities in the country which keep records on the approved plan. No doubt, there are more but the local safety councils that are now operating, of which there are

some 40 with paid managers, are now launching this campaign so that uniformity will prevail and we hope that, through their agency, the local police departments will be stimulated to use it.

MR. PAUL F. STRICKER (Baltimore, Md.): I would like to ask if the figures for the automobile fatalities for the various cities are taken from the health department reports including the fatalities for the city and vicinity, or whether they are taken for the city iself, or whether the line is not definitely marked.

CHAIRMAN DUBLIN: We were compelled to write to the one official who we know had the information, the registrar of statistics of the city. His duty is to call every death that occurs in a city a death chargeable to that city. Now, we realize perfectly well that a good many of the accidents occur outside of the city limits and that those people were brought into the local hospitals and died there. Subject to that correction, the figures are correct. They represent all deaths that occur in the city.

MR. ROUNDS (Detroit, Mich.): The police department in Detroit requires a report of every accident, every fatal accident occurring within the city. A lieutenant connected with the accident investigation bureau of the police department attends every corner's inquest. Every fatal accident occurring outside of the city is tabulated by the sheriff and the police department checks back with the city board of health. Therefore, when the record is completed it has absolutely every fatal or serious injury accident occurring in the city or in the county.

MR. J. H. DYE (Pittsburgh, Pa.): In regard to the state law for licensing drivers, on the first day of March of this year it was compulsory, in my state, for every driver of an automobile to take out a license. Those who were licensed drivers in 1923 received their license cards by sending to the state highway department a fee of $1. Those who were not licensed drivers in 1923 were compelled to send a fee of $2.50.

That would give them what was called a learner's certificate. They had 30 days in which to learn to drive an automobile. When they thought they were competent to drive, they notified the state highway department. We have stations in all our important cities. We have one in Pittsburgh, were the people of Allegheny County take their tests for driving.

That test is made by a lieutenant of the police department of the state highway department. He will not issue a permanent permit or license to any driver unless he is fully capable of taking care of his car. He examines them in all the rules and laws of the road, the rules and regulations of the cities where they expect to drive and of the community in which they are driving. He investigates in regard to the conditions of their cars, the brakes, the headlights, and he will not issue a license to the driver of a car until it is perfect in all those things. Still we have accidents.

Now we go a little farther in regard to the taxi-cab concerns. We compel those drivers to take out a license in the City of Pittsburgh.

They must attach to their application their picture, and in a number of cases, we have gotten hold of men that have been arrested and charged with some crime or convicted of crime.

In regard to violations of our city laws, we have 103 of them. We have today 48 motor vehicle men and 24 mounted men that we use in traffic. The man who is violating the parking rule is given a card similar to the one the Chief has mentioned. Our motor vehicle men have a triplicate book. When they get a violator of the law, they give the violator one copy with his name and address, his license number, keep one copy themselves and the other goes to our traffic court. Today, we are holding two traffic courts every morning in two rooms by two judges.

A man who receives a card for parking has the privilege of writing his name and address on the bottom of that card and mailing $1 to the traffic court for his first offence. If he comes in for any other violation of the law, it is detected immediately by the clerks in that office. For the second violation, he is fined $2, for the third violation $3 and the fifth violation costs him about $7. The percentage grows higher. In that way, we are getting a lot of money into the public coffers but we are not eliminating the cause.

I would like to know how we can work out these situations in any better way. I am here to try to learn all that I can and to give you men the experience that I have in the police department.

Our speeders are immediately arrested and taken to the police station and $55 is the forfeit that they have to put up. If a man does not have $55 and can show ownership (he must have a certificate of ownership for that car before he is entitled to a certificate to drive), we impound the car.

If a man is drunk while driving a car in Pittsburgh, he is arrested and taken to the police station and the least possible bail upon which he can get out is $1,000 property bail or $500 cash bail. If he has injured a person while intoxicated he is not released from the police station until such time as the physician in the hospital notifies the police department that that person is not in a serious condition.

FRIDAY MORNING SESSION

DRIVER'S LICENSES, INCLUDING EXAMINATION AND REVOCATION

Robbins B. Stoeckel, Commissioner of Motor Vehicles, Hartford, Conn.

A discussion of the operators' license system is compelled, at the outset, to recognize that its establisment depends upon public sentiment. It is a fact that in certain portions of our country such sentiment is against its installation, on the argument that its adoption is an unwarranted infringement upon the rights of the individual.

In distribution, as already established, the system seems to be almost exclusively an eastern state measure, perhaps the result of the attempt

might be a written examination and be given on the basis of the issuance in each state of a list of a large number of questions,—at least a hundred—on the motor vehicle law of that state, from which number certain ones will be asked. These questions could be given wide publicity. It would follow that any applicant would learn the answers to the whole list. A test on one or two would then be sufficient to demonstrate his knowledge because it follows that if he knows the answers to one hundred questions on the law, he knows the law.

The Driving Test. The examiner must give a road test. It must be severe. Any one who cannot actually operate a motor vehicle correctly and well must not be passed for, while it is a fact that a beginner is usually cautious, yet the issuance of a license is a privilege to go anywhere under any conditions of traffic. So the examination must test out the proficiency of the applicant in traffic. He should be able to do any of the ordinary things which he will be required to do again and again in actual driving. The examiner should reject him on the very first slip of importance. Here, the judgment and discretion of the examiner will be invaluable, and each case will be handled by him as an individual proposition. He should be willing to assist and instruct an applicant who has made a slight slip through nervousness, but, in a general way, the time of the examiner ought not to be spent in teaching people to drive. He is there to discover whether they can drive or not and, if they cannot, in his judgment, they must not waste his time but be forthwith rejected.

Defects. The details of an examination go into all sorts of determinations. Can the applicant read direction signs? Can he give hand and horn signals? Is he considerate in passing others? Can he properly use his brakes? his spot light? Mainly, is he observing and cautious? There are people who are entirely deaf; others who cannot hear in one ear; still others who have one leg only, or one arm only. For each of these cases the test is bound to be whether, notwithstanding the physical infirmity from which the intending operator suffers, he can operate the car as well, by compensation of senses or adjustment of machinery, as he could if he had the sense unimpaired or the member which is gone.

General Limitation

In making an examination the examining authority must always remember that traffic conditions are getting steadily worse, that a defective is more apt to be a bad driver than one who is not defective, and he must draw the line strictly, without fear or favor, to cut out any one who will be a danger.

The license having once been issued, it has proven a safe proceeding to continue it from year to year as a formality, up to a period of three years.

Uniformity

In this group of states to which reference has been repeatedly made, there is now in existence a uniform code for examinations which each

state will put into effect. The specification of this examination will shortly be published as one of the proceedings of the Eastern Conference of Motor Vehicle Administrators and will be available.

During the course of an examination along the lines indicated, all that class of persons who are by nature, disease or habit unfitted to operate motor vehicles will be finally eliminated. It is only matter of a short time before all the states named will have in operation a comparison whereby any person who has been finally refused a license in one state will be refused in others. When put into effect this will ultimately prevent any person suffering from a sufficient disability from getting upon the roads as an operator.

The Revocation and Suspension of the Operator's License as a Method of Discipline

Another great advantage which accrues from a licensing system is that a state has at its command a ready means of disciplining any licensee who disobeys the laws made to regulate him in the use of the license. A power of motor vehicle license suspension is unquestionably limited to be used under motor vehicle laws or laws which have to do with the use of the license. Such a suspension cannot reasonably be used as a method of punishment for any crime or omission which has nothing to do with the operation which the license authorizes. This principle has been lost sight of sometimes so that the power has been too freely used. But with the stated limitation in mind, there is no quicker, better or more effective punishment for any operator who disobeys a motor vehicle law than the suspension or revocation of his license. Nothing will bring him to time quicker or make a deeper and more lasting impression upon him.

Wilful Offenses

In equity and justice to the persons who are to be disciplined a close and careful distinction must always be drawn between those offenses which are wilful and those which are not wilful. For example, a man who does an injury by means of his automobile and then runs away to evade responsibility ought to be swiftly punished in a drastic manner and that course taken whether the injury is done through wilful reckless driving or by inadvertence. The same principle is true as to any person who wilfully becomes intoxicated and thereafter operates a motor vehicle. No punishment can be too drastic for that type of wilful crime. Reckless driving is another wilful form which should always be so punished.

Non-Wilful Offenses

In non-wilful cases, bad driving which happens through inattention or carelessness can be punished on the principle that if permitted to continue, such types would become a practice. Strict discipline in cases of this kind is also indicated but the suspension power would be exercised as a judicial determination by the administrator in charge.

Another use of the license suspending power which might be exercised without harm, providing a careful process is involved, is for the enforcement of the administrative processes upon which it depends. For example, if the motor vehicle law of the state places a distinct duty of report to the state authorities on persons who have accidents then, after a reasonable attempt on the part of that authority to secure such report, it might be justified to suspend an operator's license or registration until such report can be obtained.

There are some instances which may or may not be criminal offenses where the suspension of a license is justified on grounds other than those connected with the offense. In every fatal accident the license of the operator of the motor vehicle causing that accident should be forthwith suspended by law and taken up by the suspending power until a thorough investigation can be had and until the question as to the fault of the operator and his ability to operate further have been considered. A great percentage of all fatal accidents caused by motor vehicles are without fault on the part of the operator. With the broad discretion of the suspending power in mind, recognizing the principle that personality and individuality enter as variable causes into every phase of operation of a motor vehicle, the suspension of a license can be justified in such cases on the ground that an accident of this kind is so upsetting to the operator's nerves and consequently so disturbs his normality as to make him an improper person, at least for the time being, to be in charge of a motor vehicle upon the highway.

A resume of the legitimate purposes for which licenses may be suspended will appear something as follows:

First—An absolute, definite and long term suspension, heavy enough to act as a deterent, in every case of wilful misoperation, including especially the three worst crimes in the motor vehicle catologue—driving while intoxicated, evasion of responsibility and wilful reckless driving.

Second—A discretionary suspension in cases where carelessness and inattention arrive at a point where the guilty person was fairly put on his guard by a law or traffic condition.

Third—A discretionary suspension in specific cases for admistrative purposes, under which licenses may be suspended with careful limitations, to make the office of the administrative power effective.

Fourth—A term suspension with discretion in the suspending power to shorten the term, in certain cases which, by their very nature, make the holder of the license incapable of safe operation on account of personal reactions; this to include, besides the cases heretofore stated:—all cases of extreme age, infirmity, sickness, mental disaster, physical break down, physical disability, loss of limb, loss of hearing, loss of eyesight and, in general, anything whatever which deprives the operator of his normal senses to

such an extent as to make him incapable. In all discretionary classes the suspending power ought to be held open for hearings. No licenses should be permanently taken without the utmost care to secure for the person from whom it is taken every equitable and legal safeguard which will give him a fair hearing, not only before the authority who suspends the license originally, but also to secure to him a right of appeal, fair trial in court and every other method for protection of his rights.

If properly exercised with due care and in the broad spirit of fair play, with understanding as to the ends to be accomplished and appreciation of the irreparable damage which may be done by such a deprivation as the suspension of an operator's license, a commissioner or department which exercises a suspending power of the nature indicated, will eventually succeed in removing from the road a large proportion of persons who ought not to operate and by educational processes, through interviews, publication of action and all of the other forms of publicity which an office of this kind would have at its command, will bring general driving on the highways up to a better standard.

Education Values of the Suspension of Licenses

The suspension of an operator's license ought not to be considered from the standpoint of punishment alone, but can be rated as being of educational value as well. In a state where suspensions are freely used, word soon gets about that certain forms of driving are taboo and that a conviction or a justified complaint for an offense of that kind will bring swift action by a state department along the lines of a suspension.

A man's driving record, extending over his driving period, becomes as valuable to him as the chain of title of his piece of land. A man who can can refer to a state department and show by its records, if needed, that he has driven in the strenous traffic of modern times without complaint and without discipline, will certainly be regarded by a court or by a license suspending power with favor. Business interests and his neighbors in general will regard him as a man who has trained himself to an extent where he is safe.

It will naturally occur to any one who has followed the thoughts presented in this paper that it is proper to inquire whether the licensing system has, as a matter of exact application, proved itself capable of reducing motor vehicle accidents; that is, in those states referred to herein, are accidents reduced through the machinery of the licensing systems in use in such states. It is a fact that there is no basis of comparison and the question suggested must, in honesty, be answered by saying that it is impossible to tell, by statistics, the exact results which licensing systems have secured. Wherever systematic attempts have been made throughout the industrial world to reduce accidents in factories and among workers, sure results have always been obtained [illegible] different from that used for the reduction o

accidents in public traffic. This amounts to an application of discipline and education through various means, of which the license system is one.

It therefore seems fair to conclude that the license system is justified from the standpoint of accident prevention, even if exact statistical results cannot be had to prove the fact.

CONNECTICUT

Record of Suspensions.

	1921	1922	1923	1st 8 mos. 1924
Reckless Driving	90	110	1022	1756
Intoxication	254	394	773	578
Under Age	17	20	35	22
Fatal Accident	176	181	244	157
Evading Responsibility	42	57	100	96
Improper Persons	38	34	37	16
Taking Car without Permission	33	46	68	28
Unregistered Car	..	18	185	161
Operating without License	293	437	748	746
Failure to Appear	93	46	46	23
Overloading Truck	13	77	116	65
Second or Third Conviction	49	35	60	..
Throwing Missile at Motor Vehicle	1	..	..	..
Physical Infirmities	2	4	6	..
Passing Standing Trolley Car	1	2	..	..
Theft of Accessories	..	..	2	..
Allowing Minor to Operate	..	..	..	..
Loaning License	1	1	7	2
Failing to Pay Fine	2	1	2	2
Failing to Report Accident	4	185	1444	853
Improper Use of Jitney	8	1	1	..
Registration Suspension	5	11	7	..
Evading Toll	..	..	..	..
Improper Brakes	..	..	..	..
Tampering with Motor Vehicle	1	4	8	9
Misuse of Markers	2	53	18	11
Getting License Falsely	..	2	..	..
Misstatement of Facts	8	3	8	1
Improper Public Service Registration	42	18	8	6
Illegal Lenses	1	..	..	..
Operating without Public Service License	3	18	35	20
Bond Forfeited	4	70	177	27
Giving Bad Check for Registration	1	5	13	1
Mutilating Engine Number	..	2	4	..
Improper Registration	..	..	12	7
Oversized Body	..	..	1	..
Towing 4-Wheeled Vehicle	..	..	1	..
Serious Accident	..	..	9	..
Theft of Motor Vehicle	..	..	9	4
Not Located	..	..	2	89
Complaint	..	..	26	3
Operating while Suspended	..	..	2	9
Accident Record	..	..	..	1
TOTAL	1184	1835	5236	4693

Synopsis of Replies from all Eastern Conference Members re. Method Used to License Motor Vehicle Operators.

Delaware
Chauffeurs only licensed and examined, method described in attached clipping.

District of Columbia—
All operators must have permit, must make application and be at least 18 years of age, have no physical defects, and must be examined.

Maine—
No examination required until this year, and machinery not yet set up to carry out new law.

Massachusetts—
Sworn application, about a ten-minute road test—moral fitness not tested, deafness not a bar, but eyesight carefully watched—must read English well enough to understand law and rulings and must be at least 16 years of age.

New Hampshire—
Written examination and driving demonstration required.

New Jersey—
Written examination and driving demonstration required.

Ohio—
No examination required.

Ontario—
Chauffeurs only examined—must be photographed.

Pennsylvania—
Learners Permit first issued followed after 30 days by examination, including inspection of car.

Quebec—
No examination required except for chauffeurs.

Vermont—
Written examination and road test required only of professional chauffeurs.

Virginia—
No examination except for professional chauffeurs.

Maryland—(No reply).

List of all States with Notes re. Motor Vehicle Operators' Requirements Made from Copies of Laws on File.

Examinations for all operators.....12
- District of Columbia
- Maryland
- Massachusetts
- Michigan
- New Jersey
- New Hampshire
- New York
- Pennsylvania
- Rhode Island
- Vermont
- Connecticut
- Washington

Examinations for chauffeurs only.....14
- Alabama
- Colorado.
- Delaware
- Idaho
- Illinois
- Indiana
- Iowa
- Kentucky
- Minnesota
- Montana
- Virginia
- Texas
- Utah
- Ontario
- Quebec

Age requirements only.....11
- California .....14 minimum age
- Kansas .....14 minimum age
- Maine .....15 minimum age
- Nebraska .....16 minimum age
- New Mexico .....14 minimum age
- North Carolina .....16 minimum age
- Oregon .....18 minimum age
- South Carolina .....12 minimum age
- South Dakota .....15 minimum age
- West Virginia .....14 minimum age
- Wyoming .....17 minimum age

No Requirements 3
- Arizona—Arkansas—Ohio.

Statements of Information 2
- Georgia—Mississippi.

No law on file—but requested.
- Florida
- Louisiana
- Missouri
- Nevada
- North Dakota
- Oklahoma
- Tennessee
- Wisconsin

DISCUSSION

Mr. F. E. Jack (Vice-president, Chicago Motor Club): I have a great many pronounced ideas. The most pronounced is that we must educate

minds the fact of the realization of their responsibility when they get behind the wheel of a motor car, and we must be just as persistent in our education of the pedestrian. The man behind the wheel of a car who toots his horn and does nothing else in the way of regulating the movement of his vehicle tells the rest of the people to go to hell, he owns the road. Also the pedestrian who walks across the street even at the place where he should walk with the air of "I dare you to hit me," is in the same class. We must bring about a better feeling. a fifty-fifty proposition between all motorists and pedestrians, and I firmly believe that one of the best educational features we can introduce and persistently follow is the licensing of the driver, providing we build a law that will be equitable, just and fair, for we never will reach any point desired in individuals and groups unless we will each be fair with the other.

I have known the motorist quite intimately for a great many years, partly because for a good many years I was a builder of automobile bodies and came in contact with him in a business way. For a great many years I have been an officer of an organization that has grown, since I joined it as No. 129, to approximately 40,000 members. For a number of years it has been my duty to study the motorist and to known him as well as to devise ways and means to counsel as best I could from a humanitarian standpoint, and I want to say to you that a large percentage of the motorists are highly intelligent men of integrity, God-fearing, law-abiding, when they are not driving cars. Why that intelligent, high-grade gentleman forgets his feeling of courtesy toward man, why it is that he is an entirely different individual outside of his home than in it, I don't know. As you all know, if you went into the home of any man here you woud be given the best chair in the house; if you were fortunate enough to be invited to eat a meal, you would get the best cut and all the white meat if you wanted it, but the next day when you met him out on the road, he would be a different person. I don't know why that is, but I just know this in this long experience that I have had with this class of men, (and you see I occupy a dual position the same as all of you; I am a pedestrian a good part of the time and a motor car driver the rest of the time) that we are going to do wonderful things because there is a necessity for it.

God bless the safety council and every one else who is interested in this tremendously wonderful problem, the saving of human life. None of us could be engaged better. We are accomplishing things, and this same motorist, because we are accomplishing things, is going to take this matter up seriously; he is going to decide not only on this matter of a licensing bill, but all others; he is going to consider those subjects. He is today awakening and he is going to awaken more until his mind is clear on this subject. He is going to consider these matters in his office and in his home and not while he is driving the car. So we are going to get the best from him that is in him.

MR. E. H. COTCHER (Chattanooga Safety Council): What fee is considered necessary to cover the administration cost of the law? Who has the suspension power in the states with which you are familiar?

MR. STOECKEL: The fee will approximate $2 to $3, and that is based on the law that the fee should pay the administration expense and nothing else. That is in the interpretation of the decisions to that effect.

MR. H. O. ROUNDS (Police Department, Detroit): I want to ask a question. When the license has been revoked, what is your experience? Has the man ceased driving or does he continue to drive regardless of the revocation, and is there any action taken to discover that he is driving, and what penalty is placed on him?

MR. STOECKEL: Of course, you can't do anything with any system of enforcement which is not made effective, and you have got to depend upon your police enforcement to make that effective. When we suspend the license we send notice to all the police chiefs in the state that so-and-so's license is suspended. In the East, particularly in Connecticut and Massachusetts, we have close personal knowledge through somebody in some town or city, and we catch a great many of them attempting to drive. If we do, we refuse to return the license at all. We very often penalize, for example, a young man under the age of 18 who drives in Connecticut. If we catch him driving against the law before he is of age, we penalize him for a corresponding period after he becomes 18, by refusing to issue the license. The penalty is a court penalty, a fine, or imprisonment, and we have imprisoned quite a few people.

MECHANICAL CONTROL SYSTEMS

R. F. Kelker, Chicago, Ill.

I think we know from experience that the installation of mechanical signals will slow up traffic. The degree will depend upon the proximity of the signals to each other.

If you take, for instance, the outlying boulevards in Chicago and other cities where we have heavy traffic streams and where you cannot police every crossing because of the expense involved, the installation of an adequate and proper signal is eminently desired. It gives the pedestrian a chance to get across, and he certainly should have that right, in reasonable safety.

I think, as a general proposition, we can use automatic signals in the outlying districts in any large city where traffic is fairly heavy and also in smaller towns where traffic corresponds in degrees.

When you come to putting a series of signals on a street like Fifth Avenue in New York City, Broadway in Los Angeles and Michigan Boulevard in Chicago, or Woodward Avenue in Detroit, you have an entirely different proposition. Those who advocated the installation

of signals on Michigan Boulevard believed seriously, I think, that they would speed up traffic. The contrary is the case. It has diminished the speed of traffic. The only thing it has had a tendency to do is to lift the crest speed of cars between signal points, and that can only be handled by the police requiring the motorists to obey the speed limitations. The tendency to speed up and to make up for the standing time is very prevalent. It is obvious that if you have a series of signals on a street, with a pre-determined time interval, the running time between points, not from signal to signal but for the entire journey through that street, is going to be greater than if you simply had the normal police control. The reason for this is that there will be times when the signal will be against you when there is no cross traffic to detain you.

The greatest benefit to the motorist, as I see it, is the fact that he has something mechanical before his eyes which is not subject to whims or doesn't have to sneeze or walk off and leave the job.

The motorist doesn't like the traffic officer because he knows he gets a "rotten break" all the time; he is perfectly sure of that, however capable the officer may be. Consequently he would rather take his chance with something that is automatic and can't be tampered with; something he can "cuss" with no reply, than to have a scrap with the officer. From that point of view he considers automatic signals a good job.

Signalized Areas in Los Angeles

When we come to signaling an area we have a more difficult proposition. The only signaled area of any extent with which I am familiar is in Los Angeles. There they have signals on thirty-one intersections of four North and South streets with nine East and West streets. It is a pretty hard job to tell whether they are good or bad. You can get answers pro and con. There is one thing dead certain; they seem to give a pedestrian a chance. Whether this is because the pedestrian pays more attention to the automatic signal than he would to a traffic officer's signal, is a question.

In Chicago, in our loop district, we tried to speed up traffis. We have a difficult proposition, and we all know that the pedestrian hasn't a chance and he never will get it until we slacken up the speed of our traffic, and charge to the movement of traffic a part of the time that we want to give to the pedestrian for his benefit, safety and convenience.

Signals, I believe, should not be installed hit or miss. Before you put in a signal you should know your surrounding conditions. You should have checks made before and after so that the effect that the signal has produced may be known. When signals were installed on Fifth Avenue in New York, for instance, there should have been a check. I haven't seen a check of any kind and I couldn't get a line on any check that was made before and after those signals were put up, and yet everybody that is backing the signals says they are an

unqualified success. The taxi driver, if you are in a hurry and you tell him to get to another point rapidly, will leave Fifth Avenue like the plague. There you are. Why? It may be a whole lot better, it may be a whole lot safer, but it is slower. There are no comparative facts available to prove the point pro or con.

We spent $7,000 in Chicago to make a complete check of Michigan Avenue prior to the installation of the signals. We expect at some time to repeat that check and make proper interpolations for the increase in motor vehicle traffic. When you consider the great variation in traffic on different streets, the difference in the layout of every city the difference in the habit and action of your motorists, the relation of street car speed to that of other traffic, the relation of the speed of horse drawn vehicles to that of motor driven vehicles, you cannot apply one solution. Each particular point should be carefully investigated and then your experiment should be made with some reasonable assurance taht when you have completed it you will have comparative data on which to base an opinion as to its success.

Standardization in Signals

It seems to me that our signal friends have tried to stick as many doodads on signals as they can and to make them cost more at every turn of the wheel. I think it is a mistake to make them so expensive in order to secure a patent right. What we need is standardization in signals and in the use of lights. We go back to our experience on railroads and try to apply that to street traffic. It doesn't work and there is no reason why it should. You men who are familiar with railroad signaling know the absence of a signal where there should be one means "stop." That is an imperative order in every rule book in this country. The absence of a signal on a highway means "go." There is one of your contra-distinctions. In some places we have the red and the green; in other places the red, green and yellow. Out on the Coast there are something like sixteen different types of signals in the city of Los Angeles. They have one at Western Avenue and Wilshire Boulevard that has a moon face with the word "stop" in red on top and the word "go" in green on the lower half. On top of that there is a half circle painted yellow which turns around showing part "stop" and part "go" until finally you get the entire "go." This signal has a bell, as well as a siren for use in case of fire, and some fellow said that the only thing he didn't know whether it had or not was a cuckoo clock I suggested they put on a weather vane and make a job of it. It looks like a Chinese puzzle.

It no doubt has cost a pile of money. The fellow who put it up thinks it is the best in the world. He has put a lot of money and time into it and he hopes the city will buy it. The only signals the city of Los Angeles has even bought are those downtown; the rest are on trial

Chicago is cluttered up with signals on trial.

In New York, as I recollect, they go on the yellow, stop on the green and get ready on the red. In Chicago we stop on the red, get ready on the yellow and go on the green. I submit this to you gentlemen: why do we need that yellow light between a red and a green? I come up and find the red against me; I stop. Why should any expense be made for a light to tell me to get ready. Hang it, I am going some place and I'll get ready if you give me a green light to go. It doesn't mean anything to have that yellow, but it costs money.

The yellow flashes between the green and the red, and this is what happens: as I approach a green light it changes to yellow, indicating that I must slack and be prepared to stop when the red comes up. What do I do? I am going to beat that red, that is all. I "step on it." The yellow doesn't do anything it is supposed to do except to accelerate my desire to beat the red. What good is it? On the other hand, when the yellow comes up before the green, the motorist starts unless there is an officer near at hand.

We have to get away from these extra things on signals. If we can get rid of the yellow we get rid of one circuit with its complications, and some little cost.

Why can't we get rid of the green? I would like to have you think about that. Miller McClintock of the Research Bureau of Harvard University, and I were talking about that last summer out on the Coast. The green realy does not mean anything. In the absence of a signal on the highway, you go; if you get a red signal, you stop. When the red goes out are you going to sit there until somebody turns on the green light, or are you going to go? You are going to go. You may sit a little and wonder about it. If you know that the red light is a traffic signal and indicates stop, you will go when the red goes out. It will cut the cost very materially.

Recommends Signal

It seems to me that if we had a signal shaped like a banjo, for instance, marked "Traffic Signal," illuminated at night by a fixed white light and painted so it would be visible in the daytime, having in the center one red bull's eye like the tail light of a car with the word "Stop" on it and having the timer hooked up so that the circuits for each direction would overlap, it would meet all requirements. With a signal of this design four red lights (one for each direction) would be shown during the traffic change interval so nobody could move, then if you lifted a pair of lights, the traffic would move in the same manner as it now does when green lights appear. Then put on the four red lights for a short period of time, four, five or six seconds and raise the other pair and you have a signaling device which will control traffic just as safely and effectively as it can be controlled with signals having three or even two circuits.

The objection, of course, is that we use red lights for everything. They mean danger. We use them for a boulevard stop sign, and after one stops and gets tired of standing one may go, which is silly and

wrong. I would suggest to the Council and its members that in th consideration of traffic signals it strive for the ultimate in simplicit because if a single circuit signal can be procured for say $300 or $40 three or four times the number of signals can be provided for th amount now required for one, as some of the signals now being in stalled cost $1,200. The Los Angeles signals cost $2,000 an intersectio We had bids in Chicago for signal installation amounting to $1,6(an intersection. I was told recently that a single signal for the cente of an intersection in Oak Park, Illinois, was to be purchased for $1,20 That is a lot of money to pay for controlling one point unless you a getting absolute value received. If you don't get it you are not justifie in asking the taxpayers' money to be spent that way. If you can g a signal for $300 that will do the trick, you can cover four or mo of your intersections and thereby obtain the maximum of traffic contr for the least expenditure.

As regards volume of traffic, there is not much to be said. In t outlying districts if left-hand turns are prohibited with the installatic of a signal, it is a good proposition, and it will save possible collision

In Chicago we have three park systems, each having its own poli system with its own jurisdiction, in addition to the city's police forc

The chances of getting together on a uniform system of traffic co trol looks pretty much like zero unless we can get together throug an institution of the character of the safety council. We should insi that certain colors have certain definite meanings, that certa signals or signs mean certain things, and these meanings shou be universal. They should not be understood to mean one thing one particular locality and an entirely different thing in another. Th should have the same meaning in the city, state and nation. We a just as interested in handling traffic conveniently and easily througho the country as we are in having laws passed insuring the competen of our drivers.

MENTAL TESTS FOR COMMERCIAL DRIVERS

A. J. Snow, Northwestern University, Evanston, Ill.

A feeble-minded person or an imbecile is absolutely incompete to drive an automobile or to do anything else unless it be under ve close supervision. The point is that you cannot always tell a feeb minded person or an imbecile by looking at him. Some of them ev occupy important positions.

The only way to get at that class of feeble-minded individuals is a method which has proven successful without a doubt during t war, and that is by psychological tests which can be given in grou or individually and take only from 15 to 20 minutes.

We have assumed that people usually are wilfully reckless drive It does not follow however from a scientific point of view. Peo

are reckless not because they want to be or don't want to be, but because it is their nature to be. We know that people are born with a mechanism or an organism which makes them behave different from the bulk of individuals, and we say that they are reckless wilfully, and we send them to jail, thinking that they will become more careful. Sending them to jail doesn't do that in the least. You have to remake a man.

The next test is to devise an objective method, a mechanism, which will fortell if a man has a tendency to be reckless or not. You can lecture to him all day long, you can have beautiful placards, beautiful museums showing the various forms of recklessness, and still you will not change his nervous system. The only way to do it is to segregate that group by test.

We know perfectly well that not all human beings react in the same way to a situation. Suppose I were to take 100 of you and train you equally to run a mile. It doesn't follow that all of you would run the same mile in the same time, no matter how well you have trained yourselves to do so. Some will do it faster than others. There, again, you are born with that mechanism which enables you under proper training to do what you actually have accomplished.

Some human beings can't put on the brakes as fast as others, and some of them are so slow that they are really a source of injury in reacting in that way.

The Bureau of Standards has discovered that some human beings are frightfully slow in reacting to a danger signal by placing the feet on the brake. That is one class.

Another class is that class of human beings who simply become paralyzed when an emergency occurs. They would just as leave jump out of the car or throw up their hands; they lose control over the car. You can't tell that sort of individual by looking at him; he has two eyes and two ears and a nose and all the rest.

The National Association of Taxicab Owners has devised machinery by which it can tell the individual beforehand, and ascertain whether he is going to react normally, rapidly enough, control his wits, or not.

Statistically we have discovered that 18 per cent of commercial drivers are responsible for 46 per cent of our accidents. Still better, five per cent of the eighteen per cent are responsible for twenty per cent of our accidents. We have also discovered that only 68 per cent of our commercial drivers are responsible for all the accidents. If it is possible, and we feel it is, to eliminate by examination that 18 per cent, we will reduce our accidents in half.

These are facts that we have found after we have examined accident records of 2,000 men for a period of six months at the Yellow Cab Company in Chicago.

We have given this test to 2,000 men, and we have discovered, with some exceptions, that the man who has failed to pass the test has a

bad record. We also have discovered that the man who passed th test has a good record from the standpoint of accident.

It is not a question of what you gentlemen think or what we thin about this matter. The facts are that we can without a doubt toda in 25 minutes tell whether a man is a potentially safe or unsaf driver.

I wonder how many of you will see to it that the public is arouse that our commissioners see to it that a law is passed to the effe that an individual cannot be given a license unless he can pass thi test. That is the only way to do it. As I say, your lectures, yo booklets of safety, your pamphlets, your revivals, will only help whe you deal with the material which is potentially safe, but it will n reach or touch the 18 or 20 per cent that are unsafe.

As I tell my students, you can never make a gold statue out of pound of clay; it can't be done.

MR. L. L. MILES (Louisville Taxicab & Transfer Co.): I would lik to ask Prof. Snow to give an illustration of that test.

PROF. SNOW: In the *National Safety News*, the July issue, the tes are described for your convenience.

HOW A COMMUNITY SAFETY COUNCIL CAN AID THE POLICE DEPARTMENT

Major Thomas H. Allen, Fire and Police Commissioner, Memphis, Ten

I have learned in the last three or four years this rather importa fact; that law enforcement cannot outrun public sentiment very fa We had an interesting experience in Memphis. In 1920, in a new admi istration, all the business men took control of city affairs, and one the planks on which they were elected was law enforcement. In li with that pledge, we proceeded to carry it out. In traffic matters as all other matters, we put the screws on as hard as we know how. W read the law and proceeded to enforce it, with the result that in a ve short time the people of Memphis were up in arms about the traf situation. They were haled into court for all kinds of minor offens The result was that we lost a commissioner of police and a city jud who had done nothing but enforce the law. That was the only criticis

At the end of that session I was placed in the police department undertake to straighten out that rather serious situation. My fi police order was "Now, chief, don't make any arrests for traffic." then proceeded to study the problem and study the whole police sitt tion. We then went to work and gradually put on regulations, beg ning in a small way and working to a tighter situation all the time. W found that it was absolutely essential that the public of Memphis educated to proper driving rules.

About that time the National Safety Council made its appearance Memphis. I believe in the National Safety Council; it has done rema able work. It has been of tremendous assistance to the Memphis Poli

Department. The Memphis Police Department keeps statistics; so does the Safety Council. The thing is bound together in a more or less intimate way, due to the close co-operation that exists between the head of our community safety council and our police department, with the result that we now have a fairly complete set of statistics.

We now have a police officer, Patrolman J. L. Pennick, who takes his orders from the Memphis Safety Council. His work in the schools is with the Junior League. The boys and girls of our city have their own traffic rules, their own safety rules, their own courts, and they enforce their own regulations. I was very much interested in one case where a teacher who persisted in running by the green and yellow flag was hauled into court and sentenced to stay in every afternoon for 30 days. The school board backed up the sentence.

This year we have assigned a lieutenant of the fire department to the safety council for fire prevention work. His work will likewise be largely in the schools but, of course, it will touch our commercial and other organizations.

I want to tell of the psychology of the local safety council. As a policeman, I know exactly our function. In the usual routine of a police department, we do not deal with people who are kept on the right track by that thing called honor or by the instinct that makes a man go right for right's sake or because he respects himself, the community and the law. The police deal with the people who have no honor, who have lost their self-respect. That is the usual routine of the police department —the handling of that small number of people in our community who do not travel the straight and narrow way.

Our method of procedure is to punish the man. We shake a club in his face and tell him to come with us, and proceed to lock him up or fine him for the particular offense. It is a disagreeable job. There is nothing pleasant about spanking people. That is our job—to spank people who are wrong and set them right, if we can, but the great bulk of our people cannot and will not be handled in that fashion.

The safety council comes in and collects statistics. Statistics are all right, but the thing the safety council does is to visualize those statistics. It ties a blue ribbon around them and hangs them out where you can look at them and understand what they mean. The safety council comes along with these statistics, dresses them up in an attractive form, tells you, in a forceful way, fundamental principles that you already know, and proceeds to educate you to that point where you obey these laws and regulations, not because you have to, but for the protection of your neighbor and yourself. That is the real value in the Memphis Safety Council.

In Memphis last year, our safety council ran up against some financial troubles. It took about $12,000 to make them breathe easily. Frankly, it would have been a very simple matter for me to have set aside $12,000 out of our police budget to assist the Memphis Safety Council, and I would have been glad to have furnished the money but for one fact.

If we put police money into the safety council it would become an of cial thing and not a self-starting affair. In my opinion, it would have ha the wrong effect upon the citizenship of our community.

The main value of the whole proposition lies in the fact that it self-regulating. It makes each man a safety engineer, a safety expert, safety exponent; it makes him want all people as well as himself to d the thing that is the right thing for that community.

The results speak for themselves.

From January 1 to September 21, 1923, we had 35 fatal accidents Memphis, with a population of between 162,000 and 200,000.

In the same period of this year, plus four days to September 25, w have had nineteen fatal accidents, a reduction of sixteen. The stre car company, which keeps a very accurate record of its accidents, repor a 40 per cent reduction in those 14 months since the safety council ha been at work in Memphis.

The street car company has established a plan that divides the savin in damages, and in the last 14 months they have paid to their me $30,000 as their share of the savings effected through accident preventio

Our taxi cab companies tell us of their reductions in accidents. Th fellow who draws in wrecked automobiles tells us we have made abo a 33⅓ per cent reduction in his business, and one of my good friends, Ford dealer, has told me that he has had about a 35 per cent reductio in rebuilding wrecked Fords. So we sum it all up and say that o reduction in accidents in Memphis from all sources, police record safety council records and from these various utilities that use o streets, has been net 33⅓ per cent. We believe that, that is a very fi showing for the first year's operation of our safety council.

The police department has a difficult job at best. There is no instit tion perhaps that appreciates as much as does the police department th exact value of the Memphis Safety Council or the safety movement. venture to say that in every community, if you go to a police chief a police official, if he is really doing his job, he will tell you that san thing. We will go a little further. Col. W. F. Braden, of Louisvil points out that the police play only a small part in law enforcemen All we do is apprehend the criminal and bring him in, make the ca and present it to the courts. We are just a link in the chain of la enforcement. The other agencies involved are the courts, the attorn general's office and all the various legal machinery that grinds out pu ishment, because without punishment police departments are absolute of no value.

The safety council has had a very definite effect upon the action a point of view of our courts in the City of Memphis. Prior to its educ tional campaign, it was a daily happening for our traffic officers to bri in offenders who were fined for violations and the fines then remitte or held up by the court. I have seen a judge look stern, tell the offend

mere formality, but a judge who knows that a body of citizens representing the best in the community is checking every action is not going to be so careless in his judgments; he is going to be more careful that his records and his procedure and his happenings in court are in accordance with what they should be. It is a pleasure to state that, at the present time, Judge Clifford Davis, who sits on our city court bench, is heartily in sympathy with the Safety Movement and is deserving of much of the credit for what has been accomplished.

The effect is manifold. It is a check on the officer, it is a check on the law, it is an examination into the law, it is an examination into the courts that enforce the law. I believe that the Safety Movement is the finest thing that has happened in this country for the enforcement of the law, because it builds up respect not only for traffic regulations but for all the law.

DISCUSSION

MR. E. B. LEFFERTS (Los Angeles): I want to ask about the four-corner signals as compared with the center intersection, and what has proven the most effective height for the center intersection signals, if they are suspended, and about the suspended signal as compared with a pedestal signal on a wide intersection that would permit the square turn to the left.

MR. KELKER: The whole thing is a matter of topography. If you have a flat surfaced street with no grades and wide intersection, you may be able to get along with a center signal. The height is a difficult problem, particularly if you have bus stops or if you have trucks and vans. I think on that point, each particular location should be worked out to the best advantage. The center signal is easier to see and is more convenient, but offers an obstruction in the street. Some states have limitations as to obstructions over the center of the street. They make it 14 feet, or 18. So it really becomes a local matter that cannot be answered by a general statement.

Personally, if you have signals on the corners, I think the signal on your right can be seen on the near corner as well as the signal on the left at the far corner, so you can get an indication in case you are cut off, which is probably as good an arrangement as you can have.

ADJOURNMENT

Public Safety Section
Women's Division

October 1, 1924

MRS. J. P. THOMY, Chairman
St. Louis, Mo.

MISS HARRIET E. BEARD, Vice-Chairman
Supervisor, Safety Education, Detroit Public Schools, Detroit, Mich.

MRS. JOSEPH R. WILSON, Vice-Chairman
Philadelphia, Pa.

MRS. B. W. NUTT, Vice-Chairman
Cleveland, Ohio

MRS. LEWIS E. MACBRAYNE, Secretary
Boston, Mass.

CHAIRMAN THOMY: Our work has been entirely new and we hav been trying simply to see what could be accomplished.

WOMEN'S ACTIVITIES IN ST. LOUIS

MRS. ROSS: The Women's Division of the St. Louis Safety Counc is divided into two groups:

1. Advisory Board, which works in conjunction with the executiv committee.
2. A school of instruction for women automobile drivers.

The Advisory Board consists of one representative from each of 1(organizations and is divided into five committees whose functions are

1. Organization committee—to secure names of all organizatio possible for the distribution of bulletins.
2. School committee—to exchange information with school patrc alliances, parent and teacher associations and the Mothe Congress.
3. Bulletin committee—to collect material for publication purpose and give suggestions and assistance in the distribution of sam

4. Speakers committee—to supply speakers for organizations when requested.
5. Luncheon committee—to arrange program and details for luncheons.

The board held five business meetings. One open meeting, addressed by Judge Alva R. Corlett of the municipal courts of Cleveland, Ohio, and Miss Harriet E. Beard, supervisor, accident prevention in public schools of Detroit, Mich. One joint meeting was held with the Women's Drivers' School at which time prizes were awarded to graduates of the school.

The Women's Automobile Drivers' School held eight meetings. Five lectures were given at Scruggs, Vandervoort and Barney auditorium. Two field day practical driving demonstrations were held. A luncheon was held with the advisory board as the final meeting of the school.

The first action of merit passed by the advisory board was the upholding of the safety council's recommendation to the mayor for investigation of "fronting" in the court. This is where a case is nolle prossed or discontinued through political influence and also where too small a fine is assessed to penalize. This general action brought force to bear on city authorities.

The board also endorsed the new traffic code recommended by the executive committee.

Recommended the removal of gongs from all vehicles except those of the city where required.

Recommended sirens to be placed on fire apparatus only.

Recommended a peculiarly shaped bottle in which poisonous drug should be placed.

Community problems for accident prevention are brought before the board and in many cases we have alleviated the hazards.

The Women's Division also issued three safety news bulletins issued under the name "Counselor". This bulletin gave the public the work accomplished by the Women's Division and the needful instruction along safety in the homes.

CHAIRMAN THOMY: I have a report, which I had better read for Mrs. MacBrayne, of Boston, giving us an idea of the work done there.

"The Women's Section of the Massachusetts Safety Council was organized in January, 1924, its membership representing the State Federation of Women's Clubs, the Massachusetts Parent-Teacher Association, the Boston Home and School Association, the Boston Playground Association, the Industrial Nurses, and the State Department of Education.

It has issued a 20 page booklet, "Common Accidents In and About the Home," which has been placed in 14,000 homes in a dozen cities, and which is to have a further use this summer in the playground safety campaign that the Massachusetts Safety Council has organized in several cities. The booklet has been distributed by district nurses, school teachers, and playground supervisors.

On May 2nd the Women's Section held an afternoon meeting in Wo cester as a part of the state conference of the Massachusetts Safet Council. The subjects that were ably discussed were: "Home Accident As The District Nurse Sees Them," Miss Rosebelle Jacobus, superi tendent of the Worcester Society for District Nursing; "School Demo stration Centers for Safety Instruction," Miss Idabelle Stevenson, Ne York, field secretary, Education Section, National Safety Council; "Wh the Child of Today Needs Safety Instruction," Carl Schrader, directc of physical education for Massachusetts. This was followed by a demo stration of safety instruction by pupils from one of the Worceste schools.

As a result of the presentation of the child problem before women organizations of the state, the Massachusetts Safety Council has bee invited to put on safety programs for the entire school system of sever towns, these organizations standing behind the expense of the meetings

APPOINTMENT OF NOMINATING COMMITTEE

If there are no more reports, we will go on with our addresses. Ho ever, before doing so I will announce the nominating committee: Mr Newman, Mrs. Ditmar, Mrs. Craig, Mrs. Salisbury and Mrs. Williams.

WHAT THE WOMEN OF WASHINGTON ARE DOING FOR SAFETY

Mrs. Ellis Logan, Washington, D. C.

Washington women have heard the call of safety and here respond by personally caring for children—taking them and returning them hon from school and guarding them during recess periods. Our streets we a menace, especially at their unguarded crossings. Often frightful hea breaking accidents and deaths would occur. As I had served as preside of our District of Columbia Federation of Women's Clubs and chairm of public welfare and other civic organizations, I knew exactly t groups of women who would help in the protection of child life.

We definitely organized for volunteer service to protect the children street crossings, going and returning from school and during recess. O splendid chief of traffic police, Inspector Albert Headly, instructed regarding signals and traffic regulations, and we were thoroughly equipp for duty. Our badge was a broad white band worn across the right ar Police and public were thoroughly interested and in sympathy with o work. For eight months daily, through sunshine and storm, the wom aided in caring for the children. We directed the older ones in cari for the younger, halting careless drivers, and, on several occasio fairly risked life in saving some daring child who had ventured in danger. No child was injured or killed where women were guardi

The safety movement has opened an avenue of service for all women. At first, the women of Washington felt somewhat conspicuous in carrying forward their work, but theirs was a wholesome public interest which developed co-operation and sympathy, school teachers giving splendid assistance.

Later, the Washington Safety Council was organized with its far-reaching work, its interesting posters, its talks to school pupils and many other functions. It was officered and financed by our best known citizens. Its mission in our city has been of definite value from every possible point of view and its membership of men who were accustomed to viewing difficult and big undertakings with broad vision, has been beneficial in every respect.

Women must help by word, deed and encouragement, every effort to prevent accidents. All the men's organizations on earth can't succeed without co-operative support of the women. We are dealing with life problems, and as thinking, responsible, intelligent human beings, take cognizance of the dangers on our streets, so largely caused by the ignorant, careless and vicious.

TEACHING SAFETY TO THE NEXT GENERATION

Mary Noel Arrowsmith, Executive Secretary, Education Section, National Safety Council, New York City

To be quite honest, doesn't the phrase "safety education" make your heart sink just a little? All education is such a struggle—there are so many, many kinds of training that long-suffering children cannot escape. Why darken their lives still more, especially when this particular kind of education seems to take all the spontaneity out of everything they are likely to want to do? Why harrass them with lugubrious or impatient warnings? Why not let them alone and trust to luck that they will be all right? I am in the midst of a tale where the hero's uncle is described as follows:

"Uncle George was forever commanding him to be careful and not fall off of the chair, or to stop climbing upon the porch rail, or to watch out and not get too close to the horse's heels, or to let the matches alone, or to keep back from the fire-place, or to eat slowly, or to stop playing with the scissors, or to blow his nose, or to put down that paper-knife, Penny, or you'll jab your eye out. It seemed to him that Uncle George never came to visit his mother that he didn't spend practically all his time warning him that if he wasn't careful about something or other he'd be a cripple for life."

Doesn't that sound familiar? Of course, the effect of safety education such as this is deservedly zero. How could it be anything else? If we are going to be Uncle Georges, we had much better save our breath to cool our porridge. We might as well realize at the start that if we have not patience and imagination enough to make the idea of safety

attractive and reasonable to a normal, healthy, lively youngster, w might just as well not bother about it at all.

But how is it possible to make an intrinsically dull thing like safet interesting? To be safe, to be sane, to be cautious, to "watch you step"—doesn't it all sound depressing? Wouldn't you rather have you children reckless little daredevils than like that?

But we know that it is actually possible to make the idea of safet appeal even to these same little daredevils. How is it done? Childre have pretty good intuitions. If they see something in this idea o safety, there must be something important and vital in it. What i the thing that gives the safety movement its appeal and the powe of gripping people, which it undoubtedly has? I believe it is th dramatic element inherent in it.

All human beings love the dramatic. An accident is essentiall dramatic. To realize this you have only to open any daily pape and see the amount of space devoted to accounts of accidents. Man more people die of disease than from accident. but illness lacks th dramatic quality; it doesn't make a good "story," and unless ther is some unusual feature about a case of illness, it does not find it way into the paper. Accidents always have a dramatic quality an that is one of the chief reasons why children are so easily intereste in safety, or in other words, accident prevention. They see its dramati possibilities and they identify themselves with the drama to be played We must make them feel that they have a very real part to play i this drama and that they are responsible for playing it to the best o their ability. They will be proud of their responsibility. They wil realize that their own personal safety is a small part of a much bigge thing. A child will take whatever is offered to him, provided it ha a spark of life of its own, and make it live by infusing into it hi own vitality. He will take safety if it is presented to him in the righ way, and make of it a game, a drama, a crusade.

Interpretative Function of Safety Education

It is not only its dramatic quality that gives the safety movemer color and life. Safety education has a distinctly interpretive functio as well. It offers a really wonderful means for welding togethe a child's impressions, for helping him to understand the struggle an movement that go on all about him and his own relation to tha struggle. Life is essentially a struggle, not only for existence bu for a better existence. It has a certain rhythm that helps it forwar Accidents make the struggle harder; they break into the rhythm an hinder progress. They were not meant to be. Children will feel all thi vaguely. With their awakening sense of the beauty and wonder of th world comes also a sense of the presence of pain. In this rhythr that we speak of, there are certain notes of pain that seem to belon there—that are necessary to the full depth and richness of the ton But there are other notes, harsh and jangling, which have no place–

suffering that need never have been, lives broken or crushed out, bodies, meant for strength and beauty and activity, crippled and disfigured, spirits which might have soared, cramped and distorted. These are the fruits of accident, of some ugly thing that need never have happened but that breaks down the stirring beat and rhythm of life.

You will say that all these abstractions may be true enough but why consider them in dealing with the very concrete question of training children in safety habits? We cannot talk to children about the drama and the rhythm of life and their response to it, but we must have some realization of the elements inherent in the idea of safety if we are to give children any sufficient and reasonable motive for trying to be safe themselves and working for the safety of others. There is a philosophy of safety without which the whole movement would sink to the level of the "don't get hurt", "safety first", "play safe" slogans. Most intelligent people bitterly resent slogans like these. The reason is that these signs give no inkling of any inner meaning at all—they seem to express only a somewhat cowardly shrinking from physical pain. If that were all, safety education would have no justifiable place in the homes and schools of the country. But it is not all. Safety is a fundamental condition for all life and progress. The plants and animals which couldn't adapt themselves to their environment, or in other words, which could not safeguard themselves against enemies, simply ceased to exist. The old gentleman who has been accustomed to blowing out his candles and kerosene lamps must adapt himself to the properties of gas when he goes to live in a gas-lighted house, or he will cease to exist. Most of us value life pretty highly and we value it not because it is mere existence, but because it is full of color, emotion, movement, opportunity, in other words, experience. The real reason that accidents are to be fought against is that they diminish or cut off entirely the possibility of our having vivid, satisfying experiences. It isn't the fact that a broken leg is intensely painful that matters. The important thing is that a broken leg keeps you from doing a hundred things that are more interesting and worth while than lying on a sofa with your leg in a splint.

Safety means conservation of life, health, happiness, opportunity—not waste of these precious things. Accidents mean waste, due to someone's ingnorance, carelessness or irresponsibility. Safety means the direction and choice of activity, not curtailment of what we want to do. Safety is the condition which lets life go forward on its appointed way.

Reaching Children Through Their Natural Interests

Children can be made to feel and to act upon this conception of safety as a fundamental condition of life even if they do not philosophize about it. Now let us come down to the concrete question of how to get them actively interested. We must reach them through their instincts and natural interests, first of all.

Children are intensely curious, keenly observant and imitative. Th are dramatic and idealistic. They love color and rhythm and motic They love animals and make-believe. Here is certainly a wealth avenues of approach. Which one shall we choose?

Curiosity is perhaps as universal a characteristic in children as a other, and it is an enormous asset in their safety training because is the thing that makes them want to know how things work. is really only another way of saying that a child takes an intellige interest in what goes on about him. I rather suspect that this quali was first called "curiosity" by grownups who had got tired of answ ing questions. But did you ever think that the more fully and inte gently you answer a child's sensible questions, the less chance he w have of asking foolish, aggravating ones?

In this paper I shall have to pass over the first few years when child's curiosity is more likely to be a liability than an asset—wh it makes him want to touch, handle and taste everything he sees. those years, it is the safety educations of the parents that coun their ability to make the home as safe as possible for the child a their patience in watching and taking care of him. But with t child who is old enough to understand simple explanations of wh things will do under certain conditions, how they work and how should use them, curiosity is a great spur. Take for instance a chil interest in automibiles. They are the greatest single cause of fa accidents today—but we don't want to begin by teaching him th they are great monsters, waiting to crush or maim him. Not at a They are an endless source of speculation and wonder to him. Th color, shape, movement and machinery fascinate him. With this inten interest to start with, it is easy to interest him also in the gre groups of automobiles and other vehicles that make up the tra of a modern city, and to teach him the rules governing traffic a pedestrians. He is keenly observant and will see the application of rul once they have been pointed out to him. Let us imagine a ch going out for a walk with his parents or a group of kindergart children out walking with their teacher and follow alongside for few minutes. We shall have to remember that what is old and st to us is new and unfamiliar to the child and that while he is quick notice objective things, he must have the relation between the the principles on which they work, pointed out to him and explain before he will understand them thoroughly.

We go slowly along the sidewalk, picking out the different kinds automobiles. Here comes a yellow taxi, cruising along the curb the hope of getting a passenger. There is a big touring car comi along behind it which we didn't see at first because the taxi hid Wasn't it lucky we didn't try to cross the street just there—the l car might have run us down. That is the trouble with crossing t streets between corners. There are so often cars or wagons standi still at the curb or moving slowly alongside which hide other ca moving quickly up behind them. We must remember always to cr

at crossings and never in between, because we can't see nearly so well whether cars are coming or not, and if we step off the curb into the street, drivers can't see us until we are right in front of their car and then perhaps they might not have time to stop or to steer around us. An automobile can't stop nearly as fast as we can.

What Colors Mean

There comes a truck with a load of lumber. Look—there's a piece of red cloth tied on to the end of that long plank that sticks way out behind. What is that for? To warn people not to get too close. They might not see that gray-looking board but they can't help seeing that bit of red. Red is always the color we use when we want to warn people of danger. Let's go on to this next corner and we will see red used in another way. Do you see that post in the middle of the street? We call it a "silent policeman." There is a red light shining on one side and a green light on the other. What does that mean? It means that all automobiles and street cars and people on the side where the red light shines must wait a minute and give everybody on the side where the green light shines a chance to go across the street. Red is for danger and it says, "stay back." Green is for safety and it says "come on." Pretty soon the lights will change and the others will have a chance to cross. It's just like a game—we all have our turn and when that is over we must give the other fellows a chance to play. If we break the rules and try to dodge across between moving automobiles, it holds up the traffic because drivers have to slow up or stop to keep from running over us, and often it makes them try to steer away from us so quickly that they run into another car. We certainly don't want to be as selfish and thoughtless of other people as to do a thing like that so we will just wait a minute until our turn to cross comes. There comes the green light on our side—now we can go. You see there are so many automobiles and street cars and carriages and motor-cycles and bicycles and all sorts of things on the streets nowadays that there just have to be rules for them and for the people who walk. If there weren't any rules, nobody would know what anybody else was going to do and people would always be running into each other. For instance, here's a man coming down the street toward us. He knows we will turn to the right to pass him and we know that he will do the same, so we shall not bump into him. If there weren't any such rule, we might go dodging back and forth to get out of his way and just think how silly that would look. It is the same way with automobiles and everything on wheels—they keep to the right side of the road so that they can pass cars coming in the opposite direction easily without running into them. That is why we always look first to the left and then to the right when we cross the street.

Here is another corner and there is no sign and no policeman to tell us when to go across. We shall have to make our eyes as sharp as possible and be sure that the way is clear before we cross. You

tell me when it is safe to start. That's right—look first to the le and then up the other way. Shall we start now? All right, here w go, but we won't run. We will just walk over rather quickly. Th reason that we never want to run across the street is that we can see so well or stop so quickly as when we walk. And if a car shoul happen to come up suddenly, we should want to stand quite still i the middle of the road until it passes us.

The next street is a very busy one, full of shops and people an cars and two trolley tracks. Let's stand still a minute, out of people' way, and watch the policeman. He has a blue uniform and a silve badge so that everybody can tell he is a policeman. Suppose one c us gets lost, what would be the very first thing to do? You woul go right up to the policeman and say, "I'm Tommy Jones and I liv at 163 Washington Street, but I've forgotten how to get there. Wi you help me?" And the policeman would say, "Of course, I will tak you home. That's what I'm for, to help people." And in a few minute you would be safe at home. But now let's see what this policema is doing. He has a "stop-and-go" sign. It says to us "stop" and t the people on the up and down street "go", just as the lights di on the post we called the "silent policeman". The real policeman wi turn the sign around in a minute to tell us to "go". Sometimes h hasn't any sign and then he motions people to keep back with on hand, and beckons the people on the other street to come on wit his other hand. We must always watch him carefully and do exactl as he tells us to because he is there to take care of everybody wh uses the streets, whether they are driving or walking, and to see tha nobody gets hurt.

There is a street-car stopping to let somebody off. O dear, tha lady with the package under her arm isn't getting off the right wa She ought to hold her bundle in her right hand and hold on to th handle over the step with her left hand, facing forward. Then sh wouldn't fall if the car should happen to start suddenly. It's just th other way when you get on a car. You take the handle in your rigt hand then, the way that man is doing. He knows how to do it.

What a lot of things there are to remember. Let's go home (c back to school) and make a game about them and see who remembe the most. You can build a street with your blocks on the floor an put a policeman at the crossing and run your own little automobile up and down. Perhaps the other children would like to play wit you too—you can tell them some of the things you have seen. W can put some of the things into songs and we can paint pictures c the policeman and his sign and some of the cars.

The Dramatic Instinct

This is a crude sketch of some of the things a child must learn he is to be safe on the city streets and also a suggested method c approach. Of course they sound very dull to grown-up ears, but w

and that there are many ways of repeating the same lesson so t
he will not tire of it. Give him a start and you will find him dra
tizing what he has learned in a hundred ways. His dramatic insti
is always at work and anything is fit subject for impersonation.
will be the policeman, the pedestrian, the taxi-cab, the fire-engine,
locomotive, and with a little guidance, will evolve all sorts of deligh
games.

The child's dramatic instinct and his love of make-believe will a
make him able to grasp things in the large. He will be quick to
the idea of immense forces at work in the world, fire, water, ste
gas, etc., if they are personified for him as giants, fairies, gnomes,
any other of his familiar friends. In this way his own relation to
facts and conditions of the larger life about him may be made cl
A charming and vivid presentation of electricity has been develo
along these lines in a school safety publication from Oregon. E
tricity is called the Fairy Electra and told about in a way that e
first-graders can understand. The story begins like this:

"Once upon a time there lived in the world a very wonderful fa
This fairy, whose name was Electra, was the fairy of light and pov
She was very kind and loyal to her friends and very industrious,
if anyone tried to interfere with her work or to injure her in any w
she became very, very angry at them. Electra always loved to
doing something for someone, and she was very clever as well
very powerful. She was always ready and willing to work for anyc
and she still is, but she never does so until she is asked."

The story goes on to tell about all the clever things that Electra
do for us and how we must treat her. Electricity is established
the children's minds as an immensely powerful but kindly force wh
is ours to use but not to abuse. This imaginative treatment of
forces which have revolutionized modern life and which, through ign
ance, have been the cause of many tragedies, opens up fascinat
possibilities which have been taken advantage of only to a very sli
degree.

I believe that this method of approach will be an extremely import
one. We have only to think back a moment to see how, from
earliest times, human beings have personified the great forces w
which they are confronted—how they have made them into gods
giants or demons. The most superficial study of comparative relig
shows how deeply ingrained is this tendency to personification a
what an important influence it has had on thought and action. It
the basis of many religions, folk-lore and fairy-tales. The anci
Greeks saw Appollo in the sun, Neptune in the sea, Aeolus in
wind. The old Icelandic peoples heard Wotan in the thunder and
the treacherous fingers of Logi in the fire. Perhaps the new g
which we shall create will lack some of the majesty of the old g
—we understand them better and are on more familiar terms w
them, but their old power is still present and the impulse to person

those forces which can control us if we let them is still strong. Children understand the language of symbolism and this method of approach will give an added dignity and interest to the safety movement.

There are many other avenues of approach beside those already touched upon which there is not time to discuss. One of the most important is perhaps the child's love of animals. The most dearly loved children's books are animal stories, the Jungle Books, Uncle Remus, the Wind in the Willows, Peter Rabbit, and a score of others. The moral of a tale seems to lose its bitterness, though not its force, if told in terms of animal friends, probably because the application is a little less direct and therefore more tactful. Animal stories never seem to lose their appeal for children and safety lessons based on the clever things that animals actually do when confronted with danger will be interesting and effective.

Many people ask what is the strongest motive to appeal to in training children in safety habits. Undoubtedly it is the spirit of service which, while it comes out more strongly in older boys and girls, is present even in very small children. A youngster who does not understand how grown up people can possibly object to playthings strewn over the floor will pick them up if he knows that someone may trip on them and get hurt. If children are shown that the safety of somebody else may depend upon them and are taught concrete ways in which they may actually help to prevent accidents, they will not fail to respond. The idea of saving someone from pain or injury touches their imagination and their chivalry. That is the secret of the success of the junior safety council movement—there is a very real motive behind the activities that the children undertake and ideals that they pledge themselves to live up to.

In closing I want to say just one word of warning. All of us here are interested in safeguarding the children of the country and helping them to form habits that will safeguard them at all times. In doing this we are dealing with the delicate, sensitive structure of the child's mind. We can not be too careful to be sure that all our teaching is constructive and positive. Knowledge, skill, alertness, mental and physical co-ordination, common-sense and thoughtfulness for others are better safeguards than fear. Caution is by no means the same thing as timidity. Probably all of you know the Scotch child's prayer, which goes something like this:

"From all witches, warlocks and wurricoos, from all ghosties and things that go 'bump' in the night, Gude Laird deleever us!"

All of us can remember how many things there are that are likely to go "bump" in the night—let us not add to them. Unnecessary, morbid dread of fire, of drowning, of being run over, may be the cause of very real suffering to children and may unfit them to meet the emergency if it comes. It is mystery and uncertainty that frighten people. To many persons, streams of traffic, for instance, are an unfathomable mystery. They have never taken the trouble to find out what to expect and they

get safely across the street more by good luck than good management, thanking their stars accordingly. We want to give the children now growing up a better equipment than that to meet whatever dangers they must meet. Intelligence, a sense of responsibility for oneself and for others, and an appreciation of the relative values of life—these are as important in the field of safety as in any other field. In this field as in every other, the "truth shall make you free."

REPORT OF THE NOMINATING COMMITTEE

MRS. NEWMAN: For chairman, Miss Beard; vice-chairman, Mrs. Thomy; vice-chairman, Mrs. Dittmar; vice-chairman, Mrs. Newman and secretary, Mrs. Nutt.

(Miss Beard withdrew her name and Mrs. Thomy was nominated in her place. The report was adopted by unanimous vote.)

HOW WE INTEREST FOREIGN WOMEN

Mrs. James N. Downey, Chairman, Women's Safety Committee, Detroit, Mich.

In Detroit, we realize we are living in a motor state and the traffic problem is a big thing, but by no means is this the only thing to be considered. We have large industrial plants and many homes. The population has reached about a million and a quarter, and 65 people out of every 100 are foreign born, so you can see the large field for safety work.

The primary factor in the movement is public opinion and, in Detroit, we have many agencies working to arouse this necessary enthusiasm in public safety: the board of education, the police department. There is also a citizens' organization. There are women representatives of different organizations interested, and many from the large industrial plants are working. These busy men and women meet once a week to discuss the problems and try to devise means by which they can make Detroit safe.

Their plans are studied by the people, too, for the work they are doing is a tremendous work and the women are not to be outdone in this desire to teach means of safety whether it be on the street, in the factory or in the home. They have formed a women's safety movement, with all of the leading organizations being represented with members on the committee. The president and past president of the Detroit Federation of Women's Clubs; the president of the Parent-Teachers' Association, a representative from the Board of Education, from the Red Cross, the Board of Health, Visiting Nurses' Association, The Council of Catholic Women, the Council of Jewish Women, Camp Fire Girls, Y. W. C. A. and W. C. T. U.

These women meet about once a month and our chief work is in editing a pamphlet. This pamphlet is gotten up for home safety, and

with the help of these organizations, we have distributed 50,000. The Detroit Federation of Women's Clubs has the distinction of being the first to work for safety. They have paid for the distribution of these pamphlets among the foreign born. We consider this a great work.

During the campaign we always have a day set apart for women and at this time have a safety program, which is given with the leading women assisting. The Y. W. C. A. international movement, during the campaign, has had speakers and lessons in English—giving these to 32 groups—on safety. They also have distributed pamphlets. The speaker has a safety story sent to the leading foreign papers in the United States. She also has published articles on home hazards, or safety pleas for safety methods. This covers "falls, drowning and poison," and, I should say, all home hazards we can think of.

Speakers are sent to address the Bible students on the east side, to the colored and the foreign born, to teach the little ones, and Miss Beard is on our advisory committee. Miss Hutsell, of the Police Department, is active, also the Red Cross, and the Parent-Teachers' Association. Miss Beard is supervisor of safety education in the Detroit Public Schools, and she has done a wonderful amount of good.

In our talks, we stress home safety vigorously. Over 100 children met accidental death in Detroit last year. Half of these were caused by traffic and for the other half parents are to blame. There isn't a day passes that a serious accident does not occur. Lack of thought causes the same thing as malicious intent. We are pleading with the mothers—we tell them it is not only a man's problem, but the conservation of human life is a social thing. We are getting down to the very root of this evil and each and everyone should take an active interest in the saving of life and better living.

We feel there is another form of safety, and that is safety of our government. We are urging our women to take a part and stand back of the men with our best efforts to insure the moral as well as the physical safety of the older children. We are asking the parents for closer co-operation, especially with our children of high school age. I am out of patience with the reformers who hold up their hands in horror at the young people of today. I admire our young people; they are marvelous, they are independent, aggressive and courageous. Are we doing the right thing? Do we know their companions, their habits, or do they have religious instruction? These are things we should ask ourselves. They need our companionship—we must get their point of view, and they will profit by our point of view, if we are patient.

I am asking that we work together with the National Safety Council, in all of its phases, and make the United States the safest place in which to live.

CHAIRMAN THOMY: It gives me great pleasure to present to you Mrs. Bayless, president, Kentucky Federation of Women's Clubs.

MRS. BAYLESS: Inasmuch as the giving of life is women's part in the scheme of the universe, it naturally follows that woman is inter-

ested in the tenets of life and in the conservation of powers and forces attendant upon a perfect body, so the General Federation of Clubs is urging that all of the members co-operate with you in the plan of safety for children and adults, and this matter was taken up by one of the departments of the federated clubs and planned last week at Washington.

I am going to read to you the plans for co-operating with all agencies that are interested in safety, and particularly those of the National Safety Council, as the council is to be our leader in all matters pertaining to this subject. This is Mrs. Sherman's report.

A SUGGESTED SAFETY PROGRAM FOR THE GENERAL FEDERATION OF WOMEN'S CLUBS

1. **The Problem**

   [illegible] accidental deaths in the United States in 1922.
   [illegible] accidental deaths of children under 15 years of age.
   [illegible] automobile deaths, children and adults, 1922; nearly 2,000 more than in 1922.
   At least 30 times as many non-fatal injuries, many of them very serious.

   Five years trial of safety education in grade schools has proved that at least 50 per cent of fatalities to school children (from all causes), can be thus prevented. General experience indicates that through a comprehensive safety campaign 75 percent of all accidents could be prevented.

2. **The Part of Women and Women's Clubs**

   a. Work for introduction and effective continuance of safety education in schools.

   b. Inform all women of the need for home training of children, for safety both on the streets and at home.

   c. Take part in (or organize if need be) the general community safety campaign.

3. Specific Activities of the Federation

   a. Adopt Safety as a recognized object of study and activity. Assign some officer or committee member to give her principal attention to the intensive study of this subject during the next year, preferably spending a day or two at National Safety Council headquarters in Chicago, and also, if possible, at the Council's Education Section headquarters in New York, as well as studying the available literature. She should attend the Annual Safety Congress at Louisville, September 29-October 3, 1924, if possible.

   b. Articles on Safety in the Federation's magazine. (Material available in any desired amount, from National Safety Council.)

   c. In such articles, and otherwise, invite interested clubs or

women to write for further information either to the National Safety Council direct, or through the Federation.

d. Urge all state associations to adopt a similar program, and all local clubs to adopt the program which follows.

4. **Specific Activities of Local Clubs**

a. Ascertain the number, distribution and causes of fatal and non-fatal accidents in the community; inquire of coroner, police department, health department, and local safety council. If satisfactory statistics are not to be found, consult National Safety Council with regard to proper system of records to be installed by local officials.

b. Ascertain what is being done actually (not merely on paper) by schools, police, safety council, motor club, chamber of commerce, etc., to reduce accidents.

c. Present these facts at a meeting of the club. Draw attention particularly to accidents to children, their causes and location and preventive measures; likewise to all home accidents, their causes, and location by districts of the city.

d. If Safety is not being taught effectively in all public and parochial schools—or if Safety is being taught but child accidents still increase—work with Education Section of National Safety Council in securing introduction or improvement of such safety education, including children's safety patrols or junior safety councils.

e. Work for additional supervised playgrounds to keep children off the streets.

f. Work with the local safety council in its general program for community safety. If there is no local council, consult National Safety Council with regard to organizing one.

ADJOURNMENT

Joint Meeting of Public Safety and Education Sections

October 5, 1924

L. E. MacBRAYNE, Chairman,
General Manager, Massachusetts Safety Council, Boston, Mass.

CHAIRMAN MacBRAYNE: I would suggest that we use the next fiv or six minutes before we have the formal papers in a little informa discussion.

MR. A. W. WHITNEY (National Bureau of Casualty & Surety Unde writers, N. Y.): I am going to take advantage of this time to give little background of the situation that led up to our relationship wit the National Congress of Parents and Teachers. In the movement fc the introduction of safety education in the schools, the progress ha split up into two parts; first, the breaking of the ground and gettin hold of the more imaginative and progressive superintendents and cor munities and getting a certain amount of safety work started in th schools. That phase of the movement is about completed in that w have come now very distinctly to a second process. The breakin of the ground has gone far enough so that the idea has taken root i many cities successfully and we now have convinced the people wh control the educational policy of the country that safety education belon in the curriculm. It now becomes a problem of getting the thin actually over on a large scale, and the fact that we have been able interest such organizations as the National Congress of Parents an Teachers and the National Playground and Recreation Associations al represented on the program this afternoon, is very significant. We ma look forward now to very rapid development, and the problem now is n to sell the idea; we don't care so much for the publicity as we do abo the problem of actually putting it over and how it shall go over, how can be done in the very best way.

THE ORGANIZATION AND FUNCTION OF THE DEMONSTRATION CENTER

Harvey Gruver, Superintendent of Schools, Lynn, Mass.

My education so far as my attitude toward safety is concerned h been completely transformed. I owe a great debt to men such as C. '

Price, who came to Worcester several times in those two years and gave inspiring, helpful talks, not only to the Council but to civic organizations and to the educational forces of the city; to Dr. Paine, to Frank E. Norris, A. W. Whitney, Lewis E. MacBrayne, and Miss Arrowsmith and Miss Stevenson of the Educational Section of the National Safety Council.

The National Safety Council was extremely farsighted in selecting the method of school demonstration for getting safety over in the schools, because I know of no better way than through means such as that. Less than two years ago I had the honor of cooperating with Miss Arrowsmith in putting on the first demonstration in the city of Worcester. Since then a large number have been very successfully put on with increasing influence.

What I say will largely be the result of experience and also the result of seeing how the thing might have been done better if we had another chance.

In the first place you should select the school with a great deal of care. A school should be neither too large nor too small. For the most part it should be from perhaps 12 to 24 teachers. If it is smaller than 12 teachers it doesn't give us sufficient opportunity for the variety and scope of work that ought to be demonstrated during the demonstration period. If it is beyond 24 teachers it becomes a little too unwieldy and too hard to control, a little too hard to prevent waste energy and too difficult to keep within the line of the proper scope of the work that ought to be carried on.

Great care should be used in the selection of a principal. You must have a principal who enjoys undertaking a new task, who likes to do some pioneering, who has initiative, a principal who has had at least experience enough to know how to organize such a project and how to command the enthusiastic following of her teachers.

On the other hand, the principal must not be too old to be receptive to new ideas. It is quite desirable that her staff of teachers for the most part should be those who have most recently come into service. It is much easier for a young teacher to grasp the ideas involved in safety instruction where it has not been previously introduced in the course than it is for a teacher over 40 years of age. A young, vigorous principal and a staff of teachers from 12 to 24, mostly young, vigorous, still in the formative state of their professional growth and development, would perhaps afford the best type of opportunity.

Three Fundamental Considerations

In undertaking the work there are three fundamental considerations that must be observed. The principal and teachers must have an intelligent understanding of what the work will consist of. They cannot get that over night. It is better to select a school where they have been interested to a certain extent for a year or more so that in presenting the phases of the problem to be worked out it will not be wholly new

to them; they will recognize certain facts, and will be accustomed, perhaps, to think in terms of safety in their school, so that must be very carefully observed.

All the help that can be gotten should be secured for them. The Educational Section of the National Safety Council is willing to do all it can in this connection. The Council has literature which is quite valuable, and not only do they assist with the literature they have at hand, but they are willing in a personal way to give all the assistance that they possibly can. You may confidently expect the enthusiastic support of Mr. Whitney and his two able assistants, Miss Arrowsmith and Miss Stevenson, in putting on the program for demonstration purposes.

The school being selected and the task set, the principal and the teachers understanding for the most part what the work should be, next the program involved is to be considered. Everything should be done that possibly can be done to surround the school and the occasion with the proper atmosphere. The co-operation of the other city departments should be sought and secured. The police department especially can always be counted on to do its part. Safety lanes should be painted across the streets in front of the school building. A traffic officer should be on duty during this time to give proper instructions as to how the work may be carried on and relate itself to the work of the school.

In a similar way the fire department's co-operation should be secured. Fire departments are more than willing to do all they can to make the work interesting and effective from their point of view. So it is in other departments where the occasion makes it possible for their co-operation.

The plan should be very carefully and specifically made. Each teacher should be given a specific part of the work to carry on, to be completed, and, as far as it is possible, all the features that can be introduced into a school program ought to be worked out for the purpose of the demonstration, beginning with the first grade on up to the sixth, seventh or eighth, or as many grades as may be in the building under consideration. Of course, the work must be related to the school subjects. It must carry on, as far as possible, to the entire day or days of the demonstration. It is much better not to prolong the demonstration too long or not to make it too short. I should say for the most part two days ought to be set aside for this purpose. I doubt if a period longer than two days should be engaged in for the reason that it is a terrible strain on the teachers and the pupils, and by the end of the second day I have found the teachers are very much fatigued and I doubt very much whether the enthusiasm which must be carried throughout the entire procedure can be expected to last for the full three days. We must remember that for the weeks and even months preceding the demonstration, the teachers are under rather high strain. They must not be hurried. You can not attempt to get ready for a demonstration and put it on successfully in a month or two. It is very much better if they can have six months, preferably a year, if that can be arranged conveniently.

Work Must Be Sincere

Second, the attempt must be sincere. It must not be engaged in as a mere plaything, as an opportunity to get a little publicity from the local press and from the surrounding cities and from the National Safety Council, but those who are engaged in the endeavor must recognize that they have a real opportunity for service, that they are performing a service that is worth while and that, with every phase of the work presented, they must present something of worth.

Third, they must have energy, enthusiasm and the determination to see it through. I can't imagine anything more disastrous either from your point of view or from the local point of view than to engage in such an enterprise and start off with a rush and give every evidence of carrying the thing through in fine fashion and then at the last minute have the thing collapse. You must impress upon the teachers that it means work, hard work, that there must be unflagging enthusiasm and that they must see it through to the end no matter what may happen.

Perhaps one of the chief means of stimulation which the principal and teachers may appreciate is the fact that they are going to be given credit for what is being done. I have no sympathy for those who place such a responsibility as this on staff teachers and then try to appear to be the big noise and the whole show. At every conceivable turn give the principal and her teachers and the children and the janitors and the neighborhood the credit for the work that is being done. You must show that appreciation to the school committee and the public and to all who are concerned.

I can assure you that teachers who go into such an enterprise in such a way will go the limit and do everything they possibly can to carry the project through to a successful conclusion.

The poster can be used to great advantage. I doubt if there is any more effective way of getting safety over either from the teachers' standpoint or from the children's or the neighborhood's or the public in general than the poster. Children, especially from the fourth grade up, are tremendously resourceful in expressing themselves with color, and in the art classes, either in black and white, black and white and one color, or whatever the requirements may be, they can produce these posters.

Safety slogans are quite an effective means. We got some very unique productions in slogans. Especially if you have them printed and hung around the room they are effective. These posters can be used for school decorations.

Everything ought to be done that possibly can be done to give the school the atmosphere of safety, both outside and inside the building; the walls, corridors, stairways, even the basements should talk safety at every turn. The blackboards can be used very effectively for crayon drawings showing situations in which the safety element is a part. The English work can be very easily correlated and very effectively corre-

lated as a part of the program. Perhaps one of the most effective means is dramatization. Children love to dramatize. It is remarkable how well they can dramatize.

Portray Relation of Safety to School Work

In every phase of the work you can portray in important life terms the relation of safety to school instruction. Another important way of doing it is the sand table. For instance, one sand table portrayed a Safety Town in which all the elements were created on the floor where the children brought their toys from home, and they constructed a proper Safety Town with proper safeguards for street crossing; they utilized the means on the street for their sand table, showing what was necessary on the street on which the school was located to make it properly safe for children. Another was a beach where all the devices for safety were used. So on throughout the entire program, every element, every phase of school activity was portrayed in some fashion. Even in arithmetic a table was secured where the number of fatalities were given for men and women in a certain city during a certain period of time. The children took those tables and used them as a basis for their arithmetic lessons during those days. In almost every conceivable way the work was carried throughout the entire school program for the two days in safety problems.

The purpose of those two days were merely to show the possibilities of what could be done in a school program. Of course, we don't intensify we don't emphasize safety instruction to that extent throughout the year We merely give it its proper place in life in relation to vital problems For the purpose of demonstration one is certainly excused for placing undue emphasis and seeing to what extent in a legitimate way the safety phases of the school instruction can be carried over in a school program.

During these two days 50 odd schools were represented among the visitors. More than 200 homes were represented. Fifteen different cities were represented, about eight different superintendents, school committeemen and a host of others inspected the work.

THE ORGANIZATION OF THE JUNIOR SAFETY COUNCIL

Miss Emma Woerner, Louisville, Ky.

I look upon safety education with regard to the work from the kindergarten through the eighth grade in a way probably a little different from what some of you may look at it. To me it is nothing more nor less than form of discipline. It is a form of discipline because to me discipline in a school is nothing more or less than the expression of a school, never the repression within a school. If discipline is to be the expression of the school, we want it to mean to the boys and girls a very, very definite form

safety methods. There is no question of that, I think, in the mind of any man or woman here who may have worked out a program of safety for their own school.

Last year in the City of Louisville we had over 10,000 active members in our Junior Safety Councils. I don't know how many associate members we had.

It happens that in Louisville we have schools that run only through the fourth and fifth grades. Our Junior Safety Council organizations work, as I shall tell you in a moment, concerns only the sixth, the seventh and the eighth grades. The principals of the schools where they had no such grades came to me and said, "The need is just as great in our schools for some sort of a safety organization. What are you going to do for the girls and boys in the fourth and fifth grades?"

I said, "The thing we will do is simply to reverse the whole order of our active membership button and have the button with the green and white reversed, which will be our associate membership button, and that may be worn by any fourth or fifth grade girl or boy in a school where they do not have a Junior Safety Council."

When the original plan for the Junior Safety Council was taken out, we were not willing that the plans should be lost, so we incorporated a plan that every boy or girl eligible for Junior Safety Council membership should be or must be a boy or girl who lived up to those rules. In addition to that, any boy or girl eligible for membership had to learn the pledge, a pledge to look out for themselves and for the other people in their own school and on the highways and byways in the city. In addition to that we framed a code of 21 different habits. It would be almost an impossibility for an adult to go out and change over night and begin living up to 21 new rules that you had never thought about before.

We said to the principals in charge, "The thing that we want you to do is to go back to your school, talk over with the teachers in your building the three most necessary parts of this safety code, and have your children live up to those for a month. Next month take three more, so by the time the end of the term comes every boy and girl in your school may have lived up to the 21 different parts of the safety code."

It happened that in some parts of the City of Louisville there were many new buildings being erected, so the thing the principals in those districts felt needed to be stressed more than anything else was that no boy or girl should go in a building under construction. Often, children going near such buildings are hurt. The very first medal given in the City of Louisville for preservation of life was our gold star button, given to a little boy who at the risk of his life climbed out on the beam of a building and brought a little seven-year-old boy back to safety.

Besides working on the parts of the definite program that I have told you about, in some of our schools we had worked out a very definite civic program. We were not willing for those teachers and principals to tear down that civic program which they probably called their own civic

improvement league, but we simply asked them to take over the work a a department of their civic organization. Under those conditions th Junior Safety Council plan has functioned just as well as though we ha asked them to tear down and build up a new organization. The work i the school yards has been taken almost entirely over by the Junic Safety Council organization. They not only take care of the childre coming to school in the morning as they cross the streets, but they tak care of them passing up and down the halls, they map out with the facult adviser the plan for the fire drills monthly, and the place that the chi dren and the teachers should report during that fire drill; they take car of the passing to and from the yards at recess time; they look afte the drinking fountains. I suppose all of us believe in drinking fountain but we certainly do not believe in the teeth that have been broken as th result of a child's mouth coming in too close contact wtih the metal ri of the fountain. The Junior Safety Council lines the small boys up i a line and lets them come one at a time.

Last year, through a concerted effort on the part of the children in th schools, we were able to put across a safety program that is going to g even farther, because now we have appointed in the City of Louisville woman as head of safety and health. I don't know that any other scho system has taken over the subject in just that way. Personally we hel believe that it will work out very well. I can't see how a healt and safety program should not go hand in hand, building up a stron safer body for the boy and girl, and teaching the boy and girl how t preserve that health when it has been gained.

As for the future of safety work in Louisville, there is one plan th we have to look forward to, I think, and that is that we are going t have to teach more and more of our girls and boys to swim. Last ye I was struck by the fact that at least 60 per cent of the gold star buttor given for the actual saving of lives went to boys and girls who had gor down into our own river and dragged to safety some other boy or gi who would have been drowned otherwise.

The gold star button in Louisville is awarded for two very definite pu poses. First of all, any boy or girl, an active member of the Junior Safe Council organization, is privileged to wear this button who performs thr acts for safety, for instance helping a child across the street in the mor ing; if that boy or girl was on the safety patrol it would not count, b if they were not on the patrol and somewhere up in town helped a bc or girl, that would count. For three definite acts of safety a boy or gi may send in to the office of the supervisor an application for the go star button if they have kept all the code, have lived up to the health ar safety rules as outlined in that school, and perform these three defini acts for safety. Then we present the gold star button. In the case life saving we immediately give that button.

The effect that we are getting is not exactly what we want, becau we feel there should be some very definite recognition given to actu

to the National Safety Council, that some form of safety recognition be given out from the education headquarters for actual life saving among members of Junior Safety Councils throughout the United States. I think a button of that sort would mean more to a boy or girl than a Carnegie medal. I would like to see some plan set on foot whereby girls and boys all over the United States might be receiving the same award for the same type of willing sacrifice on their part to save the life of some other person.

It seems to me that a growing sensitiveness to the voice of safety establishes the background for activities which are possible only in an atmosphere of orderliness and lawfulness. The children who thus live through this type of self-control and group discipline help to create their own environment, and this may in time instill in them a basic interest in the principles of safety for themselves as individuals and later on as functioning members of the city and the commonwealth.

DISCUSSION

MR. PAUL F. STRICKER (Baltimore): A number of schools in our city have safety councils in one form or another and are doing different kinds of safety work. We want an outline or suggestions on how to go from a splendid demonstration center to every school in the city. Can it be dne best by a meeting of the principals or by a city-wide meeting of teachers? Just how could that best be done?

MR. GRUVER: The only criticism that was offered by the principals in this demonstration last spring was that other principals were not given a chance to do the same thing. All the principals during those days visited this demonstration and many had their teachers visit it also.

MR. STRICKER: Did you have any difficulty in getting the teachers to visit demonstration centers? I believe what we need is some method of inspiring the teachers, some method of just creating that beginning enthusiasm and arousing their interest so they will go to the demonstration center.

MR. GRUVER: I am a great believer in making such things, as nearly as possible, voluntary. In announcing this demonstration to the teachers of the city, they were not required to visit the demonstration. However, every teacher and every principal in the city was given the opportunity to visit, and as a consequence every school was represented by at least two or three teachers, including the principal, at the demonstration, which showed a very genuine and wholesome interest in the work that was being done.

MR. J. E. THOMPSON (Cleveland Safety Council): On that point I would like to say that we believe in Cleveland the Educational Section's monthly bulletin sent to each principal from the local Council with the request that it be passed around to all the teachers will add much to that inspiration to the starting of Safety Council work, because they will be getting something constructive and worth while twice a month. It will get them in the mood and make it easier.

MR. GRUVER: These are in great demand in our schools. Of cours they are perhaps a little unusually interested now because of the loc color which is displayed. Practically every one of the bulletins for t past few months has had the plays and posters reproduced.

CHAIRMAN MACBRAYNE: The cost of the bulletins is a dollar a ye The Educational Section will be glad to send copies to any one in yo district. We found no difficulty in finding the principal of the school the superintendent very willing to place them in the hands of strate teachers.

MR. WHITNEY: The price is only 50c in large quantities per year.

MR. H. O. ROUNDS (Detroit): The Board of Education of Detroit is sold on the question that it appointed a supervisor of health and safe who has taken charge of all of that branch of education in the schoo Beginning next month in the civics classes of the high schools, the traf ordinance as an ordinance, will be taught as a class subject. We ha in 125 schools the Junior Safety Council, the patrol section, and we ha organized this past year in 89 parochial schools the same thing.

We also have a medal that we are giving for service. On one si it has the safety cross and the words "The Safety Patrol Service Meda and on the other side the name of the pupil and for what it was giv Thi sis given to the members of every safety patrol. I have 5,000 in office at this time, and we expect to give out a large share of the 5,(before the end of the school next June.

THE PARENT-TEACHERS' ASSOCIATION AND WHAT CAN DO FOR SAFETY

Mrs. Arthur Watkins, National Congress of Parents and Teachers Washington, D. C.

The National Congress of Parents and Teachers stands primarily service, and it serves the children of the nation through helping parents to become trained. Do you realize that the profession parenthood is the only one for which our schools give no training? O recently, in a few of our universaries, have courses been started in tra ing for parenthood.

Before we had been working very long we found it was too big a t for this national body to take care of 48 states, that it would be m better if we had state branches, so these were formed. We now h 47 states, all but two of the states being organized. Nevada and Arkan are the only states not organized as state branches, and they hav large number of locals, but not quite enough to meet the requireme for the organizing of a state branch.

These state branches found before very long that they could not w effectively over such a large territory, and so they organized distri In some of these districts they have divided into county and city coun

The county and city councils are made up of local associations. I do not know how many districts we have. I am sending out a questionnaire to try and ascertain that this year, but I know we have somewhere between 12,000 and 20,000 locals. Those locals are made up of individuals, and of these we have 700,000.

Five years ago we had 119,000 members. That will show you something of our growth. Why are we growing in that way? Just because the educators of the country are coming to realize that with the parents behind them they can do anything. Our parent-teacher associations get out and work for bond issues, they do all sorts of things to help the schools, as many of you already know.

When you get us to help you, you can count on 700,000 individuals. But you say to me, "How in the world do you ever get the message from the National clear down to the individual?" I'll tell you about that. Please keep this organization in mind—the national, the state branch, district, county and city council, locals, individuals. It was found very, very early that we could work best by having in the national a national committee chairman who receives the messages direct from the board or from the convention. For instance, we just sent out a message to our national chairman of legislation to get busy on the child labor amendment.

How Organization Functions

This national committee chairman asks each state branch to appoint a state chairman. Let's take, for instance, the safety committee. This is one that has been organized, and may I tell you that Commissioner Meredith is our national chairman of our safety committee. He will send out a letter, which will be mimeographed in the national office, to the state presidents, which will say, "Will you please appoint a chairman of safety?" Each state persident will send to the national office the name of the state chairman of safety. The state chairman of safety will prepare a letter which will go out to the district chairman, saying, "Will you please see that we have a safety chairman in the county and city councils and also the locals in your group?" So almost before you know it we will not only have this national chairman of safety, but we will have a state chairman, a city, county and local chairman.

Just as soon as this national chairman finds time, he will prepare a program for the use of the states. Why doesn't he prepare a program for the use of the locals? Because that would be going over the head of the state chairman and it would not be doing the thing in a very courteous fashion. He will prepare a list of suggestions for the state chairman; the state chairman, acting on the suggestions contained in this letter, will prepare the same thing for the districts and for the locals. When you get the thing into the local association you probably will have a program presented once or twice or three times a year on the subject of safety, and there you will get your individuals.

We also have some other ways of helping on this safety program. have not only this form of organization, but we have divisions of th locals. We have local high school associations, we have junior h school associations, we have grade school associations, we have fath clubs, we have mothers' clubs, and best of all we have pre-school circ Here is where I take it our best safety work is to be done.

Miss Arrowsmith told me a few minutes ago that about 50 per cen the burns and accidents of that description come right in this per before the age of six. Then when should our emphasis be placed? Ri in the pre-school circles. That is organizations made up of fathers mothers of young children, too young to go to school. We want th parents to join these pre-school circles either just before the baby born or the day after, because the time has gone by when we as pare (I am one) can sit up and say, "Well, when Johnny goes to school will learn to mind, and when Johnny goes to school he will learn to all this and that and the other." No, no! Parents have got to step ri up and say, "When Johnny goes to school he must know how to mind he must know how to do all these things."

Parents Are Teachers

It is a fifty-fifty proposition, and we are trying to teach our paren we are having a terrible time—both fathers and mothers, that they h just as much to do with the education of the child as any teacher, when we get through sending damaged products to the teachers won't have so many school problems.

I wish that every one of you here would send to the national of which is in the National Education Association Bldg., Washington, D. 1201 Sixteenth St., Northwest, for this little booklet on History, Org zation and Program of Service. That program of service is your sa program.

THE RELATIONSHIP BETWEEN SAFETY AND REC ATION AND HOW EACH CAN HELP THE OTHER

Eugene T. Lies, Special Represenative, Playground and Recrea Association of America, Chicago, Ill.

The Safety Movement is in the interest of human welfare. recreation movement is in the interest of human welfare. Both ain make life worth the living. The safety promoter says, "Let's people go through the normal span of life whole." The recreation moter says, "Let's help people to go through the whole of life heal husky and happy." Both agree that the fundamental rights of Ameri citizens to life, liberty and the pursuit of happiness are not really g anteed if danger and death stalk everywhere and if environment inl [illegible] upon the spirit of men are too numerous

The safety man saves life and limb for the recreation man to train and make fit for democracy. Lives and limbs are the latter's raw material. Without them he has no reason for existence.

It is clearly apparent that there are close relationships between these two fields of endeavor.

In the safety field, possibly every problem involves two major elements, the thing and the person, and then, of course, their relation to each other, their possible right and wrong reaction each to the other. In the recreation field there is usually but one element for major consideration, the person. True, the problem of action and reaction between persons enters in, but it is the human factor as against the material thing that chiefly engages the attention.

The intermingling of the two types of problems is shown in striking fashion in a crowded tenement district of a city where traffic is unregulated and children play in the street because a playground is not near at hand. The result thereof is tragedy. Evidently at least three things are called for here:—regulation of traffic, safety instruction for children and parents and the provision of play space. However, slowing traffic in such neighborhoods and preaching "don'ts" to the human beings involved and letting it go at that leaves another problem unsolved, the problem of inhibited, repressed instincts in those children which should be free for exercise. Continue to inhibit and suppress them and you are sowing seeds for possibly still more serious trouble in other directions. The hunger for play *will* find outlets. The question is: Will we provide the wholesome outlets on a supervised playground or will we permit the boys and girls to go in the direction of least resistance?

That this particular problem of accidents to children from automobile traffic is a huge one in the United States is clearly indicated by the gruesome fact that about 4,000 little ones are killed and 250,000 injured every year, a veritable "slaughter of the innocents."

Backyard Playgrounds

If adequate public playground provision were to be made for all of the younger children it would be necessary to have centers everywhere within a quarter of a mile from their homes. But since such an ideal will not be reached for a long time, we propose the multiplication of back yard playgrounds for every home, those being intended principally for the smaller children who need the greatest protection from traffic dangers because of the difficulty of direct instruction in safety principles and because of their natural heedlessness. This implies the need of arousing interest in this subject among parents and of educational effort among them by the community recreation director as to the values in different types of play as well as an extension of their repertoire of games which they, in turn, can pass on to their children. In many places during a special "play week," promoted by recreation departments, it has been found possible to stimulate the making, by fathers and older boys, of a great deal of backyard equipment, such as sand-

boxes, swings, teeters, horizontal bars, etc. Widespread parent education on this whole subject of play for children, in all its aspects, is one of the great needs of the hour in America. I say this in view of its direct relation to safety, health, juvenile delinquency, crime and citizenship.

The question of proper placement of public play areas is a very important one from the standpoint of safety. They, of course, should be placed, wherever possible, away from main highways, on side streets. The approaches to them from the homes to be served should be by way of the smallest possible number of dangerous crossings. There is involved in the question also, consideration of the need of provision of play areas in all new subdivisions. This is when choice of location is wide open and lower cost of land is an easy prospect. Incidentally, the profits to subdividers from attractive layout plans with ample open spaces are greater from the mere solid gridiron type of planning.

There is one remaining consideration in respect to play grounds and that is as to what should be done in congested districts where there are few backyards, no public play areas or utilizable vacant lots. The only solution in such cases seems to be to close certain streets to traffic at stated hours and turn them into play grounds for the time being. Pavements, if of asphalt, can be flushed by the fire department. There will be special need for supervision because of the limitation as to types of games which can be played under the circumstnaces, with homes and adults all about.

Everywhere where studies have been made of results in injuries and death of children from street accidents before and after the establishment of public play centers under direction, there has been found a large reduction of such casualties. But the interesting thing worth while pointing out is that, in taking the child off the street and putting him on the supervised playground, you not only are protecting his life and limb but you are giving him the chance to develop strength, poise. endurance, decision, alertness, concentration, self-reliance, self-control, discipline, disease-resistance, muscular co-ordination, and thus you are fitting him for life in an age of strenuous and dangerous living as well as satisfying his natural craving for activity, association with his fellows and for joyous existence. "Safety" and "recreation" thus play effectively into each other's hands.

But repeatedly must we stress the point that if we adults want our children to play in the right places, at the right time and in the right way in order to get the most out of it, rather than in the wrong places, at the wrong time and in the wrong way thus letting them get the worst of it, then we adults must do some downright serious thinking and busy ourselves with the problem in all its phases. A *laissez faire* policy is a criminal policy. We adults bring the innocents into our adult made complicated civilization and ours is the responsibility not only to fit them to survive that civilization but to equip them to meet its new demands and perhaps push it forward a few degrees.

Five Thousand Children Killed At Play in 1920

One is reminded that play on the streets is not the only way in which playing children or adults may meet accidents. Statistics on the subject say there were in the United States in 1920, 5,447 fatal accidents met with during play time away from the streets. Something more than a third of these happened to children. Evidently, there is indicated here the need of cautionary safety instruction in the use of play apparatus, in the proper methods of using certain forms of recreation such as swimming, for example, in the observance of rules of, games intended to guard against undue and unnecessary violence; also training in alertness in avoiding dangers from thrown, hit or projected play objects and, finally, physical examination of participants in athletic activities calling for special physical strength and endurance in order to exclude the unfit. A valuable by-product from such examinations will be the discovery of weaknesses for which special exercises may be prescribed.

From the recreation angle again there is a fine opportunity of teaching the younger children safety ideas and inculcating safety habits through special games, simple dramatic playlets and pantomimes and through the learning and singing of songs incorporating such ideas and set to well-known tunes. The Massachusetts Safety Council, of which Mr. Lewis E. Mac Brayne is general manager; special committee headed by George B. Masslich and appointed by the superintendent of schools of Chicago in 1923, the Cleveland schools, the Oregon State Department of Education, Mr. A. W. Whitney of the National Safety Council and others have done excellent creative work in devising such media, which can be utilized both in schools and playcenters. It is likely, however, that all such instruction will be more effective in the school where the didactic spirit is accepted by children rather than on the public playground where the freer and more joyous play spirit dominates the situation. Furthermore, it is utilizable principally with the younger group of children, possibly below ten; with the older ones it is likely to evoke ridicule rather than serious respect.

In the field of industry there is increasing recognition of the value of all forms of constructive recreation for keeping workers physically fit, mentally alert and spiritually happy: for such workers, it is found, do show greater efficiency and carefulness on their jobs, which in turn means fewer accidents.

The Santa Fe Railroad is spending large sums for workers' recreation grounds and building along its right of way, its officials declaring that they are "taking the wreck out of the Santa Fe System by taking the wreck out of recreation." Among other things these officials and other industrial leaders are thinking of the dangerous after-effects revealed during the time they are on the job of the wrong use of time while they are off the job.

Facilities for noon-hour physical play connected with industrial plants will pay big dividends in restored nerves, physical balance and fresh

spirits. For some types of workers it is true that other forms of recreation, e. g., along musical lines, will be more effective restoratives and preparation for further labor.

We know that two dominant characteristics of present day industry are the automatic machine and the minute division of labor processes which call upon the worker for the utilization of but a few minor muscles. And when we remember that such a large part of this labor is done within four factory walls we begin to grasp the need by these hundreds of thousands of human beings of those forms of recreation which bring into play the larger muscles, the breathing aparatus and which give the heart its proper exercise.

In this very connection let us remember that, according to the Life Extension Institute, while the great plagues like smallpox, tuberculosis and yellow fever are being conquered, yet the "degenerative diseases' due to defective organs, stomach, heart and lungs are greatly increasing Our monotonous, sedentary industrial life may be largely to blame.

Boyd Fisher declares that figures in his possession prove that nearly 90 per cent of the illnesses among factory people are due to indigestion infection of nose and throat and other troubles, due to too little physica activity, sluggish circulation, dissipating energies and comparative over eating.

Without adequate disposal of waste combustion products in the human being there results what Mr. Fisher calls "energy blockade," but thi pent-up energy breaks through often in the form of spasmodic move ments and other uninvited ways. Nervousness and strain are additiona by-products.

Recreation in Industry

Factory managers everywhere need to grasp these important truth in relation to the health and safety of their employees. In the Henr T. Noyes Co. factory in Rochester and in that of Joseph and Feiss nc only are "rest periods" provided but it is insisted that, during thos periods the workers shall engage in energetic activities, such as dancing group games, etc. Here we have a clear recognition of the therapeuti accident-preventing and spirit-reviving value of recreation.

But it must be remembered here that such so-called "rest periods are not sufficient to meet the whole problem. The larger part of must be met outside of the industrial plant and that means durin off-time.

And so in addition to provision of these sorts in direct connection wit plants there is much thought being given also by leaders in industr and outside of it to the need of municipally maintained recreatic systems which shall deal with the general leisure time problem of th community, serving all the people and all ages, thus including prese industrial workers and future industrial workers.

There surely can be no question but that when all the people get th habit of taking regular physical exercise especially in forms mac attractive through the introduction of the fun and competitive element when they get well rooted in their consciousness and act out the tru

that they need wholesome, frolicsome social contacts and indulgence in esthetic expression—that then we shall have a people marked by qualities of health, courage, alertness, steadiness, morals; in other words a people fit to meet more successfully the demands of a bustling strenuous age. We shall then have less impulsiveness and carelessness in the worker at his automatic machine, in the driver of a high-powered car, in the pedestrian on the crowded street crossing.

But we must realize that we are still very far from this happy state. Are we aware of the fact that in the matter of physical education, only about one-tenth of our 25 million school children are now receiving any worthwhile training? This is due to the non-existence of legislation on the subject in many states or defective legislation or to faulty application of existing laws by schoolmen. Do we realize that, though much progress in municipal recreation has been made in the last 25 years, there are still over 400 cities of 8,000 population and upward, not to speak of hundreds of others of smaller population. that have done woefully little to meet the needs of their people. They go on blithely year after year paying the mounting costs of dealing with disease, insanity, crime and accidents when they could easily save huge sums by doing more along preventive lines.

The Playground and Recreation Association of America is busily engaged in the effort to arouse public officials to greater activity in the recreation line and is offering them 18 years of experience as aid in such endeavors.

DISCUSSION

CHAIRMAN MACBRAYNE: The discussion will now be led by Mr. George B. Masslich, Superintendent of the Chicago and Cook County School for Boys, Riverside, Ill.

MR. GEORGE B. MASSLICH: This is significant, that every school man, particularly the superintendent of the school in the big city, wants to call attention of the lay people outside to the fact that the schools are being starved, they have been asked to do more than they can do on the money that is given them.

Traffic conditions are getting worse. Automobiles are getting more numerous and faster. Children are being pushed out on the street because there are fewer backyards and fewer play spaces.

I stress this more than everything else this afternoon—men in industry are working with automatic machinery now. The joy of individual achievement has gone out of the money making life of today in a way that we don't realize, and men and women, as well as children, have got to find the joy of living outside the four walls of the factory.

If we are going to have no backyards, if our playground space is going to be taken up by skyscrapers and we are going to be thrust out on the street and then run over by automobiles, what is the use of try-

ing to live anyway? That is the need of safety instruction, starting with the pre-school circles, these children who fall down and get hurt and get burned with the gas burner and spill hot water on themselves; we must start with and work mighty hard in safety.

Recreation Programs Tried Throughout Country

MR. FRED C. WILLIAMS (Springfield): I am interested in knowing how many cities are following a recreation program now.

MR. LIES: Everywhere where they have established a modern type of recreation department or system that is part of the program. It isn't any more exclusively devoted to the getting of public playgrounds in certain definite areas, but the program is in the broadest possible way the whole question of recreation for all the people and recreation in many places for all the people, and so the beginning of the program is the home and its immediate environment. That would include, therefore, the back-yard and the neighborhood vacant areas of all kinds that are not built upon. The thing is growing and is developing fast.

MR. WALL: I might say, Mr. Lies, that Dr. Moore has induced at least one apartment house builder in New York City to introduce that feature for the playground.

MR. E. H. COTCHER: (Managing Director, Chatanooga Safety Council) In Chattanooga they had a playground association last summer, supported partly by city funds and partly by voluntary contributions. When they attempted to dismantle one of the playgrounds in so far as the apparatus was concerned, the children kicked and said to the men who were taking it down, "What are you tearing up our playground for?" The men took the playground apparatus off and the children promptly waited on the playground people, and a compromise was reached and they put back the apparatus which was considered safe and are now using several of those playgrounds without any supervision whatsoever. It seemed the only solution of the problem. Apparently it is satisfactory, or has been so far. I am wondering if we are liable to get into trouble or if that is the right way to solve it.

MR. PAUL F. STRICKER (Baltimore): The attitude of the playground leaders in Baltimore might be interesting along that line. There has been considerable agitation relative to opening up school yards without supervision or without supervising play leaders. The playground people, I believe, take the attitude that you can no more conduct a playground without a play leader than you can conduct a Bible school without a Bible teacher. The results which you get without the play leader are rather detrimental. We have been fortunate there in getting additional play leaders and getting additional playgrounds, but that is the attitude of the playground people in Balimore.

Closing Streets For Use as Playgrounds

CHAIRMAN MACBRAYNE: I would rather see children play anywhere than in the highway. In one section of Boston last year they tried the experiment of closing certain strets as play streets during the entire summer

in that area, which has a population of 70,000. There was only one child killed, a very low record. That is a place that fairly teems with children

MR. E. B. LEFFERTS (Los Angeles): A question was mentioned by one of the speakers as to the method in which they have put their safety work and their safety organizations in the schools, most of it being voluntary That is the plan that we have followed in Los Angeles. We have tried to sell them the idea rather than force it in. I know in some states notably California, fire prevention has been a compulsory subject by an act of the legislature. I am wondering if any experience has been had with respect to the compulsion of safety education in the schools or whether in every place where any has been done it has been done from the voluntary standpoint.

CHAIRMAN MACBRAYNE: In Massachusetts a bill was drafted making it compulsory to give a short period of safety instruction in every school throughout the state. That was defeated in the House. We held a conference after its defeat and came to the conclusion that if there was any objection whatsoever it might be better to put the idea over through the superintendents. The matter was then presented at a dinner of the superintendents held last May, and I think the record will show that Massachusetts has shown as lively an interest in safety instruction in the schools as perhaps any other state.

MR. REEDER (National Safety Council): We have been discussing this afternoon some topics that center around two general classes of accidents: First, accidents in the home, all classes of accidents to all ages of persons: second child traffic fatalities.

In connection with those and the agencies which we have been discussing for reaching and preventing those classes of accidents, it seems to me there is a fundamental thing in the places where those accidents occur in the community. You will be interested to know, perhaps, that we have made the national community safety surveys, which have shown a striking coincidence to say the least. I don't say that it is necessarily true in all communities, but it was true in both the communities which we surveyed. We found that the home accidents, that is the home fatalities, were centered in certain localities largely. We found in the City of Cincinnati, and also in the City of Kansas City, three general localities or areas in which we found home accidents were highly concentrated from the standpoint of fatalities. Those areas we found, upon study, to consist of populations of certain characteristics, largely colored sections and poor tenement districts.

I might say also that our child automobile fatalities spot map, which we made of Cincinnati, indicated a very large percentage of them occuring within the same district.

I am not here to present a solution but to challenge your attention to one thing, that is that we must very definiely attack the problems where they are occuring or where they exist, and the various institutions, the schools, and parent-teacher associations and playground associations, and so on, must recognize, I believe, the existence of just such a statistical

record as we have here given and the fact that we must direct the greater portion of our attention to points where accidents are most frequent.

MR. LIES: I want to refer to a table on which there are some little booklets on various recreational lines in the back of the room. In those towns where tax funds are not available, at least not available in sufficient amount to get supervision wherever it ought to be had on playgrounds, it is well to keep in mind that there are organizations that are keenly interested in this thing and that are in existence in nearly every community today of any size. I speak of the Rotary Club, the Kiwanis, the Lion's, the Elks, the Junior Chamber of Commerce, the Parent-Teacher associations themselves, which are keenly interested in this whole question of recreation, particularly for children, and who are making in many of those organizations a line like that of special interest, and who often do, according to our knowledge, furnish funds for temporary purposes at least in providing such supervision until tax funds become available. It is just an interim in the way out of the problem.

MR. BERT N. WHEELER (Commissioner of Public Safety, Duluth, Minn.): I might say in connection with that that we had a very serious hazard near one of our schools and we roped off the street at two avenues during the recess time both morning and afternoon so as to protect the children and give them a playground.

People Object to Street Being Roped off

CHAIRMAN MACBRAYNE: In another city the people who lived around the street objected to it. They happened to have selected a street where there were automobiles and dogs in greater number than children. They didn't want so many children around their street making a noise, and they so notified the park commissioner.

MR. SIDNEY WILLIAMS: (National Safety Council): I am speaking as a more or less humble citizen of Evanston, Ill., and the personal representative of the officers of a local mothers' club. I want to ask Mr. Lies whether he would approve of the practice that I believe is being used in Evanston of helping out the supervision of playgrounds by the use of definitely appointed and commissioned boys as a sort of junior police organization. There is no Junior Safety Council in my city, I am sorry to say, but this is a sort of similar organization, boys that are given some sort of recognition by the city government as police for these playgrounds. Is that good business?

MR. LIES: Yes. It is being done increasingly around the country, and Chicago is doing quite a little of it on the playgrounds.

MR. CARROLL ROBB: (National Safety Council): The question of playgrounds is a thing that should be given the attention of all the realtors in the country. The most successful realtors set aside 10 per cent of any new subdivision for playgrounds.

MR. LIES: Armand has done it himself and has been preaching it. H got the National Real Estate Board Association to adopt a principle c that kind.

DR. WILLIS A. MOORE: (Greater Cincinnati Safety Council): I am gla to contribute the experience in Cincinnati. An organization called Con munity Service, among other things has been doing this kind of wor for several years, which is very greatly appreciated. Several street are roped off. They take a very long one, as long as three city block and from 5:30 until dark play is organized, always supervised, in thos sections on those setreets. The workers are voluntary workers wh have been trained by Community Service, and some of the automobile are asked to come around on certain nights and carry girls dressed u as gypsies, who are trained to tell stories, and stories are told to th children in these streets for 20 minute periods and then they take the to another playground. This organized play has gone on for a numbe of years very successfully in the poorer quarters of Cincinnati.

ADJOURNMENT

Public Utilities Section

September 30, October 1 and 2, 1924

H. W. MOSES, Chairman
Superintendent, Employment Bureau, Edison Electric Illuminating Company, Boston, Mass.

B. B. McCULLOCH, Vice-Chairman
Bureau of Safety, Chicago, Ill.

J. B. DOUGLAS, Vice-Chairman
United Gas Improvement Company, Philadelphia, Pa.

H. M. WEBBER. Vice-Chairman
Illinois Bell Telephone Company, Chicago, Ill.

GEORGE OPP, Secretary
Safety Engineer, Detroit Edison Company, Detroit, Mich.

CHAIRMAN MOSES: Gentlemen, we will listen to the report of the secretary, presenting his own report as secretary and embodying with that, the report of the chairman of our various sub-committees.

REPORT OF SECRETARY

George Opp

Your officers of the past year have endeavored to do their utmost to achieve the maximum contact of the entity of the National Safety Council, with safety men and executives of the various company members—the objective, if I may use some similes here, to "do or say it electrically" was to keep all the "wires" ever hot between the "generators" of good work in the Safety Movement and the agencies ("motors") whereby this energy was to be transformed into real and useful work. As soon as any individual part of our body of 310 company-members and 12 associated companies submitted a suggestion or device the whole organization, or that part directly interested therein was communicated with.

Our media of communication were the News Letters (of which five were issued) and the special messages, letters and telegrams that

were created whenever items of special interest arose. (A total of 3,430 pieces of mail matter being issued by our secretary.)

So you see we have made use of all of the elements of our component membership—all the public utilities—endeavoring to assist all and to use the cumulative efforts of all parts to advance the whole.

To be of service was the outstanding desire of the executive committee of this section. "Making this a year of mutual service" was the motto of the officers of this section as expressed at their first meeting in New York City last January 18th.

Then following this meeting in New York City were held a two-day meeting at Detroit on March 13 and 14 and a session at Philadelphia, on June 24, 1924.

The crystalization of the desire expressed at the opening and each subsequent meeting came in the effort to give the membership the utmost in service. How well this service has been rendered is left for you to judge for yourselves; viz:

1. "Better bulletins" was the desire and I believe, also the achievement of the bulletin committee—under the able chairmanship of Mr. H. W. Lueck. In this connection, let me say in the absence of Mr. Lueck that he has provided enough bulletin material to run to the first of next year. However, I repeat the words of the secretary of last year, that no section meeting is complete without an appeal for help in the preparation of the safety bulletins. The continued success of the section is not alone dependent on the service it renders the members but equally as well the assistance received from the members.

2. Providing the program of activity for the section for the year, to consider the advisability of geographically divisional meetings as well as providing the program of papers and discussion for this section of this congress—all this coming largely from the hand and mind of H. C. Lucas. He has worked hard to give us what I believe you will all agree will outrank any prior congress program for real meritorious interest and instructiveness. Due to recent illness Mr. Lucas cannot attend this meeting. I believe that we all know how much it means to him not to be able to attend these meetings and how glad he would be to be here with us.

3. Spreading the benefit of our organized safety work to the many companies previously not identified with the National Safety Council was the particular field of the membership committee. The fact that a total of 54 new companies (thrice the accretions of the previous 12 months) have been added to the roll of membership of our section during the past year is saying a great deal—but to add that not a single large company-member was inclined or permitted to drop their membership—except for the reason of their consolidation with other companies (and in these cases the newer and bigger companies were brought into the fold if they were not already members of the National Safety Council) is adding volumes—all to the credit of David Daly, chairman of our membership committee, who performed constantly

and indefatigably the function of securing new members and holdin all of the old ones who might be inclined to withdraw for economi or other reasons. Mr. Daly has been a real salesman of the Publi Utilities Section to those who never before displayed interest in th National Safety Council. Our section, as far as we are able to ascertai is still the largest section, in point of number of company-membership in the National Safety Council.

4. To do the old things better and to do the new things as we was the function of B. B. McCulloch, your vice-chairman, who havin graduated from the secretaryship of last year, is responsible for man valuable suggestions made during the past year.

5. To give us the added benefit of a year's tenure as chairman the Public Utilities Section was the privilege of A. O. Mitchell.

6. As "minister plenipotentiary" for the gas interests and also collal orating with Mr. Mitchell, Mr. J. B. Douglas was an ardent worke attending all executive committee meetings—in spite of the fact tha on two occasions he had to break in on his own regular business trip and cover considerable mileage to get to the meeting places.

7. Acting as our special representative to the Engineering Sectio of the National Safety Council, H. J. Burton has been ready to serv the best interests of our section in the deliberations and activities the Engineering Section.

8. Keeping the paths of communication open to the world is a natur function of a telephone man—and such a one is Harry M. Webbe He was ever ready to sit in deliberate counsel with the rest of th executive committee and then "tell the world" of the good works safety.

9. Keeping all parts of a big and scattered organization like ou section—scattered geographically and having three distinct lines interest of major importance each playing a leading role in the country big business and daily life—is a function that belongs properly to master-worker only. And such a one has been our chairman, H. V Moses. He has been busy day and night—while on his own job at h own office and even while vacationing from that—thinking, plannin working all of the time for the good, and the advancement, of the Publ Utilities Section. As chief executive officer he has been a wonder.

10. To keep you advised of the items of possible interest from tim to time and to help you get an answer for the various problems whi have been submitted by many members and to attempt to organize permanent and continuing bureau of the accident records of the vario member-companies of our section, (An early issue of the *National Safe News*, will give you a detailed summary of the accident reports of or more member companies—gas, telephone and electric, who ha sent me statistical digests of their accident records in response to t

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN MOSES: The next order of business is the appointing of a nominating committee. I take pleasure in appointing on that committee Mr. Wills MacLachlan, Mr. J. B. Douglas and Mr. H. A. Mott.

REVIEW OF SAFETY MOVEMENT

Magnus W. Alexander, Managing Director, National Industrial Conference Board, New York City

I have a strong urge to express my satisfaction at being present at this birthday anniversary of the National Safety Council, and to reflect how this babe of only 13 years has developed into a strong and sturdy and very useful factor in our national life.

To be perfectly frank, there was a time in the early days of this baby's struggles when I was apprehensive of its loud-voiced and flambouyant insistence to press its precious existence upon the notice of the people. But, after all, this children's disease, so to speak, was only a natural symptom of a young life and soon it ran its course.

In recording this incident I do it, not with any purpose of criticism but in order to set against this background the splendid achievements of the National Safety Council since, and its value in our industrial economic structure.

To me, somewhat of a veteran in the safety movement, this issue has a two-fold appeal. I recognize its strong economic value and necessity, to make the work and leisure periods of life safe, in the factory and the mill, on the street, beneath the surface and above it, in the home and in places of congregation, be it for worship or amusement.

But I also recognize its great social value and necessity as a factor in general citizenship development with its appeal to the observance of, and obedience to, reasonable rules and regulations for personal and public welfare and with its stimulus to us as a nation worthy of the inheritance of our fathers, the founders of our Republic, to continue their progress and even their daring, but to do so with due caution and due regard for the lives and limbs of others as well as of our own.

The closer, therefore, our work and activities come to the activities of the community in which we live and labor, the more does the civic as well as the economic factor in the safety movement press upon us as a human obligation. Hence, its special significance in the field of public utilities, so important a part of our industrial organization.

Any one asked to enumerate the major characteristics that set off modern industrial life as against that of a generation or a century ago, would place close at the top of the list the high degree of specialization and centralization in industry, which has gone hand in hand with the development of quantity or mass production, and the great attention

now given to the human equation in industry. These two factors st
out so prominently that they cannot escape attention. Furtherm
any one asked which of these two he would consider more in
ascendant and likely to be of greater importance in our economic
a generation hence would surely name, in my judgment, the hu
aspect.

Personal Welfare

Where the combination movement in industry with its developn
of large scale factory operation and its massing of large number
employees under single managerial control seemed for a time to en
and to obscure the human aspect in our worklife, there is no ques
but that in the last few decades a change has been going on that
resulted in even greater attention to the personal welfare of
employee and greater protection of each worker, than he ever h
tofore had enjoyed. It is a common failing of the human race to
round the past with a certain rosy sentimentalism that tends to ig
real conditions. Any one who attempts to describe the period en
passed by the words "when I was a boy" is very apt to paint a pic
of glorious life and satisfactions and fine conditions that is ra
quite in accord with the facts. "The good old times" were good
times only in the sense that man's wants were fewer and simpler
therefore, less difficult to satisfy; but, actually, conditions of the
old times were quite hard. Human beings died of diseases and ailm
that are today absolutely under the control of medical science. T
for a moment of the difficulties in communication that existed
nay, thirty years ago, and what the railroad and the steamship, the
plane, the automobile and good roads, the telephone, the radio,
accomplished for our comfort and for our safety. The houses in w
the wealthy of a generation ago gloried, are today the tenements
the cold water flats of the foreign quarters and of the poor.

In a similar way, we are apt to point with satisfaction to the p
in which manufacturing was simple, when the contact between empl
and employer was direct and intimate, and their relation was clo
the ideal. As a matter of fact, the picture of the good old times in
respect is not so rosy for wages and living conditions were relat
low, hours of work quite long, and conditions of work not always
and sanitary. Unemployment and stoppages of work were more
quent and, generally, of longer duration and greater hardships
they are usually today.

Better Working Conditions

At present, despite the fact that about 40 per cent of all the empl
in manufacturing are in only about one per cent of the industrial e
lishments, work conditions are far more humane and better in every
than they have been, and the improvement is still steadily goin
Certainly, it may be said that, while industry has become more
plex and complicated and, with it, the risk factor has loomed gr

both in frequency and severity, the steady tendency of industrial management has been in the direction of protecting the human element from the risks inherent in the industrial-economic system; and in so far as management has not voluntarily essayed to overcome these risks for the benefit of the employees or to pay for their consequences, society has insisted upon placing this obligation upon industry and upon the state.

Moreover, this progress is actuated by a broad, humanitarian spirit combined with sound business sense, and it is carried on in the United States in a way and to a degree found in no other industrial country of the world. The United States is now the leading industrial nation of the world and she will continue to hold that position as long as she will place the highest value upon the well-being of her industrial personnel.

The safety movement may be claimed to have been in the forefront of that great humanizing influence in industry which occupies so prominent a place in industrial management of today. The strides made in safety and sanitation in the last few decades have wrought a veritable revolution in working conditions. The attention given to these factors by individual managers and by the different states in their labor codes, the astonishingly large number of states that in a short period adopted Workmen's Compensation laws, and the marked tendency for liberalizing and improving these laws in many states, are merely evidences of the changed conditions which I have been describing.

Two factors in the main assisted in the progress of the Safety Movement:

First: A quickening of the individual, as well as of the public consciousness in respect to the duty of industry and commerce and of business generally to those therein engaged; and

Second: A recognition that unsafe and unsanitary work places are not good business.

As industry became more highly intensified and the managerial burden became greater, it was natural that men with broad vision and great ability should be called into control. Great burdens require great mental and physical backs to carry them, and the new type of industrial manager, who took the place of the old employer-capitalist, has been and is being actuated by a sense of obligation that it is the duty of industry to make work places as safe and sanitary as reasonably may be.

But, had the Safety Movement rested on humanitarian grounds alone, it would, I fear, have suffered from the same fitful progress of all movements in which the emotional element is the motivating part. The recognition of the losses to the industrial employer from unsafe and unsanitary working places presented a practical consideration no less powerful than the humanitarian motive. Whereas in 1850, the average per capita investment for each employee in American manufacturing industry was $328, in 1920, according to government figures, it had risen to $4,901. Between 1850 and 1920 the capital investment

for each worker in agricultural machinery and implement manufactu rose from $495 to $6,764; in boot and shoe manufacturing, from $122 $2,902; in cotton manufacturing, from $242 to $4,338; in wool man facturing, from $738 to $4,987; in silk manufacturing from $356 to $4,12 and in the iron and steel industry, the capital investment per employ rose from $669 to $7,082, within a seventy year period.

In the public utilities group, information is naturally not available f 1850, since the electrical manufacturing industry dates from a lat period. In the year 1920, however, the capital investment per employ in public utilities shows a wide range. In central stations it was $30,50 in electric railways it was $18,140; in the telephone industry, with i many thousands of employees, it was $6,000 and in the telegraph indust it was $3,000.

With this increased overhead, represented in capital investment, t loss from idle machines has become fairly great and important. Wheth the idleness be due to causes chargeable to the worker or to manager organizations, there is now a constant attempt made on the part management to reduce this loss from idle equipment.

Safety and Business Competition

The loss, on the other hand, arising from injuries to workers, h been more easily apparent and, because the number of injuries w rather large, it was but natural that effective steps should have be taken to correct this condition and thus to help reduce costs of prod tion. Reduction of the cost of production is a necessity that is loomi larger and larger and more important in our national and internatio economy. Not only within our national borders but increasingly the markets of the world, competition for business is growing keen and the low-cost, quality producer will eventually carry off the pa of victory. The Dawes plan, offered for the economic reconstruction European nations and accepted at the recent London Conference, going to give emphasis to this point. It will usher in a competition fr Europe so keen that our best wits in reducing our cost of producti and that is a different matter from reducing labor wages, will ha to be employed to a much sharper degree than ever before, to g us an oportunity in world trade.

Let us make no mistake. A high labor wage can go with a low c of production, as a low labor wage can be a part of a high cost of p duction. To keep costs of production low, it is necessary to impro steadily technical processes and methods of management, but no l to make steadily better and more efficient use of the labor forces a the individual worker. Much creditable work has already been d along these lines, yet much more needs to be done in this field. make the individual worker in high place and in low an efficient produ means to keep him healthy and safe, but to accomplish this task requi

moting and protecting the well-being of his workers be joined by the closest co-operation on the part of the employee and by the latter's alertness and caution in all his work in his place of employment, in his home and elsewhere.

Accident prevention will not prevent unless he who might otherwise be the victim helps to prevent it. Various ways and means have been used through all the ages to offset the hazards of life. New conditions have called for new remedies. Publicity has been one of the major means of centering attention upon the accident prevention problem. Some of this publicity has been well done; much of it has been, and still is, of a character that deserves but little commendation and sometimes a great deal of condemnation. Indeed, the tenor of much of this publicity has been of a kind to give an entirely false representation of what conditions really are, and to place an entirely wrong emphasis on the way to meet the problem. The steps so often in the public press and on the public forum, some of which no doubt spring from entirely well-meant motives, to exploit the number and the character of work accidents have tended to give an impression that industry is a veritable slaughter-house in which men are mangled and killed with regularity and in such great numbers as to make war in comparison almost look like a pleasant pastime. Often, for purposes of sensationalism or attack the number and severity of accidents has been greatly exaggerated, and such misstatements have tended to create the picture that industry was a sort of Frankenstein into which men went whole-bodied and eager to work and come out broken and unfit for anything but the scrap heap. Yet, how many persons recognize that the average man is safer in the modern factory, in the mine or in the quarry, than he is outside of it?

Mortality Figures

Let us look at some figures in corroboration of this perhaps startling but perfectly truthful statement. The mortality statistics gathered by the U. S. Bureau of the Census present official information in proof of this but, unfortunately, the information is but little known. The latest available statistics relate to the year 1922 and show that in that year in every 100,000 people of the population 2.1 died from accidents in mines and quarries, 1.8 from accident by machines, 6.0 through railroad accidents, 1.6 from street car and 11.5 from automobile accidents, and 7.3 by drowning. In other words, only 3.9 accidents of fatal character traceable directly to the hazards of production are offset by 33.3 fatal accidents in which the burden of responsibility rests on society rather than on industry. But even recognizing that some of the accidents in transportation can no doubt, be laid at the door of management, a far greater number affects persons that are not at all employed by railroads. Yet, even taking all these as belonging to the group of fatal accidents, traceable to the neglect of mismanagement of the managerial organization, there still would be a ratio of 9.9 fatal accidents traceable in one way or another to the hazards of production and to the neglec

of industrial management as against 20.4 of non-industrial character every 100,000 persons of the population.

I first intended to draw a similar picture in regard to non-fatal ac dents, but found this to be a somewhat hopeless task. It is true, thou unfortunate, that there is no clearly defined body of statistics availab in respect to accidents of non-fatal character. It is the difference accident statistics gathered by various official bodies, departments labor and industry or accident boards throughout the country th makes a comparison futile. What in one case is a scratch on a fing and is reported as an accident, is in another case of far more seve injury not reported at all. Whereas, quite often, when a worker in factory suffers a slight cut of the skin, the factory management obligated to report that case to the governmental agency as an accide the same person, sustaining at home or on the farm or elsewhere even deeper cut on his finger will usually continue at his work witho making, or having made for him, any accident report. I am sure th the National Safety Council recognizes the need for revision of accide statistics throughout the country, and I wish it Godspeed in this ve important work of revision whenever it shall choose to undertake

Dissemination of Information

Truthful statements in regard to the occurrence of accidents and the severity should be given to the public through governmental agenci through the press or other media of public expression and in ea factory should be made available to the employees by the managemen but for the sake of fairness no less than the sake of educational val of such statistics, the facts should be placed in their proper setti and given their proper meaning and evaluation.

A second false note was struck by the emphasis so readily and glib laid on the possibility of doing away with all work accidents, and the assertion that the accomplishment of this millennium rested entire in the magic hand of industrial management. The fact that the mc complete safeguarding of all machinery and all dangerous places and around workrooms can prevent only a very small proportion industrial injuries, that the greatest number of accidents are caus by the carelessness, that carelessness of many employees is habitu and that careless workers do not voluntarily train themselves to cautious, is to often entirely ignored. The element of necessity caution in every human being continues too often to be subordinat and overlooked. In this sense, the slogan "Safety First" has to r mind been misleading, since it gives the impression that the spe factor of the industrial machine can be absolutely controlled by t individual. It has failed and fails to take cognizance of the fact th *Personal Caution* is, after all, and always will be the greatest safegua for the individual.

Is it not true, that, however great and urgent may be the need f

and use of devices and methods that will instill a spirit of caution int the thoughts and habits of all workers is infinitely greater and mor imperative?

"Safety first" is in constant practical conflict with the accelerate and accelerating work that our civilization seems to demand, and h who would fully practice this preachment is apt to be left hopelessl behind on the speedway of life. Be careful is compatible with spee and even with daring, and its steady practice can keep the individua abreast, and even place him safely ahead of economic progress.

Another factor in the safety movement which deserves mention, i the growing effort on the part of those who build machines and mecha ical devices, elevators and stairways and walkways, to build these alon such lines of safe construction that other mechanical safeguards becom unnecessary. The progress in this direction made by some should b the stimulation to greater progress along these lines by many other

A study of the number and cost of industrial accidents should nc only give, as I said before, a correct picture to place before the publi before the workers, before managements, but it should also sugges the nature of the remedies that should be applied. With the cautio in using accident statistics that I mentioned before, I once more turn t the figures of the U. S. Government, this time the U. S. Bureau of Labc Statistics, which showed last year an estimated total of 2,500,000 person who met with more or less serious accidents in their work life. Th time lost by these persons has been estimated at 220,000,000 work day and the money lost to the wage earners is at about $1,000,000,000. Thi of course, does not take into account the far greater loss in productio and that to the community at large. These figures may be an overstat ment but they are certainly worth pondering over; but we should als reflect that in comparison with the more than 40,000,000 people gai fully employed for about three hundred days in the year, the 220,000,0 work days lost on account of accidents are after all less than 2 per cer of all the work days throughout the year in the aggregate. Yet, in shov ing the relatively small percentage of lost work days due to accident, want to emphasize with all the voice I have that human and econom consideration requires that no reasonable effort should be omitted t reduce this 2 per cent nearer and nearer to the zero line.

What will do it? The enlightened consciousness of the employer a regards his social obligations to his employees; the enlightened co sciousness of the employee as regards his obligations to his employe as well as to himself; a persistent but intelligent prodding by the publ through its governmental agencies, through the press and otherwise—i other words, a wholesome and sensible co-operation of all the parti concerned: the employer, the employee and society of which both a but parts, to make life and the work of life safer and more sanita and more wholesome.

Eternal vigilance is the price of safety in industry as it is in all oth aspects of human life.

CHAIRMAN MOSES: I know you will agree with me that I did not say enough in introducing Mr. Alexander, about the fund of information that he possesses and his manner of presenting it here to you. I happen to know that Mr. Alexander came here at a great deal of personal inconvenience to himself and with the thanks of the Section I want to add personal thanks for the trouble you have been put to.

ACCIDENT PREVENTION WORK IN THE BELL TELEPHONE SYSTEM

W. P. Elstun, Department of Operation and Engineering, American Telephone and Telegraph Company, New York City

Next year, a half century will have passed since Dr. Alexander Graham Bell invented the telephone. At the time of Dr. Bell's invention and for a number of years thereafter the United States was passing through one of the significant pioneering stages of its history, not only from the standpoint of the further extension of the frontiers of civilization, but also from the standpoint of the discovery and development of utilities and conveniences which are now necessities of modern life.

It was not until the high speed era when electric trolley cars were introduced, the speed of steam railroads increased, motor vehicle transportation came into existence and high speed machinery began to be used, that it was recognized generally that accident preventative effort must accompany these necessities of modern life.

As we look back, however, over the years to the early days of the Bell System, there is evidence that in every phase of the development of the telephone the avoidance of accidents to the public and to employees was an inherent consideration. For example, one of the first additions to the original telephone circuit was the substitution protector, added to prevent accidents from lightning.

In the design and development of the outside plant too, i. e. the poles, wires, cables, etc., the prevention of accidents was not lost sight of.

Another evidence of this early accident prevention work is found in the original design of the telephone crossarm. The size of the crossarm, i. e. the amount of timber in the cross-section, was determined on the basis of providing an ample factor of safety with a heavy man supported on the end of the arm. This condition introduced greater strains and stresses than the weight of the wires which the crossarm was designed to support even under the most severe conditions of wind and ice loading.

As the history of the Bell System's development of materials and apparatus is studied it is found that in the specifications both electrical and mechanical requirements are specified which determine the materials and workmanship not solely from the standpoint of transmitting the electrical currents which are the basis of telephone transmission, but also from the standpoint of insuring the subscribers, the employes and the public against accidents. Not only have proper and safe requirements been provided but a sufficient quantity of each manufactured lot of material and

apparatus is inspected and tested to insure that all meet the requ ments; for example, a large percentage of each manufactured lot of l rings and snap hooks used in the Bell System body belts and sai straps is given a rigid tensile test and if distortion is noted in a sir sample, the entire lot is rejected. Destructive bending tests are also m and finally each completed belt and strap is inspected and tested for w manship, material, and finish. Everything which reasonably can be d for their protection has been done in the development of the plant, terials, tools and methods of the Bell System.

Accident Prevention—A Cooperative Matter

We believe that accident prevention is a cooperative effort by the ployees and the management under whose direction they work, from standpoint of the individuals and the groups concerned. Management the one hand is responsible for seeing that the materials, tools, a ratus, etc., both as to design and finished product are safe from standpoint of the employee and the public, and that the methods use the construction and operation of the property are likewise safe f both viewpoints. The employees' responsibility consists in exerci care and caution in his or her acts in the proper utilization of these terials, apparatus, and methods. Management and the employee b have a joint responsibility for education in accident prevention and suggestions to improve the instrumentalities and methods used in ing telephone service.

Aside from this internal coperation, there is concerned a coopera with national bodies interested in accident prevention and matters rectly or indirectly related to it e. g. the National Safety Council, Federal Bureau of Standards, the Electric Light and Railroad Assc tions, etc.

Some one has expressed the thought that cooperation like cha should begin at home; in other words, first put your own house in o before you go visiting.

The principal which we have constantly endeavored to follow in operating with national and other bodies interested in accident preven and matters directly and indirectly related to it, contemplates that Bell System will undertake to carry out a carefully considered, cont ous program of accident prevention in the best possible manner. means that the various operating companies making up the Bell T phone System should be actuated and operated along the same fu mental underlying principles, not only in so far as they themselves concerned but also in so far as the whole telephone industry is concer Through the relations of the operating companies of the Bell Telep System with the various connecting and independent companies, carefully considered continuous program of accident prevention wil extended to embrace the industry. Thus, we feel the Bell System effect the full measure of cooperation to the general safety movmen

A number of years ago a development took place in connection with the manufacture of tape lines. It was found that by weaving small metal threads into fibre tapes it was possible to prevent their stretching and thus at reasonable cost produce a more accurate fabric tape. We found that even these small hair-like threads would jeopardize the safety of an employee measuring light or power clearances in connection with the construction or maintenance of our leads. The Associated Companies, therefore, were advised of the danger and in consequence have made every effort to exclude this type of tape line from telephone work.

The paraffin used in splicing work to drive moisture out of the splice before sealing is another example of some very effective accident prevention work. This paraffin is heated to a liquid state on the surface lowered to the man in the hole who by means of a dipper and catch pan repeatedly pours it over the mass of wires which have been joined together so that all of the moisture is driven out before the lead sleeve is slipped in place and the joint wiped. It was found that liquid paraffin if overheated could be subjected to this dipping process a number of times and then suddenly when enough of the vapor had accumulated, spontaneous combustion might occur. Gassy manholes are ventilated in special ways to guard against physical discomforture to the workman, but should a pot of paraffin burst into flames in one of these manholes any small residue of gas would ignite and possibly a serious accident might result. To guard against such a happening, paraffins were studied and one with a high "flash point" was selected for our work. An especially designed thermometer was also developed so that the temperature of the paraffin could be determined and kept well under the "flash point."

A more recent example of the cooperative effort of management and the employee body of the Bell Telephone System to make the telephone business safe is found in connection with the pole replacement work.

Poles deteriorate and have to be replaced. It is obviously uneconomical to replace them until practically all of their serviceable life has expired and it may be a dangerous procedure to permit them to continue in service so long that they will fall. A plan of periodic pole inspection was developed and tried out for several years in certain sections of the country. The results of the trial demonstrated that without increasing the expense of pole maintenance, higher standards of safety were obtained. This routine provides for a system of pole inspections so that each pole automatically comes up for inspection and those which shortly will become unsafe are replaced. In replacing such poles the crews who are to do the work are required to temporarily support the pole before the wires or other attachments are to be removed.

Extent of Coordinated Cooperative Effort

This cooperative effort of management and the employee body of the Bell Telephone System to prevent accidents necessarily has to be coordinated because of its extent. This coordination is cared for through the general staff of the American Telephone and Telegraph Company working in conjunction with the associated companies.

Today, the cooperative accident prevention effort involves 25 companie associated with the American Telephone and Telegraph Company con prising the Bell Telephone System. It concerns some 270,000 employee of whom 80,000 are men in the plant department. These are the me who construct and maintain the poles, wires, cables, central offices, etc and are the forces among whom the major portion of our accidents occu The specific accident prevention activities, which are outlined in wha follows, apply primarily to these plant forces.

Cooperation in such matters as accident prevention is probably in n industry so absolutely essential to produce the desired results as it is i the telephone business. With us, the employees work individually or i small groups. Because of the very nature of the work, there are scattere all over the country in the homes, offices, and factories of the telephon subscribers and on the city streets and country roads. Necessarily the cannot be constantly under a direct supervision as can the workers i most industrial plants. The conditions under which these men worl very largely, are under the control of neither the company nor the me themselves and it is with these conditions that the telephone worke must cope to the best of his judgment and ability. Typical of this is th installer who connects the telephone in the new subscriber's home o office. He is often at a considerable distance from his immediate supe visor. His work is done almost entirely upon the premises of the su scribers and the accident hazards to which he is subjected are about th same as those which are encountered by the regular occupants of th building. The extent to which he suffers accidents is therefore ver largely controlled by the way he conducts himself while on the job. H cooperation with the management in the accident prevention effort therefore, essential to produce the desired results.

Safety Codes. For years we have worked on this fundamental principl of making accident prevention a cooperative undertaking and our effort we feel, have been attended with considerable success.

The World War, and its aftermath, however, introduced new problem which affected the prevention of accidents in the Bell Telephone Syster After the war there was an unprecedented expansion of the telephon business requiring the assimilation of large numbers of new and unskille employees. It was realized that under such conditions the influence o the employees of longer service instilled with the spirit of care and for thought in their work would ultimately engender safe habits in the new men but that such a process would require time. The problem was promptly interest the forces generally, especially the newer employee in the accident prevention work, to have them understand and appreciat the traditions of the business and to make them realize that they wer really a part of the organization of which they had recently become mem bers. The employees themselves felt that they could assist the accide prevention movement, by writing safety codes themselves. These cod were not to be in the form of specifications where our requirements ar those of other wire using utilities and the general public have to be c

ordinated, but were to be in the form of suggestions covering the me personal conduct while out on the job in so far as the prevention of a dents is concerned.

The employees selected representatives from among themselves w solicited suggestions from all the plant forces. Accident reports w reviewed and studied so that the representatives, and through them employee body, obtained an understanding as to just why these repo were required. From all of these data a number of codes were prepar Finally one general committee in each company, took all of the prel inary codes and from them prepared a single code for the Compa Committees of workers, i. e. splicers, installers, repairmen, etc., from e company brought these codes as soon as each was completed on to N York where we sat in with the men in conference and reviewed the co from a system wide viewpoint and the standpoint of the requirements national bodies such as the Federal Bureau of Standards. During visit of each committee the workers inspected the research laborato of the System, saw the largest long distance operating center in world, and met and talked with some of the System executives.

The members of each of these committees upon returning to their c pany gave talks to the employee body on the things that they had s and heard.

All of this work in connection with the preparation of the codes gendered an interest in accident prevention that could not have been tained otherwise. It fostered a spirit of teamwork not only in accid prevention but in other phases of the business which obviously resul to the mutual benefit of all.

The codes produced were some of the most comprehensive, best-il trated booklets on safety that I have ever seen and have done much ward educating the forces generally in forming safe habits. They w prepared by the working forces themselves for their own guidance constitute a fine contribution by the workers to the cooperative accid prevention movement with management.

First Aid: In conjunction with the preparation of the safety codes other phase of accident prevention work was undertaken which has sisted in minimizing accidents. This consisted in giving instruction: First Aid, i. e., the stopping of severe bleeding, splinting broken bo resuscitation in case of electric shock or gas asphyxiation, caring for and burns and otherwise making the patient comfortable.

It may perhaps appear that First Aid is an after-the-fact proposit that it is the caring for the injured after the accident has happened so has little place in a preventive program . Nothing could be fur from the fact.

Before the general adoption of First Aid training throughout the System, it had undergone a very thorough trial in one of the associ companies. It was found that the ability to care for an injured pe after an accident was only one of the benefits resulting. It develc that with this first aid knowledge the employees became more car

and in consequence the number of accidents was lessened. The day' work was better planned and more efficiently carried out. The acciden rate in this company promptly began to reduce and it has consistentl had about the lowest rate in the System since the work was undertake

After training, the employees are grouped into teams of five men eac including a patient. The teams compete in preliminary, semi-final an final contests so that eventually one team in each division is selected a the most skilled and proficient.

No football or baseball crowd in the country is more enthusiastic an interested than the employees at these contests. The audience then selves have been contestants in the process of elimination. They unde stand the technique of the work and are there to see their own district c occupation group carry away the trophy that represents superiority. Th whole atmosphere of the contest vibrates with the spirit of friendly con petition, of teamplay so necessary in accident prevention work wher forces are scattered as are those of the Bell System and working unde conditions as they find them, in the home, office or factory or on the cit street or country road.

I have pointed out how this First Aid training work has reacted i preventing accidents and in bettering teamwork, but there is anothe important feature that should be mentioned.

Some 50,000 plant men of the Bell Telephone System are now skilled i First Aid. These men on their regular work are scattered all over th country. They may be found on the streets, in the homes and offices the big cities installing and repairing telephones or placing and splicin the cables. In the remote parts of the country wherever the wire higl ways of the nation reach, these men on their trucks or small cars a present. They are equipped to render service to the general public n only in the field of communication but in saving life and relieving pai What could be a finer service?

First Aid Kits: To do any job thoroughly and efficiently it is necessar to have properly designed, constructed and maintained tools. The ki are the tools with which the First Aid work is done.

A First Aid kit for a particular occupational group of workers shoul be standardized only after a careful study of the basic accident data to l sure that the necessary supplies are included and only those supplie This was done in the Bell System and three types of kits were standar ized. A large kit is provided for the heavy construction gangs and tw small pocket kits, one for the splicing force and another for the installer have been made available.

In the largest kit practically all of the items are packed in a unifor size of container and are so arranged that any one can be removed wit out disturbing the others. This not only makes for easy access in ca of an emergency but also facilitates inspection. Almost at a glance th omission of any type of article can be detected and steps taken to r plenish the supply. On each package is illustrated the proper use of th article so that even a novice in the work has the necessary illustratio immediately at hand to show him how to apply the article.

Competitive Feature of Accident Prevention: In addition to the preparation of safety codes, the provision of First Aid kits and the training of employees in First Aid, another accident-prevention activity of the Bell Telephone System which has materially assisted in the lessening of accidents has been the placing of accident-prevention on a competitive basis.

It is fundamentally right to apply the principle of cooperative effort to accident prevention but the success accompanying the application of this principle depends upon the ability to arouse and continue the employees' interest in the work. No means offers itself to so promptly arouse and continue this interest, as does the placing of accident prevention on a competitive basis.

Only those accidents which result in one full day or more lost time are counted for competitive rating purposes. All accidents, are, of course, reported and studied to prevent future cases but it was found necessary to base the rating on only those involving lost time in order that there would be a standard for determining just what constituted an accident for rating purposes. If minor accidents are included in a competitive rating plan there is always a tendency to avoid reporting some of the cases and the fairness of the plan is thus jeopardized. In any game or sport where the selection of a winner rests upon a score, the contestants themselves must understand and believe in the rating scheme or it will fail.

In the Bell Telephone System a comprehensive report is prepared for each lost time accident. These reports are used by the associated companies for supervisory and administrative purposes and, that each company may have the benefit of the experiences of the others, copies of the reports are sent to New York where reviews and summaries are prepared and made available for all.

Quarterly accident summaries show graphically the "Big League" standings; the teams making up the "Big League" are the various associated operating companies.

In addition to this "Big League" there are minor leagues. Each associated operating company prepares charts and data for the employees showing just how each division, district, etc., is comparing with the others in this game of preventing accidents.

Automobile Insignia: When basic statistics are at hand for administrative purposes it is a simple matter to detect changing conditions even before they are fully developed. Remedial measures may thus often be applied before serious reactions occur.

In the telephone business it is necessary to transport men, material and tools over short distances quickly and safely and because the automobile is the most efficacious means of transportation for these distances, large numbers of machines are used. In the urban sections of the country with their paved highways and the constantly increasing number of motor vehicles of all characters in operation, traffic is daily becoming more congested and in consequence the chance of accidents is becoming greater. As one of the measures to minimize automobile accidents, the

Bell Telephone System adopted a plan of placing an attractive ena disc on the sides of each car driven throughout the year without a si automobile accident. Below the disc, year plates are added, one each year. which passes without an accident.

Particularly, I want to direct attention to the high standards which employees themselves have agreed to in connection with these awa It is typical of the standards in other phases of the business. Any o ating accident is cause for removal of the award. There are no questi asked as to responsibility, there are no alibis. A bent fender i traffic jam results in the loss of the insignia. The courts of law of land are more lenient. They recognize extenuating circumstances take into account responsibility but our people are endeavoring to mi ize automobile accidents and they plan to drive their cars so that a dents will not occur. Even with this extremely high standard and spite of the fact that hundreds of the system's cars day in and day traverse the most congested streets of the country, seventy per cen all the cars passed through 1923 without an accident. Not a bent fen not a scratch nor mar on seventy per cent of all the cars during whole year's driving, that is a record of which we are all justly pr

This plan that has been outlined has a two-fold reaction. First interests our employees in preventing this type of accident. Sec cars so equipped passing through the cities, towns and rural comm ties throughout the country present to the general public the fact as a public utility. the Bell System is undertaking to do its share relieve a serious situation.

Posters: The Bell Telephone System posters are prepared in ser distributed and posted where the men congregate. In the developm of these posters, dealing in generalities is purposely avoided. E poster is designed to forcefully illustrate a specific condition which statistics show is a cause of accidents. Each is of an educational na in that it shows how under the specific condition the particular opera may be performed safely.

These activities that have been described to you are not the prod of any single mind in the organization but, rather, the result of the gestions from the thousands of men and women who constitute organization. Though these activities are but a part of the wh coordinated plan of accident prevention procedure, I hope that in recital I have been able to convey to you some measure of the scop the work and the extent of coordination necessary to "carry on" w more than a quarter of a million employees scattered all over the coun

DISCUSSION

Mr. W. H. Olschewsky, Jr. (supervisor, Western Union Telegra Company. New York, N. Y.): While the fundamental principles un lying accident prevention work in the Western Union Telegraph C pany are substantially identical with those of the Bell Telephone Syst the application in practice presents certain marked differences wh

primarily may be attributed to conditions peculiar to the telegraphi industry. It occurs to me that possibly a brief outline of the manne in which the telegraph company is coping with some of these problem will be of interest.

Accident prevention practices have not as yet been uniformly adopte throughout the system but have received their principal applicatio and development in the plant department. In the past about 56 pe cent of the annual expenditures of the company in accident disabilit cases have been for injuries to the employees of this department an the opportunity afforded for the application of accident preventio measures will therefore be evident.

In order that the situation may be more readily understood a brie description of the organization of this department will possibly nc be out of place.

The responsibility for the construction, reconstruction and mai tenance of the land line telegraph plant throughout the United State and the maritime provinces devolves upon a vice president, with hea quarters in New York, who has reporting to him nine division plar superintendents each of whom is responsible for the direction of th plant forces in an arbitrarily assigned geographical division of the abov mentioned territory.

The problems arising in connection with equipment or inside plar work, in the construction and maintenance of pole lines and wire along highway right of way and city plant closely correspond with thos so thoroughly discussed in the paper just presented and need not b further dealt with in this discussion.

The major portion of the telegraph lines are, however, constructe on railroad rights of way. That the conduct of work on these righ of way gives rise to numerous conditions presenting elements of dang will be readily recognized. The possibilities of accidents to men e gaged in work from the operation of freight and limited passeng trains must at all times be recognized and guarded against. The tran portation of these workmen together with their tools to and fro work is generally effected by means of gasoline motor cars, with ar without trailers, accommodating up to 20 men and by means of small cars for the maintenance forces. The safety of the entire gar devolves upon the foreman in charge who must ever be on the ale for trains, motor cars of railroad employees, speeding automobiles highway crossings, in short he must in addition to his regular duti be a competent railroad man.

We might classify all these conditions as "hazards" but I am i clined to believe that they are not so much a "hazard" as they a a "cause." In the years of development and research work I fe that we have reduced to a minimum the known hazards so that v have now to contend with certain specific causes which must be co

The necessity for accident prevention education among this cla of employees was early recognized and has been pursued with co siderable success during the past few years.

While recognizing that the co-operation of the employees was essenti to the success of any attempt to encourage the adoption of accide prevention measures it first seemed essential to determine that l personnel and working conditions were conducive to this developmer

Physical Examinations

As a result a regulation was adopted requiring applicants for e ployment to pass a prescribed physical examination before entering tl service of the company. This has tended to eliminate the floaters a other undesirable employees, and has disclosed conditions which many instances would have caused the employee to be a menace both himself and his associates and has generally improved the ty of pensonnel. Considerable objection to this requirement was e perienced at the outset but gradually gave way when the employe came to recognize that the real object behind the plan was that of the own protection.

Formerly, gangs engaged in construction and reconstruction wo along railroad rights of way were lodged in boarding houses, tents other temporary structures. During recent years an appreciable su of money has been expended in the construction of about 150 railw camp car outfits accommodating an average of 16 men each and co sisting of from two to four cars fitted up with sleeping quarters, livi room, dining room, kitchen, shower bath and toilet facilities and storeroom for food, material and tools. These cars are maintained clean and sanitary condition, wholesome and well cooked food served by competent cooks and the accommodations are superior those obtainable in available hotels and boarding houses.

The use of these outfits has also attracted a higher grade personn bringing the men into closer personal contact socially and otherwi and affording the foreman in charge an opportunity to know his m better, study their characteristics and deal with them accordingly.

The employees in each of these outfits hold so-called monthly safe meetings under the direction of a chairman elected by them. At the meetings the various problems arising in the course of the work a discussed, particularly those relating to accident prevention, measur for adoption are discussed, recommended and referred to the respecti division headquarters where they are carefully reviewed and such acti taken as seems suitable in the premises. These meetings foster spirit of team work not only in accident prevention but in other phas of the business which obviously result in the mutual benefit of a This outlines briefly the nature of the work carried on among tl gang employees.

To further stimulate interest in this movement we have during tl past two years designated a particular month in which a given divisi plant superintendent shall carry out an intensive safety campaign

his division. To place accident prevention on a competitive basis the results obtained in the various divisions during these particular periods are compared and published. This tends to arouse and continue the employees' interest in the work which is essential if accident prevention is to be a success.

Safety rallies, held at some central location in the division precede these intensive campaigns. These meetings are attended by the division plant superintendent, supervisory forces, maintenance forces, gang foremen and a gang representative selected by the workmen in each gang. Superiority of rank or position is waived and the men meet for a common purpose in round table discussions concerning safe methods of performing work and other pertinent subjects.

Results Obtained

That these campaigns are bearing fruit will be evidenced by a brief outline of the results obtained in one particular division which may be considered as typical. Prior to the initiation of this work there had been in this particular division 18 accidents per 100 employees per year. During the first year the accidents were reduced to 6.6 per 100 employees; in the ensuing year to 4.4 per 100 employees. During this same period there was a 10 per cent increase in the size of the working force.

To give an idea of what has been accomplished since 1917 in the plant department as a whole it may be stated that while the number of employees in 1924 is 55 per cent greater than in 1917, the number of accidents per 100 employees has decreased from 14.49 in 1917 to 10.75 in 1924. This we believe is a creditable achievement and is an indication that our endeavors are being directed along proper lines.

Organized first aid training as practiced in the Bell Telephone System has not as yet been generally adopted by the telegraph company. The benefits to be derived from such training are, however, recognized and it seems probable that this instruction will shortly be undertaken among the gang employees under the direction of the American Red Cross.

In many gangs the men have already manifested interest to the extent of voluntarily taking up the series of lessons prescribed in the American Red Cross hand book and in several instances picked first aid teams have given very able and creditable demonstrations at the Safety rallies. This interest will be encouraged and developed.

Each gang is equipped with a standard first aid box. Gangs living in railway camp car outfits are furnished with an additional box to be kept on the motor car for use on the job during the day. First aid pocket kits are being distributed to individual workmen and additional equipment is being developed and issued as the necessity or desirability of it becomes apparent.

At several of these meetings we were very ably assisted by first aid teams of the several Bell companies in a practical demonstration of

first aid to the injured and resuscitation. We are indebted to t
teams for their service.

This affords you an outline of the undertakings of the Western U
Company in accident prevention work. Briefly summarizing the
perience to date the co-operation of the employees is the first esse
to the success of the undertaking and the benefits derived are in di
proportion to their contributions. This co-operation will come
through a process of education and promotion resulting from a
viction on the part of all concerned that a policy of working toge
is for the best interests of all as well as for the best interests of
enterprise. In this so-called high speed era accident preven
measures are a necessary accompaniment of modern life.

MR. E. L. HELVIN (Supervisor of Safety Methods, Southern Bell T
phone and Telegraph Company, Atlanta, Ga.): In our company
have an organization known as the Southern Association of Bell T
phone Employees, and it was through this organization that the sa
code was inaugurated. Suggestions were offered by the employees
the suggestions were submitted to a general committee, made up of
employee and management representatives. These suggestions off
did not cover all branches of our work, nor were they in such for
would permit them being written into the code; they were merely
thoughts and ideas of the men in the field who had learned f
practical experience some of the more important preventive meas
necessary.

The general committee not only compiled these suggestions, but m
a careful study of the accident reports over a considerable perio
time and analyzed them to determine the cause of each accident. F
the suggestions of the men and information obtained from these a
dent reports and other various sources, the code was finally comp
and issued in handbook form to our plant employees. This code
contributed largely in helping to reduce accidents since it embra
the ideas of the men in the form of suggestions based on their pract
knowledge of the business.

The next step undertaken in accident prevention was the training
instructing of our employees in first aid.

First Aid

Our first aid training conforms with the practices used gener
throughout the Bell system, which is the Red Cross first aid meth
adapted to the telephone business. In the inauguration of this w
the Bell Telephone Company of Pennsylvania, who are the pioneer
the Bell System in the teaching of first aid to its employees, offere
instructor Mr. Townsend, supervisor of safety methods.

Two classes of twenty men each were held. The men selected
receive this training were of the foreman type employee. This co
of instruction included an elementary outline of the structure
mechanics of the body, and the treatment for cuts, burns, brui

sprains, arterial bleeding, shock, unconsciousness, sunstroke, heat exhaustion, and resuscitation from electrical shock or from the effects of gas. The final portion consisted of practice work demonstrating correct splinting and bandaging, and the proper transportation of an injured person. After receiving an intensive course of instructions these men returned to their respective territories and acted as instructors for other classes.

In the southern group there are approximately 4,000 male plant employees, and as a conservative estimate I would say that 75 per cent of these men have received a course in First Aid training.

Annually, there are held preliminary, or eliminating contests in each of our divisions and within each department, which are made up of maintenance, installation and construction forces. The team making the highest score in these elimination contests represents the department in the final, or division contest. It is our belief that these contests add to the plant organization that stimulant of good sportsmanship that comes through competitive team work. They also have been very effective in helping to reduce accidents. It is our opinion that these first aid contests, in addition to demonstrating first aid methods, forcefully picture to the employee what may happen when carelessness occurs in the planning and in the application of safe methods to the job.

First aid training has not only been helpful to the telephone organization but to the public as well, by reason of the very nature of the work our men are engaged in; they are scattered all over the territory, in the cities and in the small towns, and there are numerous cases where the employees have been the means of saving lives of the public through their knowledge of first aid.

Foremen's Conference

Many things promote the effectiveness of accident prevention work, and it is believed that one of the main factors is that of supervision. We recognize the foremen to be the key men, because the closest point of contact with the workman is the foreman. By "foremen" is meant the employee in charge of one or more men. Accidents occurring in the gang are a measure of how well the men are trained in exercising precaution and in applying safe methods in all of their undertakings; also, the attitude of the men reflects the interest and viewpoint taken in this phase of the business by their supervisors. Believing this to be true, we are conducting throughout our territory foremen's conferences. These conferences are conducted by the division superintendents. During these meetings all phases of plant work are discussed—such as methods, designs and developments of tools, and specifications. A general review of accidents occurring in the division is discussed, with special attention to the proper classifying of the cause and responsibility of each accident.

Invariably, a large percentage of these discussions and reviews, after careful analysis, discloses the fact that the causes of accidents are

either due to poor planning or improper supervision. Thus we gr ually develop through these conferences with the foremen that tl attitude and viewpoint toward safety must be of continued inter and that in the prevention of accidents their responsibility must just as much a part of their job as in the following of the stand specifications covering each detail operation.

Accidents occurring in the past were more or less considered a combination of circumstances, or hard luck. This tendency to clude them as such could be expected until our foremen realized importance of properly classifying these accidents, in order tha would enable the management to make a careful study as to the ca and responsibility of each accident occurring. The responsibility a foreman is more than just telling the men to work safely; he m provide pósitive and preventive measures. The fact that a noticea reduction in accidents has occurred is proof that the foremen today giving more serious attention to the application of these safe measu than ever before.

Competitive Team Work in Accident Prevention

Another feature of our accident prevention work is based on gr competition, whereby each gang, district, and division competes w every other gang, district, and division in our territory in the eli nation of accidents. This competitive work has injected a spirit t is in evidence when team work is in play; and which can only secured through coordinated effort, rather than by individual perfo ance. To encourage and keep alive the interest in this work, comp ative ratings are published monthly showing the number of lost ti accidents occurring in the above mentioned groups.

Another important feature is to impress the foremen that in group performance ratings consideration is not only given to number of units of work completed, but also to how few accide occur.

For the past two years we have been making accident prevent awards to our supervisory forces. These awards are only given o no-lost-time-accident basis. We have separated these awards into t classes; one covering the larger gangs for a period of one year, other to the smaller gangs for a period of two years. Also, accid prevention pennants have been awarded to the winning district in e division and to the winning division construction force in each compa

It is our opinion that these awards have been contributing fact in our accident prevention activities because they have injected so thing that is very essential in this work, which is the spirit that co only through the pride of accomplishment. It has been sugges that these awards be based more particularly on the nature and cl of work being performed. Accidents should not occur in proport to the nature and class of work involved, although there are work conditions which are not as favorable as others and where there

probably more inherent danger of an accident occurring, but we do not know of any detail of operation that cannot be protected by the use of safe methods an dwhen proper precaution is taken. This contention is not based upon theory but upon recorded facts.

In one of our divisions we have a district that has probably the largest aerial plant in our territory. This district has maintained a perfect no-lost-time-accident record for a period of three years. There are several other districts that have completed anywhere from eighteen to twenty months without a lost time accident, and one district has passed through a period of 20 months without having an accident of any kind to occur. I merely mention this to bear out my previous statement—that the type of work concerned does not necessarily control the number of accidents which occur.

I do not want to leave the impression that the accident problem has been solved by us in its entirety, but I am convinced that when you appeal to the pride and interest of the employees, and apply safe methods to the work, accidents will be reduced to a minimum. There is another factor that enters into the accident prevention work, and one of vast importance, which is the education that comes through personal contact between the foreman and his men. This education should be one of the controlling factors in accident prevention, because this contact enables the foreman to obtain a closer view as to the habits of those under his supervision.

Habit and its Relationship to Accident Prevention

In News Letter No. 4 of the Public Utilities Section to which I have referred, I read a very interesting article by Mr. F. E. Taylor, superintendent electrical machinery maintenance department of the Detroit Edison Company, entitled "The Groove in the Mind." Apparently, Mr Taylor had in mind the monotony of work as applied to the shop where one operation is a continued performance in the everyday job of the employee. In the telephone operation we have accidents that indicate subconsciousness of the mind—not brought about, however, by the monotony of work, for the reason that the very nature of the work which our men are engaged in calls for numerous variations in each detail of his job. I am wondering whether, or not, some of these subconscious acts could be classed as complete concentration, due to financial or domestic worries, but more probably still to the habit formed through improper training. Habits, as we know, are very easily made but sometimes very hard to break. This probably could be illustrated in the conduct and acts that a cable splicer reflects which are more or less in proportion with the training he received during his period when a helper.

With the expansion of the telephone business and its increasing complexity, it is therefore very apparent that one of the most im

portant functions and responsibilities of our supervisory forces is i the observance and correction of these improper habits—because th habits formed today will be the habits of tomorrow.

Elimination of Introduced Hazards in the Plant

Accident reports disclose a multitude of happenings, but there ar several main causes that contribute to the large percent of our mor serious cases. In this connection, we are making every effort i eliminating these main causes from the plant. We have encountere introduced hazards, as, for example, those brought about by crosse between the telephone and the light and power wires; and our effort are directed in this elimination by cooperative measures with othe utilities in the construction of plant in accordance with specification covering the joint use of pole lines, whereby the light wires are place at the top of the pole and the telephone circuits well below. Thi arrangement not only provides safe working conditions for the light o power company employees, but also eliminates the necessity of ou men, who are to some extent unfamiliar with light and power circuits approaching and working in close proximity to them.

Results Obtained Through Co-ordinated Effort

In our experience and in the study of accident prevention, we ar convinced that the application of safe methods in the performance o the job, supplemented by the necessary safety devices, are more pro ductive of better results than the reliance on safety devices alone Careful planning and constant supervision and co-operation are ver essential in making this work effective, because the amount of effor expended in accident prevention is just like any other phase of ou work—it is reflected in the results obtained. Accident preventio measures and efficient operation must be inseparable because ther cannot be efficiency when there is waste, and accidents are waste That the plant men in our group appreciate their part of the respon sibility and have applied safe methods to the job is evidenced in th reduction of major accidents.

One way to determine progress is by a comparison between periods and as a matter of information I would like to give you the percent age of reduction made in lost time accidents occurring in our terri tory during the past two and a half years. During the year 1921 there was a total of 569 lost time accidents occurring to the mal Plant employees in our group. During the year 1922—which wa the beginning, or rather I would say the time when more unite efforts were put forth to reduce accidents, we made a reduction of 5 per cent over the previous year; during 1923, as compared with 1922 a reduction of 25 per cent was made ;and for the first seven months o 1924, as compared with the corresponding period of last year, we hav made a reduction of 24 per cent.

THURSDAY MORNING SESSION

SELECTION AND SAFE INSTALLATION OF GAS APPLIANCES

A. O. Mitchell, Adjuster
Northern Indiana Gas and Electric Company, Hammond, Ind.

The steadily increasing number of accidental axphyxia cases, due to improper, unsafe, and unapproved gas appliances, devices, and appurtenances has been the cause of serious investigation by civic and legislative bodies as well as many safety organizations throughout the country. The result of these investigations has placed upon the ordinance books of at least one city and has caused to become a law in at least one state, legislation, which when fully understood and in practice, must surely lessen in a great degree, the unnecessary suffering and loss of life; not only in these particular states, but everywhere gas of any kind is used for domestic purposes. Their action in this regard has been broadcasted through the medium of daily newspapers, weekly and monthly periodicals, etc., and has brought the subject forcibly to the attention of individuals, operating companies and others affected.

We all know that gas, properly used, through the medium of a tested, approved, and properly installed, well-maintained appliance, is a God-send to mankind. It is as safe as any public benefit that it is our pleasure to enjoy and only common sense is required to use it in absolute safety.

Within the scope of my duty during the past twelve years, I have investigated scores of cases of gas axphyxia, and I am in a position to say that the greater number of them were due to imcomplete combustion, the appliance of course not being equipped with a vent or flue pipe. Only in remote instances were these appliances installed by, or under the direction, of the operating gas company. Sometimes the house owner has purchased from a mail order house and had made the installation himself—*no vent pipe!* In some cases the "neighborhood handy-man" had been called in—*no vent pipe!* Again we find evidence of the plumber's "haste"—*no vent pipe!* There were several instances in which a regular gas fitter had never seen the appliance, and we are reasonably safe in assuming that the appliance was never properly adjusted.

It was with fear and trembling that I undertook to prepare a paper on this subject, as I felt sure that my endeavor to assemble some facts would take me through a list of gas appliances, fixtures, devices, etc., of some considerable length, but surprising as it seems, this did not develop.

Comparatively few gas consuming agencies were involved. My information was not confined to any one district, but was secured from different sources, geographically widely separated.

Few of the cases developed from what might be termed old, uns or antiquated appliances, in fact, most cases involved reasonably r and standard make gas burners, that had not been properly instal or adjusted. As far as the actual piping and connections were c cerned, little fault could be found; but the work had not been c pleted—no vent pipe installed—nor the proper checkup on the bur adjustment made.

The Bureau of Standards, working in conjunction with various ot agencies in Baltimore, finds that if two or three gas appliances i thousand produce carbonmonoxide in an appreciable quantity, at le one hundred thousand people in the United States will suffer w greater or less frequency and severity. This finding, I am sure, sufficient to make us all sit up and take interest in this subject. do not know when the dire results of unsafe, improperly connec or poorly regulated gas apliances may be brought home to us. Bureau of Standards has in contemplation, (may be in effect no the testing under the most practical condition, any gas burn appliance submitted for such test. They will investigate conditi under which it is to serve. They propose to work in conjunction w local bodies interested and with the local operating gas company. T will be of assistance to manufacturers of appliances, also to gas tributing companies, who are not so fortunate as to maintain their c testing laboratory. The Bureau will make a charge for their servi

We find that in the City of Baltimore there was introduced on Ma 31st of this year, an ordinance bearing the following title:

> "An ordinance to regulate the sale and installation of all ty of appliances, tubing, devices and appurtenances used in connect with manufactured gas in the City of Baltimore, and to require t all such types of appliances, tubing, devices and appurtenances sl be registered with and approved by the Commissioner of Hea before being offered for sale in Baltimore City, and provid further, that all installations of such appliances, tubing, devi and appurtennances shall be made by registered gas-fitters accordance with regulations of the Commissioner of Health, and t all persons selling or offering for sale any such types of applian tubing, devices and appurtenances shall first obtain a license fr the Commissioner of Health and providing penalties for any lation of the provisions hereof."

This ordinance as its title indicates, stipulates that gas work m be done by gas men and that all questions pertaining thereto sl be passed upon by a body known as the Gas Reference Committee, c sisting of the commissioner of health, as chairman, member of Public Service Commission, representatives of the gas and elec company, Master Plumbers Association, Retail Gas Appliance Deal Organization, and the American Gas Association. It will be interest to note the result of the foregoing procedure. If the plan is carr out as contemplated, it is a foregone conclusion that accidents fr faulty gas work will be of the past.

Bill Pending in New York

There has been introduced in the Assembly of New York State, a bil to prevent accidents from escaping gas from defective, old, and wor out fixtures and appliances. The bill asks for an appropriation o $25,000.00 to be used in the investigation of the types and state of repai of gas appliances and fixtures in general use, complaint having bee entered that certain gas appliances constitute a menace to safety an health. This bill sets forth the fact that deaths due to accidenta poisoning from liberated carbon-monoxide increased from 329 in 192 to 533 in 1923. I am informed that the greater number of these fatalitie were the result of incomplete combustion in appliances and from ol gas lighting fixtures that should have been condemned and junked lon ago. It is to be hoped that this bill shall receive the support of th legislative bodies, if it has not already passed.

My own personal experience has been that 95 per cent of the accident due to the products of combustion are due to water heaters, whic have not been properly vented. Of these the bath room heater is th greatest and worst offender. The bathroom, of course, is closed whe in use, both windows and doors usually, and the water heater has merry time casting its fumes of incomplete combustion into the ordinar small room, which, together with its consumption of the oxygen i the room, causes the bather to doze off perhaps to awaken to the melod of the celestial harp and in the association of angels. It is crimina to install a water heater in a bath room without equiping it with vent pipe, under no circumstances should it be done. If venting th heater from the bath room is very expensive, (this should not be give consideration where human life is concerned), place the heater els where on the premises where an outlet is more available, in any even see that there is a flue connection. We have heard engineers and safet men approve of water heater installations without a flue connection i basements.

In the light of past experience, I disagree absolutely with this ide We now have in our employ a man who is with us due only to the grac of his maker, and the cause of his near demise was a basement wate heater installation without flue. This case occurred during a sever storm in midwinter when the basement was tightly closed, no possibl escape for the products of combustion but up through the floor. I appears that someone left the heater burn all night with the resu that the entire family were so ill as to be bedridden for several day the man only being revived after much effort on the part of our employee and the attending physician. We have a rule that in no case will w install a water heater without a vent or flue pipe. No exceptions ar made. We also instruct the plumbers as to this ruling, or anyone i the business of gas appliance sales or installations. Short sighte operators some times remark—"What do we care how plumbers or pip

This attitude you will say is long in the past, it is not, it is very much with us. This type of foreman or engineer cannot see the harmful result when the morning paper sets forth in bold type "Whole family wiped out by leaking gas." In many instances it is not a gas leak at all, but is the result of a mistreated, improperly connected or "dime store" appliance. Our fitters are instructed to make note of each and every water heater installation wherein a vent or flue pipe has not been installed. These are reported, and a man who is specially engaged for the purpose, calls upon the customer, explains to her the serious accident hazard resulting from its use, advising re-location if it seems difficult to vent in its present location, furnishing an estimate of the cost of venting and then follows the case up until such a time as a vent pipe has been installed and the installation been made safe. We have experienced very little difficulty in securing the co-operation of our customers in this regard, as when the possibility of injury to themselves and family is brought vividly to their attention, they are more than pleased to have the condition remedied for the very small cost involved. We consider this very good public safety work and no doubt prevents a good deal of undesirable publicity which follows accidents in which gas appliances of any kind are mentioned.

Defective Hose and Hose Connections

Many fatalities occur from defective hose and hose connections. It is my impression that most of the larger companies refuse to make a hose connection, they should also refuse to sell gas hose for connecting purposes. A hose that has been in service for a considerable length of time necessarily deteriorates, but as long as it delivers the gas to the burner, it is not subject to inspection and its defects are only discovered after an accident has occurred. No doubt there are good grades of gas tubing on the market, but there are infinitely more poor grades which are much cheaper and this feature appeals to the purchaser residing in furnished rooms or quarters which he considers only temporary. Some cities have ruled that all gas tubing offered for sale shall first pass the inspection and bear the approval of a committee or special inspector. If it does not meet a certain specification or standard it is rejected and the manufacturer has an opportunity to bring his product to the stage of perfection required.

Among the foremost cities to take this action we find Newark, N. J. As far back as 1917 an ordinance was passed providing for the regulation of the sale of gas tubing. This action was brought about by a fatal accident, two foreigners having been found dead in their room the cause being a piece of leaky tubing. We have in Northern Indiana an iron clad rule on this feature. We will not make a hose connection to an appliance. Of course hose is still procurable and it is not unfrequent that we are called in accident cases involving the use of gas hose.

The dime store lighting fixtures, hose cocks, etc., come in for their share of criticism by claim and safety workers throughout the country

It appears that these appurtenances are installed by the tenant or own of dwellings, his entire gas fitting experience being confined to one two such jobs. These connections, cocks, etc., are dangerous enou in themselves, but when they are installed by an amateur they crea a hazard that it is not pleasant to contemplate. In one case, I learn that the daughter had done the gas fitting.

Occasionally we have a case where a range or other appliance burn will become extinguished by a flash back and that gas escapes f some time before the customer notices that the burner is not lit. Wi standard appliances there appears to be little trouble from this caus They stay put when once properly regulated, unless of course, the should be a radical change in the gas pressure supplying them. T Bureau of Standards in its tentative testing plan, would cover th feature and would specify the promissable primary air variation.

As previously stated, there is no greater blessing than standard g appliances, and when they are safely installed and maintained, acciden just don't happen. We must vent every heater regardless of its natu or its location on the premises. Devices of the so called—"Smoke Co suming", "Odorless", and "Chimney-less" types are not free from dang unless they are ventilated. The Bureau of Mines has made an analytic study of carbon monoxide poisoning from natural gas heaters. Th did not find one instance where fatalities had occurred wherein t heater was connected to a flue or vent or in a fireplace from whi the products of combustion could be carried to the outside.

It is the opinion of safety engineers that no one should sleep in closed room where a gas heater is burning. On one occasion I inves gated a case wherein the members of a family slept in one room heat by a large coal stove and were using a unvented gas heater as auxiliary. These people are exponents of a type which does n believe in ventilation, and had it not been for the activities of t dog, who apparently was allergic to breathing this family would ha required no future host of ventilators in this world.

It is my impression that when this subject was first suggested include the word "Public Safety" for you all know, previous to t shortage of help attendant upon the war, most gas companies did a go deal of "*free work*". Consumers Premises Expense, was the name the accident, and it did cover a multitude of evils. Like many g appliances it was abused, but I am sure kept us out of much troubl We made adjustments free of charge and a 'phone call was all th was necessary to bring a gas fitter to the door. With the advent almost unbelievable prices for materials and supplies coupled wi the shortage and cost of labor this practice was discontinued. Wh customers learned that they would be required to pay for cleaning the adjustment of an appliance they just did not have it done with result that considerable trouble was encountered. Gas companies, believe, are becoming more liberal in this regard, and perhaps we sh live to see the day when customers premises inspection will find

In considering this subject, I have tried to avoid everything of technical nature, feeling sure that these features would be brought ou in the discussion which is to follow.

REPORT OF NOMINATING COMMITTEE

MR. WILLS MACLACHLAN: After going over the matter very thoroughl all things into consideration, the committee begs to submit the follo ing gentlemen as officers for the ensuing year. Chairman, Harry M Webber, Illinois Bell Telephone Company; Vice-chairman in charge gas interests, B. B. McCulloch, Bureau of Safety, Chicago, Ill.; vic chairman in charge of electric interests, George Opp, The Detroit Edis Company, Detroit, Mich.; and Secretary, C. J. Rutland, Texas Power an Light Company, Dallas, Texas.

(The report was accepted by unanimous vote.)

DISCUSSION

MR. C. C. WINTERSTEEN: (Manager, Appliance Laboratories, Unite Gas Improvement Company, Philadelphia): Accidents from the u of gas appliances and their accessories have been from time to tim the cause of local governmental action in some parts of the countr Such action has been quite limited as far as affecting the applian itself, but more extended as affecting the installation of the applianc

Holding companies and individual gas companies do, in some i stances, maintain their own testing departments, or laboratories, f the express purpose of making examinations of gas appliances pri to handling them. These examinations include an investigation fro the standpoint of safety and unless an appliance conforms to the fix safety standards of the laboratory or such safety requirements as ma be determined upon in special cases, the appliance is rejected.

The adoption of specifications by the leading gas association wi be productive of results only if the manufacturers and particular the dealers cooperate and make every effort to have appliances acco with the specifications. The provision of a central testing laborato will place the responsibility for determining whether an appliance co forms to a specification, in one body, and not leave the interpretatic of the specification to several different laboratories. This shou eliminate some of the confusion that has arisen to date and simpli matters for the manufacturer whose interests, of course, are repr sented in the operation of the central laboratory.

Safe Construction and Operation

Digressing from the problem of selection we will consider brief safe appliance construction and operation. Perhaps the first essenti is proper combustion. There are a number of factors governing th

obtainment of good combustion. There are a number of factors governing the obtainment of good combustion and it is only possible in this discussion to touch upon them lightly. The design of the burner should be such as fully to meet its requirements. Incorrectly designed and undersized burners, failing to provide sufficient gas capacity to accomplish the necessary work, will give dissatisfaction and invite overloading with consequent poor flame characteristics.

Gas orifices, that is, the small holes in the ends of the cocks, through which the gas enters the burners, should be so designed that the burners may be utilized to their effective capacities. Plain circular orifices present no serious problem but care must be exercised with adjustable orifices, as mechanically imperfect adjustable orifices are very frequently sources of trouble in preventing the obtainment of the desired consumption rates or correct flame characteristics.

The disposition and design of the burner ports need very careful attention. Provision must be made for an ample supply of secondary air to preclude smothering and floating of the flame, which is generally accompanied by incomplete combustion. Ample combustion space is also essential.

Unrestricted flue passages and flue outlets are necessary to prevent stifling the flow of the products of combustion. Appliances to which flue connections are optional should be equipped with flue collars so constructed as to prevent undue restriction of the flue outlet in event a customer attempts to utilize the waste heat in the products of combustion by placing a utensil over the collar.

Air shutters on burners should be secured by positive means such as a set screw or locknut. Shutters depending upon friction for their set are very apt to be thrown out of adjustment with the result that the flame characteristic is changed.

Burners should fit in positive supports to prevent any deflection or unseating. Burners that have been accidently shifted cause an impingement of the gas jet against the well of the mixer with consequent loss in air injection power and a softening of the flame with possible yellow tipping.

Generally, in atmospheric or blue flame burners, the ports should not be too large as large ports are favorable to backfiring, that is the ignition of the gas within the burner. A backfired burner gives rise to a serious hazard in that the resulting combustion is very incomplete.

I could enumerate more conditions influencing combustion but the above will suffice to give you an idea of the factors that must be looked after in designing burners for the obtainment of good combustion.

There are many other phases of the problem involving safety, some of which may be mentioned. On appliances such as gas ranges and cookers, doors should not be provided with positive catches that would

prevent these doors from flying open should an explosion take p within the oven. Door catches should be so designed that the will readily open to relieve an explosion.

A precaution to observe on the part of the consumer in lighti gas range oven burner is to open the oven doors even though lighting of the burner does not actually require so doing. This e inates a possible explosion in event of an explosive mixture ha accumulated in the oven. It is known that consumers have interrupted in the act of lighting an oven burner and have lef the gas, when upon returning to the range to light the burner explosion has occurred.

In poorly designed burners the flames may fail to light over entire burner when the match is applied. This is frequently a so of complaint and one difficult of correction on the appliance as proper elimination of the trouble involves a constructional change. existence of burners of this character emphasizes the importanc the customer making certain by observation that the flames are lighted.

Another feature which needs very careful attention concerns lighters. Whatever form of lighter is supplied it should be posi in its action and it should cause no interference with the combus of the main burners.

Vents for the discharge of the products of combustion, or collars, should never be so placed as to direct the products aga a wall. This introduces a fire hazard.

Openings for Secondary Air

Openings for the admission of secondary air for burner combus should be so located that nothing but fresh air can be drawn them. Thus, in some ranges with elevated ovens, these open appeared directly over the top burner section. With this loca air mixed with the products of combustion of the top burners cooking vapors is supplied as secondary air for the elevated burner.

Open top grates on gas ranges and similar cooking appliances sh be made with the arms or bars well elevated above the level of top frame to insure outlets under the bottom edges of large ute and between the bottoms of such utensils and the cooking top fra for the escape of the products of combustion. If the grate arms flush the cooking top is sealed off when large utensils are used the failure of the products of combustion to escape results in ser smothering. The effect is the same as that of a closed or solid installed without regard to operating conditions.

Cocks used on appliances should be substantially constructed their design should be such as to provide an ample gas way for flow of the gas without undue pressure loss and there should be an seals and bearing surfaces to prevent leakage.

Cocks should be carefully tested before leaving the factory to m certain that they are gas tight.

In point of mechanical construction it is hardly necessary to s that an appliance should be substantially and rigidly assembled. weakly constructed appliance should for very obvious reasons be considered.

Another feature involved in the consideration of a safe applia is the use of burners that lend themselves to being easily clea Dirt accumulations in burner ports or corrosion of the port w reduce the port area and effect a change in the burner adjustm When gauzes are placed in burner heads for the purpose of mini ing the backfire hazard, they should be so assembled that their rem and replacement can be easily effected. Gauzes are subject to s page, the same as are the burner ports, particularly small ports, besides may corrode or burn out. An imperfect gauze is ineffec and no better than none. So much as a break in a single stran wire may render the gauze worthless. The necessity of having ac to the gauze is therefore apparent.

An important consideration in the design of room heating ap ances of all descriptions is the prompt ignition of all burners upon application of a light. There has been less difficulty in meeting requirement in the case of blue flame heaters than in the case of yellow flame type. In yellow flame heaters using either rat tai flat flames care must be given to all the details affecting the comp ignition of the flames. This means that the jets must be unifor spaced and properly set to insure uniformity in flame direction. fling should be provided as resuired for obtainment of the cor results.

Other details to consider in the design of these heaters are the vention of flashing or a possible explosion at the time of light In blue flame heaters, the provision of a burner construction wl will not be productive of back-firing cannot be over-emphasized.

Heaters with exposed flames should always be provided with s able guards to prevent any direct contact with the flame.

Tubing

Regarding tubing, too much stress cannot be placed upon the portance of using tubing of the best quality. The sale of ch poorly constructed tubing, has been the cause of numerous accid and has been the chief factor, if not the only factor, in agita militating against the use of tubing generally. By tubing, I m not alone the tubing proper, but the poor quality of the rubber e and the insecure method of their attachment to the tubing. A great amount of investigation has been carried on in the matte flexible tubing, by the National Bureau of Standards, gas associati local municipal departments, and by individual gas companies. To

the American Gas Association has a gas tubing performance speci cation in force and flexible tubing constructed to meet these pe formance requirements may be considered safe. I cannot take t time to enter into the many details involving safe tubing constructio but suffice it to say that the performance requirements cover allo able leakage, design of rubber ends and metal hose nozzles, elastici and gripping power of rubber ends, mechanical strength of tubin resistance to heat and freezing, flexibility, etc.

Safety appliances, that is, safety devices, are to be recommend when practical and when their mechanical construction does not pr sent complications that may cause more difficulties than the use the device would warrant. Some safety devices have come to n attention that defeated their purpose through unsatisfactory and co plicated construction. We shall always welcome safety devices th are wholly dependable and which do not interfere with the satisfa tory operation of an appliance or accessory.

A noteworthy application of a safety device on a gas range in whi separate baking and broiling burners are used in the same ove involves a locking arrangement whereby the two cocks for these bur ers cannot be operated simultaneously. No range in which separa baking and broiling burners are placed in the same oven and in whi the products of combustion of the lower burner may pass around t upper burner should be used unless provided with an interlockin safety device on the cocks.

Safe Installation

It is hardly necessary to say that when installing an appliance a inspection should be made to ascertain that it is in proper workin order. Likewise, all piping connections should be tested to mak certain that they are tight. After an appliance has been proper connected it should be placed in operation and any irregularities co rected. Special attention should be given to the gas orifice furnish in the burner cock or other fitting. The size of the orifice supplie with the appliance should not be accepted as correct, but if resul point to too little or too much gas a change in the size of the orifi should be made accordingly. Orifices must be altered to meet varyin conditions and as the manufacturer does not always know where t appliance will be installed he cannot be expected always to furnis the correct orifice size. A company in ordering ranges for use in certain city, can ask the manufacturer to provide a specific orifi equipment which they know will function satisfactorily under the average gas conditions. Some other city, however, may need a entirely different orifice equipment. Wide variations in gas quali and heating value as well as variations in pressure govern the si of the orifice to be used. In this connection I may mention that the is too much tendency to overload burners, that is, provide more g than desirable for the best operation. Caution should be observe against this tendency.

Sometimes peculiar ideas are entertained by those engaged in the installation and adjustment of appliances regarding just how the adjustment should be made and this has led to occasional trouble Thus it has been brought to my attention that in one locality the practice was to adjust oven burner flames with a yellow tip, the claim being that this adjustment was more efficient in broiling. Perhaps a yellow tipped flame does give more radiant heat but the difference is very small and certainly a yellow tipped flame is unfavorable to the satisfactory operation of the burner and may lead to improper combustion.

Where appliances are equipped with thermostatic controls the installation should not be placed in the hands of the consumer until it has been definitely determined that the control is working properly and functioning as intended. No detail should be overlooked in a general examination of the installation before it is considered completed.

Once the appliance is properly installed it should be kept in a satisfactory working condition at all times. The consumer should not lose sight of her responsibility in maintaining the appliance in clean state.

Every fitter knows the filthy condition of some ranges which he has been called upon to repair or adjust. In well constructed ranges, the burners and grates have been so arranged that the consumer may readily lift them out of place and dip them in a cleansing bath, thoroughly to remove all grease and dirt accummulations or stoppages. Any irregular operation of the appliance as noted by the consumer and which cannot be corrected by her should be reported at once to the Gas Company for correction.

In the installation of gas consuming appliances particular care should be exercised in not placing them too close to inflammable walls. Correctly constructed appliances of the ordinary domestic type should in themselves, without further protection, prevent the production of excessive temperatures with nominal spacings of the appliances from walls. A temperature rise of 90° above room temperature is the generally accepted maximum permissible. I do not know of any standard minimum spacing of an appliance from a wall. The rulings of different gas companies probably vary in this respect. This point will be covered by the proposed Safety Code. Plain common sense should dictate that no appliance be placed in contact with a inflammable wall and that a very reasonable clearance should be allowed between the appliance and the wall unless special provision has been made to protect the wall by suitable insulation.

Regarding floor temperatures as produced by appliances which set close to the floor, such as certain types of ranges and room heating appliances, provision in the appliance itself should be made by the manufacturer to guard against excessive floor temperatures. In the case of industrial and hotel equipment, the manufacturer does not

always make this provision as it is part of the installation requ ments to provide non-inflammable hearths constructed in accorda with the local requirements.

We now come to the question of flue connections. The use of connections has been a much discussed topic. In many respects c mon agreement has been obtained but there still is a wide differe of opinion regarding the flue connections to certain classes of ap ances. In some cities and states I believe legislation or ordinar have been adopted making flue connections on many classes of ap ances, including circulating water heaters and room heaters, com sory. In most cases such a rigid exercise of precaution is not con ered necessary or even desirable. However, I cannot take up y time with any lengthy discussion of the subject, but will attempt merely cite a few basic points involved in the question.

It cannot be too strongly recommended that flueless room heat appliances burning over about 25 cu. ft. per hour (average manu tured gas) be eliminated from bathrooms unless the bathroom happ to be of particularly large size and unusually well ventilated. S ilarly the installation of room heating appliances in bedrooms sho be attended with the exercise of careful judgment. Large gas c suming appliances placed in small bedrooms must be avoided, in f oversized heating appliances placed in any room should be avoid Persons occupying bedrooms are quite apt to close doors and w dows, leaving the appliance in operation during sleeping perio This is hazardous and should be cautioned against. I note so manufacturers of room heating appliances are adding to their prin instructions the good advice that the heater should not be opera in bedrooms with doors and windows shut. You will appreciate t an attempt to specify a concrete ruling covering the proceedure in installation of a room heating device is a very difficult matter bu feel that something definite in this respect can be done on the stren of the results of investigations which have been carried out and oth which are in contemplation.

The question of yellow flame vs. blue flame appliances occurs this point. The use of yellow flame heaters without flue connecti is considered safer than blue flame heaters without flue connectio because of the absence of any danger of backfire and because of absence of impingement of the flame against surrounding surfa On the other hand objections have been raised against yellow fla heaters because all flames often fail to light upon the application a match.

Automatically operated appliances in which a thermostat, or ot device accomplishing the effect of a thermostat, is used for turn on and off the gas, should always be flue connected. Such applian are operated by a continuously burning pilot flame, and as they not receive any attention from the customer, irregularities in th operation may not be noticed and for this reason flues are essen

to safe operation. Appliances such as central house heaters and large water heaters, consuming large volumes of gas, should always be flue connected.

Wherever a flue pipe is run from an appliance to the chimney, a back draft deflector should be inserted in the flue connection to prevent back drafts from stifling the flow of the products of combustion. These deflectors, or draft-hoods as they are more commonly called, permit the free discharge of the products of combustion into the room during the short interval in which a back draft occurs.

Installation of Water Heaters

Installations of water heaters of any description in bathrooms, unless adequate flue connections are made, should be prohibited.

Sufficient attention has not been given in the matter of differeniating between appliances suitable for use with flexible tubing and those unsuited. Iron pipe connections are always to be desired because of their permanency and stability; but where portability is a feature as with some room heaters, flexible tubing is much to be preferred. Moreover, room heating appliances are to a large extent not of a permanent character and customers desire to remove them during the warm months. Fire place heaters are, of course, invariably left connected as they are installed as a fixture. Tubing connections are used also for some small appliances, such as single burner hot plates, nursery burners, and as an absolute necessity, with gas irons.

When making tubing connections the very first essential to observe is that the tubing is of good quality. None of the cheap inferior quality of tubing which can be obtained pretty generally on the market should be used if the requisite degree of safety is to be assured. When a tubing connection is made with rubber slip ends, the precaution should be observed that no cock be used on the appliance. It is evident that we do not need a cock on our room heating appliances if we can control the gas flow from a cock placed at the wall fixture or inlet end of the tubing.

Tubing equipped with threaded metallic ends is to be recommended as the connection of the tubing to the appliance or the supply fixture is then of a permanent character. While tubing of this nature has been used to some extent it has not proven commercially altogether satisfactory, and has been largely supplanted by the rubber slip ends.

Care should be taken in the use of of tubing that the size of tubing selected for any particular appliance is adequate to meet the consumption demand of the appliance without undue pressure loss. Consumers and many dealers do not know that the pressure drop through tubing is a factor to be taken into consideration and appliances in many cases are tubing connected rather indiscriminately without regard to the size and length of the tubing, which factors primarily determine the pressure loss. On most yellow flame appliances a larger pressure drop can be tolerated through the tubing than

on blue flame appliances. An attempt is being made today to l tubing manufacturers state the maximum allowable consumptio each length of tubing on a small label or its equivalent faste around the tubing.

It is hardly necessary to say that tubing connected appliances, b essentially portable, should be substantially set up so as not tc upset. Likewise care should be observed in placing these applia where they will not be bumped into or where the tubing will not across doorways or passageways where it is apt to be kicked stumbled over.

The question of tubing suggests the importance of keeping wi separated two or more gas cocks controlling separate appliances f a common outlet. The use of cocks with different types of handle a further means of minimizing the hazard. This feature will quently be observed in gas range construction where the handle oven burner cocks placed in the top burner manifold are flat meta contrast with porcelain for the top burners.

In the installation of water heaters an inspection should alway made to determine whether a water meter, check valve or pres regulator is installed in the service and where such devices are fou a suitable safety relief valve should be provided at the time of m ing the installation to prevent the building up of high water pressu and high temperatures, in event the heater for any reason rem burning.

The above are only a very few of the details involved in the s construction, operation and installation of gas appliances and h been cited merely to give you an insight into these phases of problem.

THE SELECTION AND SAFE INSTALLATION OF ELECTRIC APPLIANCES

C. E. Greenwood, Superintendent of Merchandizing, Edison Electri Illuminating Company, Boston, Mass.

The home is the basis of American civilization. Can we fail to prot it in all matters of safety? We study hazards in the industries but we not think of industries in terms of the factory, the mines, the r roads.

We forget that housekeeping is the world's largest industry. It estimated that there are twenty-two million home managers—wor laboring at housekeeping. If these women received real wages, sta ticians have estimated they would receive an amount of nineteen bil dollars per annum.

We are justified, therefore, in giving attention to the safety feat in all the working tools used in the housekeeping industry, but

paper confines me to the subject of safety in selection of electric appliances and their installation.

During a period following the war, there was an influx of cheap constructed devices far below a fair safety standard and of questionable service. Some importing houses with more thought of profit in mi than the interest of the public, attempted the distribution. We fe certain that continuous discouragement in their sale by central stati companies everywhere accomplished much for the protection of t housewife in our American homes.

I would predicate my discussion on the assumption that the majori of electrical domestic appliances on our markets are now safer than few years ago, but there are still some of American manufacture, a some foreign made, that are questionable and might jeopardize t reputation of others. Our problem is to guard against their success promotion.

One function of the commercial manager of the public utility is stand between the manufacturer and the home user, to suggest the be type of electric appliance to use. He checks up on the manufacturi engineer. Once an electrical appliance is attached to the lines of t central station company it becomes a part of its service. No commerc official can fail therefore to be interested in the merits of the devi the woman uses in her home, both safety in its use and service render through its use. One is dependent on the other. My viewpoint in tl paper is that of the commercial official.

I would divide the electric, domestic appliances into three classes:

Heating Devices—660 Watt or under.

Motor Driven Devices—660 Watt or under;

Larger devices, ordinarily serviced on separate circuit from t lighting.

Before taking up each class it is pertinent to refer to the "660-W Rule." Formerly it was a blue law in the code and variable in int pretation. Instead of limiting a house lighting circuit to 660 wa with 10 ampere fusing, the code now provides that a lighting circ may have 12 outlets, and if a branch circuit, 15 ampere fusing. It expressly stipulated that no device used on the circuit will be of grea capacity than 660 watts.

We can look back to the time when six ampere fusing was the ma mum permitted on branch circuits. Later the limit was increased to ampere. The 15 ampere fusing is a broad progressive step. In practi thousands have purchased in past years 15 ampere fuses and used th to save the trouble of replacing smaller sizes. It has been one of t first acts of the myriads of washing machine salesmen to plug in a ampere fuse before his washing machine demonstration to prevent l prospect from being frightened when the 10 ampere fuse gave w with the momentary starting load.

He knows electrical fires may be caused by a short circuit and t severity of an arc from a "short" is in a measure proportional in s

to the fuse protecting it, and the over-cautious have believed the incre to fifteen ampere would be accompanied by some hazard. Official t however, previous to the change in code indicated little difference the protection afforded by the 15 ampere fuse over the 10 ampere. S theory has given way to safe practice. It may not be definitely und stood that the 660 watt maximum for heating devices is unchang It was only in recent weeks that the writer was shown a device dr ing 850 watts with heater cord and standard split plug connecti which, it was assumed, did not demand special circuit requireme That manufacturer has since learned of his error in information.

No attempt will be made to go into detail on the scores of electri appliances that might be grouped under the three classes previou enumerated. Suffice it here to analyze a few of the better known each class and to point out the safety features. The fundamental, saf principles involved are the same and if manufacturers have a recept ear for the adoption of safety practices in the best sellers, an importa encouraging step has been taken toward our goal.

Appliances 660 Watts or Under

Electric Flat Irons—In the lower wattage heating devices, the elec iron holds a place of its own. Probably 80 per cent of the wired hon in the country have electric irons in use, weekly at least. Eight lead manufacturers produce 80 per cent of the electric irons in the Uni States. It has been a carefully developed mechanism and there irons produced today which are practically fool proof.

The real hazard in the iron has been in the careless use of it; fire hazard from leaving the current on and forgotten. By virtue of service rendered by the iron, it is in contact with inflammable mater and by neglect, the mischief is done. Recent development in elec iron manufacture have recognized carelessness in use, and the "automa iron is the result. There are two forms—one, the straight cut-off wl a predetermined, dangerous temperature is reached (650°), and other is thermostatic, maintaining temperature within safe limits. B of these types represent modern thought and construction in the inter of the operator.

There can be no question that, as price permits of volume sales, will find hundreds of thousands of homes taking advantage of this p tective feature. The fact that the two largest manufacturers in country are producing these irons augurs well for their wide introducti Samples are here and will be referred to later.

Percolators—Overheating is prevented in the thermostatic cut-off u by some manufacturers in their percolators. Here again we find ferent types of protective mechanisms. These are not only to prol the life of the unit. We must give the progressive manufacturer cre for broader vision in the safety field, because we know that some h ing elements can stand the "over heat" to the point of doing dam if left indefinitely with current turned on. The thermostat perfor greater service than prolonging the life of the element.

The home manager welcomes the real safety feature in the percolator as she becomes informed about it.

Radiators—The house heater, usually of the reflector type, is becoming more popular each year. It is for auxiliary heating only and at best is not very efficient for heating, though carrying practically 660 Watts. Like the flatiron, the heater is often connected at the lamp socket—usually of key type. This error is corrected in communities where a provision for securing a heating rate is the installation on a separate circuit. Wall receptacles are thereby provided.

It is desirable to have an all copper reflector, which will prevent the reflector from becoming too hot at the handle, as when constructed of steel. The real protective features are in the guard and in the weighting of the base. Most radiators are used on the floor and are easily overturned. A strong guard is therefore essential. There are heaters on the market with insufficient heating surface for the wattage, and a radiator face downward with current turned on might do harm. There are manufacturers who have provided a safety feature, by weighting the base so that the radiator will always turn on its back when tipped over.

Curling Irons—Fashion's decree that women should wear their hair bobbed has put a strain on the manufacturer of curling irons. In this device, like the flat iron, poorer construction and less regard for the features of safety are noted more than in any other device. And yet, the curling iron is used about the woman's head and a flash at the handle might do serious harm. Strength in construction of the cord should not be sacrificed for lightness in weight. There are curlers with easily removable plug and connectors and there is as great a number permanently connected. Most important are the terminal connections where careful workmanship is required, and where suitable insulation is necessary to prevent loose connections or fraying cords from causing short circuit.

Heating Pads—One more device will be mentioned in this group of low wattage heating devices—the heating pad. Obviously its use against the body, sometimes for the sick, usually under the bed clothing, through long periods of time, and often during sleeping hours, demands protective features. Every manufacturer of heating pads has a particular obligation to the public and in the writer's opinion, there is laxity by some in their safety practice. Heating pads vary little in appearance In the fundamentals of construction they have been the same for years—namely, the helical coil of fine resistance wire wound over an insulated core with a woven outer insulation.

This coil is then sewed between two cloth strips inside of the finished pad and great care must be taken in this operation because the resistance may be damaged. The core upon which the wire is wound should be large enough in diameter to produce a good sized helix that will stand a constant bending without breaking the wire. The resistance of the finished coil must be constant, not only per foot, but per inch, other

distributed over the area of the pad in such a manner that the var lengths will not become bunched in one place.

In the heating pads of earlier times there was but one thermostat this was placed in series with the one heat circuit. No dange temperature developed until placed under the bed clothes or c covering. It was found that one thermostat was insufficient protec and one or two were added by the most reliable manufacturers.

The maximum temperature a person can stand varies from 150 190° Fahrenheit and the best thermostats are set for positive actio opening the circuits from 170° to 180° F. Scorching is thereby preve and risk reduced to a negligible quantity.

The writer is told by one prominent manufacturer that to m insert and test the thermostat of a pad involves a cost as great as of the rest of the pad; that all mechanical operation in that partic pad is done with tools so that screws, contacts, bushings, insulator h etc., may always match. A variation of 2/1000 of an inch in the of the casing would cause the thermostat to operate outside of allowed limits. The manufacturer in question uses platinum make-break points to insure accurate functioning over a term of years.

Through personal experience with physicians and nurses, the wr is of the opinion that there still persists a feeling of risk in the use heat pad more than in any other electric device. The impressio created by the performance of pads of early manufacture, or pad the present day manufacture with low safety factor and poor formance. Of course, saturation by uric acid will cause immed scorch and no means has been found of preventing this other than water-proof cover.

Generally speaking, it seems that we can be assured that reput manufacturers of all electric appliances are making every effor secure the safety of the public in the use of their products. They following the underwriters rules in the insulation of heating dev which provide for a 600 volt A. C. high voltage test, and they are c ful about the mechanical features of the insulation so that it is sur be substantial.

Cords—On the subject of cords and plugs we can either write exh tively or can give it passing comment. The writer is obliged to do latter, but would refer you to the recent annual reports of the wi committee, and of the standardizing and testing committee of the N L. A. and tests conducted through them by the Electric Testing Lab tory. Attention of electric men has been drawn to the wide varia in durability because an element of safety lies therein. One result been that cord manufacturers have scrutinized their product and provements are resulting constantly.

Motor Driven Devices 660 Watts or Under

In the class of small motor driven devices the leaders are the wash machine and the vacuum cleaner. Others could be enumerated,

fan, kitchen utility motors, vibrators, sewing machines and the li
but their relative importance with the washing machine and vacu
cleaner do not justify the time for analysis.

Incidentally, it is of interest to note the growth in the production a
use of these two devices in recent years. Fairly accurate figures
available since the organization of the association of manufacture
In 1918, only 163,167 washing machines were sold, but the output
increased until 1923 the production figures reached 554,361. Last y
alone, more than one-half million homes added a washing machine
the home equipment, and if the present rate of increase holds, o
600,000 more will be added this year.

It is of further interest to note that five manufacturers out of a to
of sixty or thereabouts, produce 60 per cent of the machines sold,
three manufacturers get approximately as much business as all
rest put together. I quote these figures to point out that the saf
feature in the washing machine is far reaching, and fortunately
can obtain large results in the safety field through comparatively
manufacturers. I understand that every machine sold in this coun
is American made. The same is true of the vacuum cleaners. L
year there were over one million cleaners sold. There are 18 ma
facturers who market machines under 77 different trade names.

Washing Machines—In the best electric washers the entire mechani
is so enclosed and guarded that no parts are exposed where the opera
can make contact. The main driving mechanism is thoroughly guard
Children are curious and are apt to go on inspection tours of their o
especially when mothers have turned their thoughts away from
machine because electricity is doing the work. Unless the safety feat
has been ignored no gears or belts will be exposed with possibility
injury.

Little trouble can result in the washing compartments though
distinct types. The exception are those having the centrifugal wrin
Care to place on the cover before starting will eliminate possible a
dent from this source. The washing mechanism in all washing machi
is slow moving and is usually performed under cover. A desira
feature found on some machines, and to be encouraged in others
the automatic cut-out switch to prevent burning out of the motor
to overloading, thereby protecting the home from possible fire dam
should a fuse fail to function. One manufacturing company has a
ticularly reliable device of this kind on its machine. Let us assu
that while the current happened to be off on a house the switch
turned on and left in the "on" position. Should the house current go
later, when the machine was unattended, possible damage from the mo
running continuously would be prevented by the switch kicking
Such refinements assure us that manufacturers are thinking along
right lines and have the safety idea in mind. Some have gone bey
usual protection to effect a result.

There is no real danger from receiving a shock from a wash

doubtless be so frightened that she would lose confidence in her la saver. Inspection for ground is part of the manufacturing process all factories. Greatest care should be given to the insulation of motor frame from the metal base of the machine. Use of the enclo type motor to prevent splashing water from lodging on it is in gene practice.

The wringing process seems to be the most unsafe part of elec washers. There is a wide variety of types and qualities to be found the machine now in service. The finest wringers have the follow sa' 'y features: Protection guard, release mechanism, and autom position lock.

Women in the home—yes, demonstrators, both men and wome will occasionally get their fingers between the wringer rolls. If guard fails to keep out the fingers, or if for reason of a clothes jam rolls must be freed, a reliable release mechanism is imperative. The saf release lever should be so constructed that the leverage of the tripp mechanism will respond to the slightest touch of the operator. Th are such wringers on the best machines and we must encourage th use on all of them.

Another feature which merits attention is the automatic position lo which automatically locks the wringer if the operator has failed to so. The wringer, not having the locking device, is quite possible spin on its support and strike a severe blow. This feature is not fou in all washing machines and the manufacturer, without it, has not g all the way in the matter of safety.

Vacuum Cleaner—And now a brief discussion of the vacuum clean which, next to the flatiron, is the most widely used domestic elec appliance. The vacuum cleaner goes where it is sent, under the b table or around chairs, and much of the possible trouble comes in 20 foot cord that conducts current to the motor. The cord wraps its around everything. In the vacuum cleaner the construction and du bility of the cord is an important item in safety.

The handle conducts this cord close to the hand of the wor operator. In the metal handle the cord is conducted inside and emer at the knob above the grip. On the wooden handles the cord is c ducted on the outside, and is fastened by staples which, in time, n cut through and cause short circuit. Switches are usually of the t type, at one time used on fixtures. It is common occurence for operator of a vacuum cleaner to drop the handle, and if the switch struck a few times, it is liable to be rendered defective with the possi ity of short circuit at the handle grip.

The fibre handle is an improvement over wood because it will warp, but the cord has to be carried on hooks. What seems to b marked improvement over both wood or fibre, is the steel handle. T hollow handle allows the use of a rocker type switch, which is stro and can stand much abuse. The curving of the handle at the grip mak protection from the switch striking, if the handle is dropped to floor. The other protective advantage of the hollow handle is the car

ing of the cord inside. It is obvious that cord must be of substantia construction because, if the strands break, the small wires breaking through the insulation create a ground connection through the cleaner It only needs then the touch of the hand to a radiator perhaps to give the operator a shock through this ground.

One of the leading exponents of steel handles in vacuum cleaner manufacture has written me as follows: "We use 47 fine strands of wire instead of the ordinary 18 strands for the conductor itself. This is served with a cotton braid. Over this we put 25 per cent of pure para rubber; then two strands are laid together and another 25 per cent para rubber binds the two together. This is served with a mercerized braid tightly woven. All of which is convincing evidence that some manufacturers are thinking clearly along safety lines.

We conclude that where any cord passes through the metal handle of a vacuum cleaner, it should be strongly constructed. The vacuum cleaner switch, when in the handle, and that is the accustomed place should be well insulated from it.

Another location where possible trouble may develop is where the handle usually swivels and makes a swinging connection. A careful selection of cord is essential for use at this point to prevent breaks and possible short circuit or ground. Likewise important for maximum safety is the careful insulation of the handle forks from the handle It is obviously obligatory to have the fan casing with its high speed fan so well enclosed that the most inexperienced operator is protected

Devices With Special Wiring

In this class there are three outstanding devices—the electric range refrigerating machine and ironer.

Electric Range—The range is making its way into the homes in every section of the country. Some of the largest cities have not become well acquainted with it for reasons which it is not relevant to mention here. We have in the modern range a device varying from 4 to 12 kilo watts in capacity, with the operator working about it a few hours each day. It is encouraging to report the improvement that has been made in the last few years in electric range construction.

Leading manufacturers recently met with the underwriters and drew up a set of specifications which would safeguard the construction of the electric range from a safety standpoint. The proper wiring was specified and also high voltage test. Still another recommendation was the connection box construction which required that the range frame be grounded to the conduit sheath.

One or two features merit special attention. The interior wiring should be of best braided asbestos. This is especially important under hot plates. A poor insulation will break and crumble, and in the event the range has a metal drip pan (there are such,) and the pan is run against a bare wire, a short circuit will result and the range user will get a shock if there is dampness about. A desirable arrangement is complete enclosure of wiring both to the hot plates and to the fuses.

From a strictly safety viewpoint the enclosed hotplate has advanta over the open coil. Unless the coil is deeply embedded in the fire br expansion may bulge the wire and come in contact with a utei Should the range user touch the kettle and a faucet at the same ti or happen to be standing on a damp floor, a shock is quite possible.

When an enclosed plate is in place this risk is eliminated. In best ranges the upturned flange of the range top, of the overlapi rim of the hot plates, or both, prevent liquids, grease, etc., from cau oxidization of the unit and protects the wiring. When the plates in place there is no chance of shock, and when removed the term connections are either so constructed or so placed as to prevent range user from coming into contact with them.

Separate fusing of the heating element seems desirable. Tho trouble is remote from this source, there can be trouble. For exam a ground might develop not sufficient in intensity to blow the main fuse, and the ground would not be detected except through cont Separate fusing has also operating advantages to recommend the prac practice.

The wiring installation for the range is important. All range fra carrying enclosed heating elements should be grounded. Experts agree on the necessity for grounding the range with open coil pla It makes possible a shock to the person previously mentioned touches the tea kettle in contact with the coil, and who may lean c the range with a damp apron or make other contact. However, objection is theoretic and grounding of all range frames is a com and approved practice.

The installation of an enclosed indicating safety knife switch cuting off the entire range is recommended. This switch installa is not a Code rule, but is justified as an emergency matter and is viously an investment in safety.

The use of a pilot light has been widely discussed in the past, but usefulness is admittedly small by reason of the householder's use o if for no other. Lamps burn out and are false indications, and much trouble is taken to replace them. We can hardly consider tl an important element of safety.

Refrigerating Machines—More money and inventive effort has been into the development of electric domestic refrigerating machines t in any other electric device for home use. The gas used in the dome type machine is the major consideration in its safety and it is fortunate that this very subject is made the basis of competitive s argument. We shall hope to see the Sales Organizations marke refrigerating machines adopt more constructive methods.

Tubing tests must be thorough especially as to pressure. One ma facturer has given information in this connection that although pounds pressure is the maximum capacity, their test includes jecting the tubing to 300 pounds pressure with a temperature of Fahrenheit to be on the safe side.

The subject of mechanical refrigeration has been given such thoughtful consideration by the National Safety Council that mere reference will be made to it at this time. The American Society of Refrigerating Engineers have formulated a mechanical refrigeration safety code which is a recognized standard on mechanical design in larger plants than would be found in domestic service, but which applies in principle to all refrigerating machines. There is a slight element of risk in most all refrigerants, but more remote in those widely adopted in present machines on the market.

Can we not depend on the mechanical engineer developing domestic refrigerating apparatus to recognize the characteristics of the various gases and their effect on the human system if liberated, and to adopt safety practice in design to protect the home users. The National Safety Council will, without question, continue its interest in this direction.

The Ironers—Please note that it is no longer a "mangle", which may have received its name through implication.

The present day electric ironer has a distinguished line of forbears, tracing back through the centuries to the early days of Rome. The first device was probably the Roman cochelia which was no more than a smooth table on which the clothes were laid and upon which a weighted cover was placed.

This was used for hundreds of years until the Dutch, exponents of neatness, improved it by equipping the cover with a turnscrew somewhat similar to the old fashioned letterpress. Rollers were first introduced in the nineteenth century, which were moved back and forth over the material to be pressed. Originally, such rollers were fixed to the bottom of a box weighted with stones to give the necessary pressure, and operated by means of pulleys and a rope.

Wooden rollers became iron, then the iron rollers became hollow and in them were placed heated iron cylinders, thus combining the heat of the flat iron with the roller press.

The awkwardness and danger of moving heavy rollers back and forth again set inventive genius to work and there was perfected the present day arrangement of rollers functioning against each other as in a clothes wringer.

Last came the application of electric power, making available the safe, smooth working machine that does much of the ironing both in laundries and in private homes, and needs only the turn of a switch to heat it and the manipulation of hand levers or foot controls to set it running.

With old faults overcome, the housekeeper not only does her work in a less tedious manner, but with slight danger of fire or accident. The best ironers are built to anticipate the presence of children and possible negligence of the operator, and all moving parts are enclosed as in the washing machine. This applies to both the belt driven and the shaft driven machines. Hand controls should not be so exposed as to pinch fingers or to burn hands. The fact that, in the foot con-

trolled machine, the operator is thrown out of natural position ma one lean toward the hand control providing safety elements are served in construction.

There is a high grade automatic ironer widely sold by a respons manufacturer. The use of a two-speed clutch, gives the mach flexibility in operation . On this particular machine there is a fl type switch within easy reach, and an operating dial controlled the fingers. Should the current fail when clothes are in process passing over the shoe, a hand wheel releases the shoe. Whether article being ironed is freed before scorching depends on the alac of the operator, but there need be no danger from fire.

In the ironer, as in the wringer, there are two pressure elements t concern us, but they differ because one of these pressure element hot. In one type of ironer the pressure elements are two rolls— padded and one heated. In another they are a padded roll and a conc shoe. The best machines of the double roll type have the table board, the padded roll so constructed that there is no possibility of the fing coming in contact with the heated element. This point is gener recognized in construction and there is no risk of burned fing unless through absolute dumbness on the part of the operator. W ordinary care there is no risk in the "shoe" type. But in all iron construction should provide for instant release of the pressure eleme if the power should go off during the "ironing" process.

The reliable ironers of today are so simple in construction that th is slight hazard connected with operation. Of course, it is desira to have motors completely insulated from the metal parts of machines.

From a safety viewpoint the directly connected driving mechan is preferable to a belt drive by reason of the simplicity of apply protective devices.

Conclusions

In this discussion, we come to the following conclusions.

1. The responsible manufacturers are placing on the market domes electric devices of high grade in which careful thought has been gi to safety in construction and in use.

2. There are to be found on the market in comparatively sn quantities certain lines of devices not as reliable, the product of sc manufacturers in this country and some of foreign countries.

3. The keen desire of the central station companies to build their load, and increase revenue from the residence field, will not m them lose interest in the safety of their customers. They must c tinuously have at heart the safety in use of the household apliand Any other viewpoint would be short sighted, almost suicidal.

But a few of the smaller electric dealers, and numerous non-elect dealers. look upon the electric appliance as a piece of merchand to yield a profit and sale and not as a medium through which a serv is rendered, and it is through these channels that unsafe produ can get into the hands of the public.

4. Responsible manufacturers who are cooperating to the limit in making their devices 100 per cent safe for use by the home manager should be encouraged in their efforts. We might adopt a theoretic minimum standard, but it should not be so low to allow in theory an unsafe device on the market. Thi sis not alone for the protective feature which is vital, but also to protect the future growth of things electric. Public opinion may be moulded by the performance of low quality products. Our purpose must be to raise public demand to our minimum standard of quality. There can be no better method employed of discouraging the manufacture of unreliable devices than through discouraging their purchase.

5. It is estimated that 85 per cent of the shoppers for electric appliances are women. If the women can be taught to discriminate in their purchases between "Quality appliance at low price" and "Cheap appliance are women. If the women can be taught to discriminate in In present times high quality does not mean high price, because the most responsible manufacturers are producing secondary lines of domestic appliances at lower prices than other standard "Trade-Marked" lines. In dependability they are equal to the more expensive lines, but they are not dressed up the same.

I submit that the National Safety Council which in essence is an "information bureau" might consider ways and means of using its influence and prestige in disseminating information to the end that shoppers will be lead to discriminate in their purchases of domestic labor savers. The price of safety in this field is little more than the price of chance.

This is a problem of public information. It must be done diplomatically and without causing timidity in use, but I would submit that the revue of the "Safety Council" should stand as recognized merit in safety of construction, just as the standing of the Good Housekeeping Institute creates in the mind of the woman purchaser a guarantee of an appliance doing her work with satisfaction.

It would be a grave mistake to jeopardize an investment of millions of dollars in the electric apliance industry by tactless propaganda. The psychology of "unsafe" in the public mind is far reaching in its adverse effects. There is a wide field of work however for the safety council, and it has done and can do more in the promotion of safety in the field covered by our subject, but the writer would maintain that, viewing the electric appliance manufacturing field broadly, an encouraging, healthy condition exists and progress is evident from the safety viewpoint. No desire on the part of a central station to load up its lines, or desire of merchants. electrical or non electrical, to sacrifice safety and service for personal gain, should turn the safety curve from its movement onward and upward.

In line with the general policy of this company of supplying its customers with the safest and best possible service, the selection of electric

All electric appliances are selected on the following basis: sa quality, efficiency, desirability, marketability and price.

On account of a public utility company furnishing electric servi its customers, it is the logical place for a customer to go when desire to purchase electric appliances, using this service. There it is essential that they be on the alert for all appliances which meet the above requirements and be in a position to sell its custo only the safest, best and most economical electric appliances.

When a company sells only such appliances known as lamp s devices, the greatest care must be exercised to only select those are the safest and nearest fool proof, on account of the custome most instances being ignorant of the liability of injury that might r to him from the use of appliances not properly constructed.

Before any negotiations for the purchase of any appliance is n we have the appliance sent to our laboratory where we maintain a of highly trained electrical and testing engineers. In the labor the appliance is thoroughly tested for mechanical and electrical de and a report is made to the new business agent giving the follo details.

A complete description of the construction of the appliance and it is wired and how the electrical connections are made and ho is insulated. Note being made of any part of the appliance which not conform to the rules of the Board of Fire Underwriter's, or rules and regulations for wiring of this company. No appliance is which does not comply with these rules. In the case of all he and cooking appliances, the heating element is submitted to a life of 800 hours continuous burning. A careful record is made at s intervals of the voltage, amperage and wattage, thereby determi the performance of the element under continuous operation. If the ing element burns out within that period or there is any appreciable in the wattage, the appliance does not come within the class of applia which will give satisfactory service. All such appliances are subm to a 1,000 volt ground test, thereby, determining whether the appli is properly insulated. Any appliance not meeting these tests is reje

When motor driven apparatus appliances are tested the power sumption is carefully noted under various operating conditions; n the voltage, amperage, wattage, power factor, starting current (s ammeter), and blocked rotor. In the test great care is given to e ination of the appliance for the lack of any protective devices, w should be a part of the appliance to protect the operator against possible injury as well as a protection against fire risk.

After it has been approved by our laboratory engineer, it is sent to our household economic specialist, who is a graduate in h hold economics, where the appliance is put under a rigid practical to see that it will perform all the duties claimed for it, and to see it can be safely and efficiently operated by one not familiar with

technical operation of the appliance. Great care is also exercised in the purchase of appliances which require the least amount of maintenance and are of the simplest construction.

After the appliance has satisfactorily passed all the above requirements, we then proceed to negotiate the purchase of the appliance. In our purchases, we endeavor to meet the market of three grades of prices, namely: high price articles, medium price articles and low price articles.

It is a very noticeable and commendable condition that the majority of manufacturers in this country have realized the importance of the safety feature in the manufacture of appliances and that there has been a great advance in the class of material being offered by them.

ADJOURNMENT

Joint Meeting of the Public Utilities and Electric Railway Sections

October 1, 1924

J. P. BARNES, Chairman, Electric Railways Section
President, Louisville Railway Company, Louisville, Ky.

H. W. MOSES, Chairman, Public Utilities Section
Superintendent, Bureau of Employment, Edison Electric Illuminating Company, Boston, Mass.

CHAIRMAN MOSES: I have the pleasure of presenting the first speaker, L. H. Palmer, vice-president and general manager, United Railways and Electric Company, Baltimore, Md.

THE ELECTRIC RAILWAY IN COMMUNITY SAFETY EXTENSION

L. H. Palmer, Vice-President and General Manager, United Railway & Electric Company, Baltimore, Md.

In discussing the place of the eelctric railway in the community safety extension it seems desirable to get clearly in mind the background of the safety movement, particularly in respect of public safety.

Organized efforts to improve safety conditions in this country had their beginnings largely in industries, and, as far as my knowledge goes, the first intelligent and concentrated efforts to reduce hazards and to protect human beings from injuries and death, came through occupational channels. Real success attended such efforts, and the need for their continuance and improvement increased as the industrial life in this country developed and became more intensive in character.

Some of the great basic industries of the country, notably those concerned with transportation, have been engaged for years in definite work among their employees to safeguard the public as well as their own men, and I imagine that these efforts may well be called the beginnings of public safety.

With the increase in traffic as our cities grew larger and as demands upon the streets grew more varied and more intense, the development of automotive vehicles as important factors in way use, the need of organized effort for public safety grew a The earlier endeavors in organized public safety work had the be of experience and instruction in safety work in some of our more gressive industries. It was largely due to the efforts of these pio that public safety work began to assume definite form of a diff type from industrial safety. As the problem grew, the organizatic various interests in the community into a definite body to deal this growing and important problem, came about as a natural co Hence, at the present time we see in most of the progressive m politan centers and smaller cities safety councils organized specifi to cope with the great problem of protecting the public, particu from accidents on highways and streets.

A real index to the progressive spirit of any community is affo by the answer to the question, "Has it a Safety Council functic definitely and efficiently and getting results?" So much for the ge background.

In the earlier days of electric railway operation, accidents largely to passenger and pedestrians. It is true that there were r collisions with vehicles, but, as I think back over my own knowl of the problem, I would say that these were less serious and less nu ous than our accidents with vehicles today, where the motor ha placed to such a large extent the horse as a means of propulsion.

In the development of electric railway operation, after its trans from horse and cable power, the factor of safety was keenly recogn and one of the definite objects of every operating officer was to pro to the utmost the safety of passengers and pedestrians and vehicle

The Age of Safety

The constant reiteration of the need for avoiding accidents has lessened as the years have passed, but has grown along with the gr of traffic. Since the horse car era, surface railways have experie an increasing number of accidents. The element of increased s alone would largely account for this. Accidents to pedestrians step-accidents, in which passengers were involved because of the l of boarding and alighting while cars were moving, gave us great cern. Increased speed contributed to the increasing number of collis with other vehicles. Fenders and life guards were introduced to le the hazard to pedestrians; cars with folding steps and enclosed entr and exit were later developed with consequent reduction in the nu and severity of boarding and alighting accidents; the air brake developed with the increasing weight of cars to make their co surer and safer; but we see now that only spasmodic efforts were to educate the public as to the causes of and ways to avoid accidents.

Following in the steps of these improvements a new hazard appeare on the horizon—the automotive vehicle. At first its importance wa not fully realized, but with the passing of years the tremendous increas in self-propelled vehicles has brought about great intensification of th vehicles hazard. We tried to educate our employees to realize thes dangerous potentialities but we have developed no effective way c reaching the public who were responsible for so many of these accident

With the great increase in automotive transportation, however, th attention of the public has been drawn to the subject of accidents i general, not alone to the street railway side of the problem. This ha given us an opportunity to support any movement that would educat the public in all phases of accident prevention, including our own. Fewe accidents increase confidence in our service and make it more attractive fewer accidents reduce our costs; and a minimum of accidents is a grea help in improving public relations. The reaction on the employee beneficial for when he realizes that his company is supporting a mov ment to educate the child, the automobile driver, the pedestrian, an the community at large he will unquestionably take the subject c safety very seriously. It is an old saying that there is no subject upo which men meet for discussion which offers less chance for argumer and disagreement than safety. It forms an avenue in which all interest of the community can meet on neutral ground.

While the number of accidents, due to increasing congestion an more intensive operation, has continued to grow, the number of deatl and injuries caused by electric railways over a period of time, has show a marked decrease. The number of accidents due to contact with aut motive vehicles, however, is showing an increase, although not in pr portion to the increased number of vehicles registered; enough, hov ever, to cause us great concern and to spur us on to renewed effort For these reasons the electric railway companies should and large do, as far as I know, warmly welcome the advent of community safet councils. The council is a new vehicle to express, visualize and develc a public realization of the need for training in safety.

The safety council is the available present means whereby definit measures can be taken from a civic and broad community standpoi to enlist the aid of all classes of people in promoting safety for th public.

Selfish Interest

An individual group in any industry, whether it represented, f instance, transportation, meat packing, machine shop, rolling mill other industry, would have great difficulty in aligning in behalf safety the various elements of the city. The question of selfish intere would come in and people would perhaps be inclined to stand bac instead of helping. Where, however, a safety council can be organize not by a group from an industry, but by public-spirited citizens of a walks of endeavor, the picture changes and the psychology of the mov

ment appeals to civic consciousness and to good citizenship on part of various business and public interests.

It does not require argument from any one to show that with s a condition existing the electric railways in our country should quick to grasp, promote and encourage this new avenue for making tl operation safer, thereby becoming of greater value to the citizens t serve. As I have indicated, it justifies the effort that they and tl men have been making for years; it heartens the personnel of company; it makes more intense and effective effort possible.

Long before terms now common in connection with safety movem were heard by the average citizen, the employees of electric railw were being trained and schooled and trained again to make the h ways as safe as possible. One of the points that we can empha now in our continued and renewed efforts with our men is the f that at last the public consciousness is being aroused to the need safety. Therefore, instead of working alone with our colleagues the steam roads, we can begin to see cooperation on the part of ot elements of the public.

In the city of Baltimore there was an increase of 32.7 per cent the number of registered automobiles during the first six months 1924 over the same period for 1923, and this figure is a reasona accurate index of the increasing congestion in our city streets.

The electric railway company of Baltimore carries some 80 per c of the people to and from the congested district, and it is only necess to mention the figure of increase in congestion to realize the increa potentialities for accidents which have been brought about in rec years.

The traffic problems of the electric railway and the accident haza that accompany city life have a bearing in relation to every t of vehicle and present considerations which affect persons of all a and stations of life.

Because of the city-wide nature of its trackage and business, th is no one organization whose accident problem covers quite so br a field as does the electric railway.

Obviously then the accident problem of the electric railway can b be met by methods which cover the entire community and which att the situation along the broad line of educational activities. This believe, is the logical method to use and whatever aids to educat can be employed will have value. Public bulletin boards, safe drive schools. continuous articles in the press, safe drivers' clubs, accid prevention campaigns, signs on the fronts and sides of commerc vehicles. notices in the cars, the arousing of the interest of constitu authorities such as the police department and other public safety partments, and the awakening of public interest, are all of value.

Perhaps the most fruitful field for permanent improvement in saf is the child. Continuous educational work in schools, and in playgrour

during the summer months is necessary. The use of junior safety councils, "Careful Children's Clubs," school safety patrols, and the continuous display of inspirational ideas to keep this problem constantly before the minds of the children are essential. We need to make safety an active part of their daily life.

All of this work can be done best, it seems to me, through an organization whose sole purpose is the safeguarding of human life, and which has no commercial or political aspect of any sort. The community council must be an organization catering to no interest and having no part in any political or other controversial interests or meetings. It must have but one purpose—that of reducing accidents.

I have spoken of the work that has been done for years in educating street railway employees to reduce accidents, and proof that this work has been successful is contained in the report of the Committee of the National Safety Council on Public Accident Statistics for 1923. The death rate per hundred thousand population for street cars and the total injuries have shown a consistent decrease since 1911, notwithstanding the increasing difficulties of operation caused by congestion and by increased speed of other vehicles.

This question may well be asked "what have you done to carry out these recommendations?"

The first effort toward organized safety in Baltimore took the form of a "Safety Week" in 1921. Such a week was held two years in succession, was widely advertised, and every effort made to arouse the interest of the citizens. Our company took a leading part both years and assumed a very considerable portion of the total expense. We realized that such efforts were sporadic, however, and had not the lasting effect that was most essential. The question of a local permanent safety organization then came up for discussion, and when early in 1923, Carl L. Smith, a field representative of the National Safety Council, came to Baltimore, he found the time ripe for action. One of the first organizations to which he came was the electric railway company. We gladly extended every possible aid and assistance to him in organizing and getting the movement started, and we have continued to take active and vigorous part in the work of the council since that time. Our senior vice-president has been chairman of the executive committee since its organization; another has been a member of the board of control; and the chairman of our safety committee has been active from the start.

Gives Liberal Support to Safety Council

We have supported the council liberally in a financial way, and propose to continue to do this as long as it functions wisely. I might have said in the beginning that the financial support given by the electrical railway company to the council should be large, ranging from 20 to 40 or 45 per cent of the first year's budget, depending upon local conditions. However, as the work broadens and other interests are

included, the amount that the electric railway company contrit probably will drop in percentage, although as long as the council its work well, the electric railway company, in my judgment sh be a generaus contributor to its income.

To sum up: Increasing business activity and traffic congestion the automotive vehicle are intensifying the accident hazard and menace to our population. The work of the National Safety Co and the community councils is the one organized effective present method of combatting this evergrowing menace.

Further, the electric railway as the great vehicle for handling r transportation of communities is vitally concerned with improving ditions and safeguarding the public whose agent it is.

Therefore, the interest of the electric railway in community sa is a paramount one and the railway should support the safety co with every means in its power.

DISCUSSION

MR. J. P. BARNES: (President, Louisville Railway Company, L ville, Ky.): The tremendous worth-whileness of saving human life making a community safer can be approached only through the po book of many individuals, and where that is necessary, I think up to us who have the broader understanding to use the mean approach to those who have not yet seen the light as we see it.

I feel that it is important for the electric railway representat and the public utilities representatives, where the local council is u organization, to first emphasize and, second, preserve that partic point of view in contact with the people we work with in the sa work. To be most effective, the local safety council must have respect of the public officials and the law enforcing authorities, a is not always true that we enjoy the same respect from those an ities that we do from the general public and from the business It seems to me that we must follow Mr. Palmer's advice to be gene contributors but humble and quiet. I noticed with a good dea interest that his company has followed the lines of success th good many others have followed; that is, they are regular attend at meetings, furnish chairmen for committees, they are generous fi cial contributors, but do not head up the program in the public. I think the greatest good in the public eye, except in some instar that the public utilities can have in any local safety council ca done by getting behind some good, outstanding man whose reputa in the community is such that he will be recognized as a public cit

MR. J. B. BROSIUS (Chamber of Commerce, Tuscaloosa, Alaban In a city of 25,000 the street railways usually show in the red, a was just wondering how you would support a council in a city of size.

MR. BARNES: It is not always in a city of 25,000 that the street car companies show in the red, and it has been experienced with companies I have been associated with. A good many times when you are in the red, one of the best ways of getting in the black is to get behind the safety council and push.

MR. A. J. VAN BRUNT (Public Service Corporation of New Jersey, Newark, N. J.): There is one feature that has not been touched on that I would like to stress just for a moment. It has been our experience for many years that it is utterly impossible to cut down the accidents on the street without the cooperation of the public. We can spend time and money teaching men in our employ, and we can do the very best that we know how to cut down accidents but unless the general public, from the school children up, cooperates in some measure our results will not be very great, and therefore, I am stressing very strongly to you men who have not interested yourselves in the formation of local safety councils, I think it will pay you in a financial way if in no other to get in close touch with headquarters, and even in cities of 5,000 inhabitants, where there is no local safety council, have one organized.

MR. J. J. CONNORS (Nashville Power and Light Company, Nashville, Tenn.): I am from a town of 135,000 inhabitants. The doubt as to whether or not a town of 25,000 can support a safety council brings to my mind the question as to what we did in Nashville towards supporting a safety council. Nashville Power and Light Company has become about the sole support of the safety council. This is our second year. The first year the street railway company was the largest contributor and the amount given was more than the total subscription from the entire city. This year we have not started our campaign yet, but the council is still alive and doing good work.

MR. S. W. BALDWIN (The Connecticut Company, New Haven, Conn.): In connection with red and black figures in connection with public safety work. I don't think it is as bad a work as it appears before you tackle the job. Just to state my own experience in the city safety council work in New Haven, our company has always stood ready to make any necessary and proper contribution. At the present time I have been having a good deal of campaign work there. The first contributions which came voluntarily were those from the chamber of commerce and the Automobile club. They haven't gotten down to us as yet. We are there when they want us, but just let them know you are back of it and you will find the rest are back of you.

INSTRUCTIONS IN AND OBSERVANCE OF SAFETY RUI IN SUBSTATION OPERATION

Homer E. Niesz, Manager of Industrial Relations, Commonweal Edison Company, Chicago, Illinois.

It is a well known fact that the best safety device is a careful w man; certainly this is true as applied to electrical substations. La sums of money have been invested in the construction of modern stations equipped with apparatus as safe for the workman to ha as competent engineering skill has been able to design, but the invis force, in the form of electricity of high voltage or large volume, w we handle, convert and distribute, is, by its nature, a source of dan to the careless or incompetent man.

During the preparation of this paper information was obtained cerning the policies of a number of the large electric power compa with reference to the rules and operations of their substation dep ment from the viewpoint of safety. Replies to a questionnaire sent were valuable, helpful and highly appreciated by the author. T showed very clearly that the practices and methods employed by various companies are very similar; therefore, in order to simplify presentation of this subject, this paper is largely devoted to the desc tion of the substations and the methods of promoting safety in company with which I am associated.

Description of Substations

Our substation distribution system is described briefly as follows

1. Attended substations supplying the Edison three-wire d. c. tem. The converting equipment consists of 250 V. d. c. rotary verters, fed from the 9,000 V. 25 cycle transmission system or the 12 V. 60 cycle transmission system. Storage batteries are used for stan service.

2. Attended substations and remote control unattended substati supplying the 4,500 volt (between phases) a. c. distribution system. equipment of these attended substations includes power transform fed from the 12,000 V. 60 cycle transmission system and synchron condensors for power factor correction. A few frequency changing m generator units fed from the 9,000 V. 25 cycle system remain in serv Power transformers are employed in the remote control unatten substations.

3. Attended railway substations supplying 600 Volt d. c. for op tion of the Elevated and Surface Railways. The converting units rotary converters fed from the 9,000 V. 25 cycle or 12,000 V. 60 cy transmission systems.

4. Unattended industrial substations located upon the custom premises. The equipment includes power transformer installatic supplying voltages to suit the customer's requirements, fed from 12,000 V. 60 cycle transmission system.

All unattended substations are visited regularly for maintenance, a as occasion demands, for operating.

Hazards

The hazards met with in substation operating are limited to sor extent by the character and extent of the work that operators a called upon to perform. It is mentioned, therefore, that the repair wo performed by our operators is confined to minor repairs or adjustmer on low tension or on non-electrical apparatus. Operators are not r quired or permitted to clean high tension equipment except the dusti of outside surfaces of enclosed apparatus, this work being done by separate trained cleaning crew. Operators are also forbidden to upon traveling cranes for any purpose or to clean or change lamps fixtures more than 16 feet from the floor.

The most serious hazards incident to substation operating and t ones to which exposure is most frequent are those electrical hazar met with in the operation of high tension equipment. Our experien indicates that the following are the most common:

1. Opening of disconnective clips while oil switch in series the with is closed and under load.
2. Accidental contact on live line or bus terminals with test c cuits or ground connectors.
3. Closing of hand operated oil switches.

The opening of disconnective clips carrying load is usually t result of failure to properly identify the switch before proceedi with the operation. It may be due, also, to failure of the operat to determine that the oil switch is closed.

In determining the open or closed condition of oil switches o operators are instructed to place no confidence in the indication pilot lamps or on the position of operating clips of oil switches.

In our training of operators we emphasize very strongly the i portance of thorough familiarity with the mechanism of each type oil switch he is required to operate, to the end that he may unfa ingly recognize, from the position of the switch mechanism, its op or closed condition.

Some companies have found devices such as the following effecti in indicating the position of oil switches:

Signal lamps within disconnect clip compartment.
Flags or signals connected with oil switches.
Switch compartment doors that cannot be opened while swit is closed.

Accidental contact against live high tension terminals is also fr quently due to the operator's failure to properly identify the appa atus. The hazard is greatest where live high tension conductors a in close proximity to that portion of the apparatus which is dead f

or poorly designed construction and in dealing with it we insist all live conductors be killed before proceeding with the work.

The hazard to the operator of applying ground connectors to lines and busses has been greatly reduced where the groundin done through the oil switch and the final operation in grounding sists of closing the oil switch by remote control.

The closing of hand operated oil switches is a very serious ha where there exists the possibility of closing the switch into a gro or other short circuit. In our industrial substations where a nu of hand operated oil switch installations still exist, the closin such switches is forbidden until the condition of the circuit is kn to be safe.

Rooms housing high tension equipment are in themselves a ser menace to the safety of operators unless of sufficient dimension avoid the crowding of equipment and provided with more than exit for emergencies.

Modern bus and switch compartment constructions, clearly mar for identification, properly lighted and providing ample working r has done much to lessen the hazards which accompany high ten switching operations.

Other electrical hazards than those incident to the high ten equipment may be mentioned briefly:

1. Opening low tension switches carrying heavy load or s circuits.
2. Short circuits caused by screwdrivers, pliers, etc.
3. Adjusting or removing brushes from machines in operatio
4. Proximity of person to railway circuit breakers when o ing under shorts or railway machines when flash-overs occur.

Serious hazards of non-electrical nature include:

1. Contact with revolving armatures or fans.
2. Slipping or falling from machines or other apparatus.

a. In opening switches under short circuits or heavy load our operators are instructed to employ a length of rope or stra to avoid too close proximity to the switches.

b. Short circuits with screwdrivers and pliers result fro using these tools where opposite polarities are adjacent. Ou safety rules instruct that opposite polarities must be insulate before work is done with tools.

3. The adjusting or removal of brushes from machines in o ation is a dangerous procedure due to the possibility of droppin brush and pigtail across several bars of the commutator. We do permit the removal of brushes from their holders while the uni in operation.

4. Railway circuit breakers and commutators are a source o danger when short circuits occur. We provide asbestos guards to b hung on either side of railway circuit breakers under load when i is necessary for operator to perform any work close to the circui breaker.

We instruct operators not to go upon any part of railway con verters after load is placed upon the machine or to approach then closely except for the occasional placing of the hand over the bearing for indications of over heating.

Accidental contact with moving machinery is a hazard that ha been greatly reduced in recent years due to the systematic installa tion of various forms of guards where such hazards existed. It i important that the clothing worn around moving machinery be suc that loose ends cannot be caught and drawn in.

The danger of slipping and falling from apparatus is minimize by providing steps and ladders for the various types of apparatus Rubber mats securely fastened with metal binders are secured t steps and base of machines.

Step ladders of standard construction are provided which have n top platform to stand on or on which tools may be left.

Safety Equipment

Safety clothing and tools provided for substations consist of th following:

1. Electroscope, for detection of high voltages.

2. Insulated stool, and heavy rubber mat (for use where insul ated stool cannot be easily used.)

3. Leather gauntlets. We no longer use rubber gloves in sub stations on account of the danger of the rubber gloves being burne into the flesh.

4. Protective leather coats for all high tension operations an low tension operations where heavy circuits may be broken.

5. Clip pullers, poles and tongs with insulated handles for open ing disconnective clips and switches and removing potential trans former fuses.

6. Gas masks are provided in substations where it may be nec essary to enter rooms filled with smoke and gas from burnin insulation.

Personnel

Believing that the workman himself is the foundation upon whic an effectively functioning safety organization must be built, we hav sought to select and train a force of operating men, who, with th aid of modern equipment and safety devices, are capable of operatin a substation system with the minimum number of injuries to them selves, interruption to service, and damage to equipment.

Selection of Operating Men

Proper selection of new employes is one of the most impo steps in an sustained accident prevention program. The hi possible appreciation of responsibility must be insured, and for reason only young men who have reached the age of 21 are sele Previous electrical experience is not required. Although a gra school education is the only definite requirement, preference is to young men who have high school, trade, or correspondence s training. No applicant is retained on the waiting list who does seem to have the necessary qualifications for the position. Final s tion, however, is made by a member of the department who is oughly acquainted with all of the conditions and requirements o position. After acceptance by the Employment Office and the De ment, the applicant is examined by the Company Physician, care being exercised in this examination to insure elimination o applicants who are subject to organic defects, special emphasis l placed on heart lesions, vision, and hearing, and evidences of ep tic tendencies.

Training of Apprentices

The training of the apprentice is in direct charge of the chief ator of the substation to which he is assigned. The new emplo at once informed of the location of dangerous equipment about substation and the precautions to be observed in their vicinity. W the first few days that a new man is in the substation he is g detailed instructions and actual experience in applying the Sch Prone Pressure Method of Artificial Respiration. It may be mentioned that all operating men are required to demonstrat least once each quarter their ability to apply this method of r citation.

All apprentice operators are required to attend classes in our tral Station Institute two hours weekly on Company time, w instructions are given in elementary electricity. After the appre becomes qualified as a certified operator his further attendanc Central Station Institute classes is optional and on his own time. the substation the chief operator lays out for the apprentice a sys atic course of study to which, with operating instructions, two h a day is devoted.

Course of Study

The course of study includes the following:

1. Rules for Safety of Employees and Emergency Operating structions. This is a printed booklet issued yearly by the Comp and includes general safety rules; rules governing putting of ap atus and lines into or out of commission; procedure and methods putting apparatus and lines into and out of commission; emerg operating instructions (stations and substations); general instruct (regarding functions of the operating, engineering, testing and

struction departments); safety organization of the company, and instructions in cases of accident.

2. Rules and Regulations of the Substation Department. This is a mimeographed volume compiled from circular letters and general instructions issued during a considerable period of years and represents our experience in operating and safety procedure.

3. The Substation Write-Up. This is a detailed write-up of the individual substations, giving the details of operating and any peculiarites that may exist in the substations. This is also a guide for relief and emergency operators who may operate the substation at infrequent intervals.

4. Substation Diagram. Simple one line diagrams of the substation busses and the more important pieces of apparatus and their connections are provided. Apprentices are required to draw such diagrams of the substation in which they are working.

Instructions in Operating

When the apprentice has been in the substation a sufficient length of time to become familiar with his surroundings and has made sufficient progress in his studies to begin to understand the various operations performed, he is permitted to perform operations with the equipment, under the guidance of a certified operator. At all times the operator is responsible for the safety of the apprentice and the operations he performs. The apprentice is required to perform these operations under the directions of the operator and is required to indicate specifically each move he intends to make in any operation and receives the operator's approval before proceeding. No apprentice at any time in his training is permitted to perform operations upon his own responsibility.

In the use of safety appliances such as protective gloves, leather coats, insulated tools, etc., he is taught that the failure to use the safety equipment provided is a serious offense and indicates a thoughtless and careless trait.

Reports

Chief operators submit weekly reports of apprentice training which cover such points as progress in subjects of study and operations performed during the week. The chief operator also reports his observations of the man's characteristics in respect to careless tendencies, absent-mindedness, mechanical manner of performing work and any erratic inclinations. Men who indicate such undesirable characteristics are carefully taken in hand with the object of correcting, if possible, these tendencies which are sure, sooner or later, to result in accidents and errors. It is desirable to remove from operating work those who are unable to adjust themselves to the serious work in hand, and it is better that this is done before the accident happens.

The apprentice during his apprenticeship receives training in a sufficient number of substations to insure experience in the various

classes of equipment found in substations supplying the Ediso 230 volt d. c. three-wire system, the 4500 volt, 60 cycle systen 600 volt railway service.

Examination for Certified Operator

Before an apprentice is qualified as a certified operator he pass an examination before a board consisting of his chief o and one or more members of the staff of the Superintendent o stations. At this examination he is given a definite rating competency which is recorded for future reference. Likewise a tified operators before taking new shifts in their own or othe stations are first certified by examination.

The questions for examination include general questions c company organization and electrical system, and specific detail taining to the operation and maintenance of the substation to he is assigned. The questions pertaining to safety cover the organization of the company and the department, rules for ac prevention, first aid to the injured, and the proper use of n supplies. Chief operators examine monthly each man under supervision on the questions used in certifying to the next position, with special reference to emergency operating and procedure.

Safety Organization

The safety organization of the substation operators and appr is an important factor in the accident prevention work of the d ment. Their meetings are conducted under the direction of thei elected chairmen. A representative from the safety division company is in attendance to present matters from that division. grams are prepared by the employees' chairman with such aid may seek from the departmental safety committee head. Th have shown a decided preference for the presentation and disc of matters pertaining to their own particular work rather th general talks on safety subjects not pertaining to their wo problems.

A free discussion of accidents which have occurred is encou and the precaution which would have prevented the accident disc The individual is taught to be alert to find and report possibl ardous conditions which may exist. Suggestions by employe encouraged and are given prompt consideration by the departi safety organization. The person making the suggestion is pr informed of the action taken and the reason therefor.

Bulletins are issued following the occurrence of serious acc and operating errors wherein the cause and result of the accid error is given and the proper procedure to avoid a recurrence Chief operators are instructed to encourage their men to discuss among themselves such occurrences so that each may hav

advantage of others' experience. Posters issued by the safety division and the National Safety Council are displayed on bulletin boards as a constant reminder to all of the importance of Safety.

The success of any method or policy may be measured by the results obtained. We have made substantial progress in reducing not only the number of lost time accidents but also the total amount of lost time.

We believe that a comprehensive program of accident prevention in substations should be consistently maintained and should include: proper selection and training of men; definite rules covering safety and operation; periodical examinations as to competency; discipline; close supervisory contact; modern equipment; safety devices; personal responsibility; and efficient safety organization within the department. All of these factors judiciously blended combine safety and operations as an indissoluble unity.

DISCUSSION

MR. F. J. CUNNINGHAM (Consumers Power Company, Jackson, Mich.): I would like to have Mr. Niesz tell more about the use of the leather coat that is used in pulling the switches.

MR. NIESZ: We use a hook with a long handle to pull the switches, and when there is danger of a flash the leather coat is required to be worn. That protects the man from any sparks or flashes that might otherwise set fire to his ordinary clothes.

MR. WM. YEAGER (Brooklyn Edison Company, Brooklyn, N. Y.): What procedure is carried on in short circuits when fire results from the operation? How do you handle the fire apparatus and equipment? Do you kill the board or what do you do?

MR. NIESZ: We have these Pyrene extinguishers for the switchboard fire or any fire caused by flashing. That is the principal method used for that purpose.

MR. P. W. EBERHARDT (Duquesne Light Company, Pittsburgh, Pa.): I would like to ask Mr. Niesz what attention is given to eye protection.

MR. NIESZ: We have made it the rule to provide goggles where there is likelihood of a flash or other injury to the eyes from mechanical causes.

MR. C. W. BENNETT (Northern Indiana Gas & Electric Company, Lafayette, Ind.): The eye protection is afforded by a helmet with a hood protecting the neck and shoulders. The glass in the helmet is a light brown glass, very heavy but easy to see through. This helmet is placed on after the leather coat. The operator must wear that in pulling the 9,000 and 12,000 volt switches. I used to work for the Commonwealth Edison Company and that is how I happen to know this.

Use of Tetri-Chloride

MR. SAMUEL H. REID (Bureau of Safety, Chicago): In the tetri-chloride for extinguishing electrical fires, various tests hav made on fires caused by arcs of high voltage, from 600 d. c. 33,000 a. c. and higher. There are various kinds of these extingu as you know. They come in quart, half gallon and gallon sizes tests that I speak of were made with the operator standing c crete flooring and there did not appear to be any leakage of back through the stream of tetri-chloride up to 33,000 volts. The voltages were made with the operator insulated from the fl don't think I would recommend the use of tetri-chloride on 33,0 equipment without proper unsulation, but I do know that thes were made on 33,000 volts and the operator felt no effects fr current.

Another thing that might be well to keep in mind is the fa there are also dangerous gasses in close quarters or poorly ven sub-station buildings where tetrachloride is used. That is a thin we want to guard against—protection of the operator against this

MR. PAUL HODSON (East St. Louis & Suburban Railway Company St. Louis, Illinois): I should like to ask Mr. Reid if this test was using commercial tetrachloride in the extinguisher.

MR. REID: The tests were made from tetrachloride we had stock extinguishers.

The Burrel All Service Gas mask has been adopted as standa the Commonwealth Edison stations and substations.

As to maintenance and upkeep. Anything of that sort as deteriorate, and they are kept in a box tightly closed and kep from dust and mechanical injury. They are inspected frequen see that there is no deterioration, and if there should be, new pa provided. A mask is like anything else—it requires frequen proper inspection if it is to be properly maintained.

MR. WILLS MACLACHLAN: I would like to say just a word for th isteer type of gas mask. I have had a mask on and been in a closet where the exhaust from an automobile was being sent into the and I was in there for a considerable time. I think that test is the practical tests with the canister type of mask. As a result test we have some 60 odd in use today.

MR. GUY RADLEY (Milwaukee, Wis.): May I add a word fo canister type of mask? It seems to me that the hose type wo impracticable in the sub-station. We have considered the obje and have adopted the canister type of gas mask. Each opera the sub-station is issued a mask and they are drilled so they ca the mask on in ten seconds. In case of fire the men put on the masks and then do what they can with the carbon tetrachloride. he does not have to have that fear that he will be asphyxiated.

Those canisters have to be renewed once in two years even used. The chemicals in the canister have a life of only about one

and we keep record of the length of time they are used and the chemicals are replaced when about half used up. That is after about a half hour's use we replace them.

The reference to the test with the tetrachloride on the 33,000 volt circuit I would like to know the distance the operator stood from the high voltage. We found if the stream breaks up into a spray there is no leakage of current back through the chloride, but if the chloride contains moisture we get a certain amount of leakage.

SOME HIGHLIGHTS ON THE HIGHWAY TRAFFIC PROBLEM

R. O. Mason, Superintendent, Transportation, The Philadelphia Electric Company, Philadelphia, Pa.

As a result of the numerous and increasing traffic accidents on our highways involving both property and life, a general agitation has taken place in the minds of officials of some of our progressive states to find a reason for and method of correcting this evil. Their answer has been found in the appointment of investigation committees, whose purposes were to definitely determine the cause of each accident of record, group accidents by causes and recommend such remedies as were of application in cases of like character for the future.

These conferences were attended by delegations of men best fitted to handle this problem of our complex present day existence.

They came to these conferences fully prepared to discuss the subject that had been assigned them, presenting documentary evidence with their written statements of what their investigation along various lines of traffic had shown, as existing, in need of improvement, and possibly demanding legislative action to either correct or enforce.

The speakers at these conferences represented the highest type of mentality in their state and their findings and recommendations demand consideration, study and action of the people of this country generally.

Two of these conferences, one held at New Haven, Connecticut, on April 8th, 9th and 10th, was under the auspices of Yale University and officials of the State of Connecticut. The second was the annual conference of the Massachusetts Safety Council, on May 1 and 2, at Worcester, Mass., at which nearly 2,000 delegates were in attendance.

Governor Cox of Massachusetts had taken a personal interest in the highway traffic problem of his state by the early appointment of a special committee on road safety, and on May 12, he transmitted with a message to the state legislature, the report of his special committee on road safety.

He asked that prompt consideration be given the recommendations contained in the report and that legislation demanded as necessary be passed at this session. The numerous sittings and deliberations of this special committee on road safety advanced the following:

"The establishment of a motor traffic board to take over the in connection with motor vehicles now held by the highway div the public works department and the registrar of motor vehicle registrar, to continue as the executive officer of the board and appointed by the governor direct.

"Also that there be appeal from the registrar, on revocation or vision of license, to this board.

"That experiment with a traffic court be made in Boston with t of extending it if satisfactory, to other parts of the commonwealth islation to co-ordinate the function of the courts and the registrar remove any cause of friction; also that the courts be permi suspend automobile licenses and to order re-examination of drive an increased penalty for the operation of an automobile by a drive licenses has been suspended or revoked.

I am informed that a conference had also been held in Chica another in New York. Probably, these dealt in a major way with problem, yet the findings of all of them were virtually the same an fore apply with equal force to the country as a whole.

Growth of Automobile

The complex nature of our present day existence has been r more complicated by the demand for speed and yet more speed this is coupled the advent of high powered machines for traffic p upon the highways.

Thirty years ago the automobile was a curiosity; today it is a ne Of the estimated grand total of 15,000,000 machines in operatio in the world, approximately 12,000,000 are in use in the United S

To judge from estimates furnished by manufacturers, we ha reached the saturation point in the United States. The conse manufacturers estimate 20,000,000, the optimistic, 30,000,000 mac

If, therefore, with the number which are in use today we find perative to impose certain restrictions, limitations and penalties tablish safety regulations, how much more imperative it will be general enforcement and application of safety principles on the hi of our country in the near future.

The traffic problem is not new. We are prone to think of present century growth. There are records extant dating from t of the Roman Republic and the time of Pompeii, which show thi lem was vital even in those times, and rules were then publis vehicular movement.

Mr. Miller McClintock, Sheldon-Research Fellow, in the Depart Government at Harvard University, who has been making a study traffic problem in all the principal American cities, says it is hi that no city has yet solved the problem.

The amazing growth in automobile ownership has engulfed the ties like a tidal wave.

Today we find the application of common law giving to the pedestrian the right to use the highway at varience with the recognized rights of vehicular traffic, and as the two cannot use the same space at the same time without danger to each, it becomes necessary that this general principal of common law be given a present day interpretation by our courts with suitable penalties for the person or vehicle which trespasses upon the right of way of the other.

This appears to be the first step in the solution of this great problem, for it is applicable to all locations.

It is obvious that modern thought has given us little in the way of traffic regulation and our present intolerable congestion is due to the attempt to meet new imposed conditions with ancient methods.

The conference before mentioned are attempts, I believe, to meet these new conditions with new methods.

What the Yearly Accident Toll Shows

From all the data that has been furnished me from various parts of the country, one point is emphasized particularly and that is, that each year shows an increase in the total number of accidents over the preceding years.

A large majority of the accidents which occur from year to year cannot be attributed to the increase in vehicular traffic alone, for statistics in the various states in which these have been carefully examined and compiled, indicated beyond doubt that carelessness in some form or other, on the part of the operator has been the major factor.

There are also instances which further illustrate this fact as for example, the absolute avoidance of all vehicular accidents during a safety week drive which compared with the same week of the preceeding year when no safety week was in force showed numerous accidents with casualties with less vehicles operated.

In New York City, with its 7,000,000 people, a safety week campaign was conducted in 1922. The record of accidental deaths in 1921 was 70 per week. During Safety Week, only 30 people lost their lives through accidents.

The drivers of the 20,000 commercial cars got into the game and helped make this splendid record. If it can be done in New York, it can be done anywhere.

The drivers of Massachusetts are waking up to the importance of safety, and here is their record for the three years—1920, 1921, 1922.

Deaths dropped from 22 per 10,000 cars to 11 per 10,000 cars, and injuries were cut one-half.

In Connecticut, in 1923, 16,500 accidents occurred. These include only those which resulted in personal injury or in damage to property in excess of $10.00. Two hundred and eighty people were killed, 500 seriously injured and more than 3,500 slightly injured. The death rate was greatest for children under 10 years and next greater for elderly people.

From 1918 to 1923, the number of accidents increased from 16,500. Of 138 street accidents in New York in one month, 83 w mobile accidents. In three months, 21 Michigan newspapers repc automobile accidents, 117 of which were caused by traffic viol improper driving.

Here are four striking facts about accidents to children.

First: In 1922, there were 15,000 children killed by acciden United States, and 375,000 seriously injured.

Second: Over one-half of these children were five years o younger.

Third: Of every hundred children killed or injured, 95 we or injured in or around the home, and not at school, and ha cause their parents did not properly teach them safety and carefully watch them when they were playing.

Fourth: More than one-third of all the people killed by biles in the United States are children.

In Detroit, accidental deaths to children of school age were from 96 to 30 in two years, and in St. Louis, children's deaths from 50 to 25. Both records were made in the face of a big inc automobiles. The drivers of commercial vehicles helped mak splendid records.

The Metropolitan Insurance Company states that all records f ties from automobiles will be broken in the United States this ye increase for January prevails for the rest of the year. The Janu rate was 17 per cent higher than January 1923, in which year th rate was 13 per cent above 1922, the worst previous record.

Season of Occurrence

As to the season of occurrence, the greatest number of accid curred during the summer and early fall reaching the peak in As to hour of occurrence, the peak was reached at approximately the year through, with a smaller peak about 8 A. M.

As to the causes of accidents, I quote from the report of the Co of Safety of Massachusetts:

"There are many causes which contribute to automobile a dents, lack of care by pedestrians, drunkenness, excessive sp bad equipment and faulty lighting, but the great and preva cause is the operation of motor vehicles at a speed too g for the particular conditions which exist. It is not the man drives at thirty miles an hour over open stretches of road wl there are no intersecting ways and few or no other cars cause accidents, but it is rather the man who as a result of c less, reckless or lack of knowledge or ability, drives in a ticular place at a rate which under all the conditions is unsa

In Connecticut, over 70 per cent of the accidents were charged directly to the operator. While I have no figures available, illustrating the findings in Illinois, Massachusetts, New York, New Jersey, or Pennsylvania. I have little doubt that this percentage will closely follow for these states.

Causes, of which the human factor (carelessness) is the major element may be as follows: Road conditions, crossings, bad curves, blind curves, obscured intersections, insufficient danger signals, confusing warning signals, glaring lights, obscure directions, improper and insufficient illumination, and on the part of the vehicle, defective equipment and defective brakes, on the part of the driver, mental or physical incapacity.

It is interesting here to note that according to the report of Mr. James Maybury, Jr., Chief of the Bureau of Railroads of New Jersey, 23 crossings in the state have been eliminated since September, 1920, and 32 are in process of elimination. Cases pending total 31, and 22 crossings have been eliminated by the re-arrangement of the crossing locations and 19 private crossings have been closed.

The elimination of grade crossings is a costly public improvement, but nevertheless, a necessary one. It has taken approximately $6,000,000 to do away with 23 crossings in New Jersey and it is estimated it will cost $9,535,000 to remove the other 32 in process of elimination. According to the report of all the railroads of the country, made to the Inter-State Commerce Commission, there are 256,362 grade crossings in the United States. Railroad Engineers have estimated that the average cost of doing away with the quarter million crossings would be $90,000 each, or about $19,000,000,000, nearly the total of the capitalization of all the railroads in the country.

It is obvious that neither public or private enterprise, could stand this enormous drain, and it is only by gradual elimination and the separation of projected crossings that this particular factor can eventually be corrected.

In 1922, there were 1,810 men, women and children killed by railroad crossing accidents, and 5,383 injuries. During the five years ending with 1922(9,101 persons were killed and 24,208 were injured on railroad crossings. The Inter-State Commerce Commission reports that accidents on railroad crossings have increased 50 per cent since 1917.

In 1922, on 53 of the great railroads of this country, a careful check was made of all crossings. Men were stationed at each crossing and the driver of each vehicle that passed over was carefully watched. By actual count, over one-half of the drivers failed to observe the rules of safety; that is, they failed to slow up and look both ways to see if a train was coming.

National Legislation

In a brief way this outlines the problem, but it does not solve it. Is the problem too large to be solved by national legislation? It is. Yet much can be accomplished by national legislation, as for example, the establishment of the vital principles governing vehicular traffic on na-

tional arteries of travel and adequate police in connection with ea standardization of speed limitations for gross tonnage; fundamei applying to the personal qualifications necessary to be possesse driver before a license to operate a car can be issued by any st tation in candle power illumination; standardization of focus ar of projected beams and types of lenses to be used and types signals.

Traffic courts should be established in each state, for auto tra as has been done in Connecticut and Massachusetts, giving them and dignity in the location they serve, such that to them will t the best legal minds whose decisions will carry great weight recognized ability.

Justice courts for traffic cases should be abolished as recor by Judge W. M. Maltbie, of the Supreme Court of Connecticut, traffic court should be divorced from political persuasion or i Give to the judges of municipal, district and superior courts t to revoke or suspend licenses for cause and to order the reexami operators when considered by them necessary.

In practically every instance, writers on motor traffic accidents prevention have advanced the idea of education of the public as a this end. The education of the public was stressed at the confere tioned as being one factor which would do more in itself to prevent than any other. This education of the public to include both adult a in what to do and what not to do on the highway either as a car op pedestrian, that this method of education should be broadcasted by bench, pulpit, platform, theatre, screen and radio, and in addition to should be the daily instruction of the minor mind at school and at the avoidance of those habits which increase the accident hazard.

It has been found that the largest number of accidents both in and major injuries are with children up to 10 years. Following accidents to the older adult.

These facts emphasize the comparative helplessness of th periods of life and stresses the necessity for the greatest ca exercised by drivers of high-powered machines in districts or l where the young and the old are compelled to meet congested tra

Places such as this require expert police supervision with t munity backing the police control.

In large cities this emphasizes the necessity for play or re grounds where the excess animal spirits of youth may find relief.

Examination of Drivers

In some states registration of cars is of recent requirement a it was found necessary in order to place and fix responsibility operation of cars, the operator or chauffeur was required to p driver's license. These are of limited or broad application. In every state in the Union, there is no application in person req law and the age limits run from as early as 14 years.

No person who is physically or mentally defective, and not familiar with the traffic rules, should be allowed to drive a car. A driver before being granted a license should pass an examination and prove that he is competent to handle a car in congested traffic or on steep grades. This would eliminate those who from immaturity, old age or other causes are unfit to drive the present high-powered automobiles.

At present it is a common sight to see children driving cars when they are hardly large enough to reach the pedals and have not the necessary strength to control it in an emergency.

There are certain fundamentals underlying the safe operation of motor vehicles which, if clearly recognized and used as a basis in the development of traffic regulations, would show a marked improvement. Careful observation of automobile traffic accidents will indicate that they are caused by careless drivers and inexperienced drivers.

It is impossible to entirely eliminate the inexperienced driver, and the steps which are being taken by certain states and municipalities in the enforcing of examinations to prevent the use of vehicles by those incapable of handling automobiles has been productive of a great deal of good. A careful study will indicate that the number of accidents due to inexperienced drivers who are careful is relatively small. In the final analysis, it is safe to state that the careless or reckless driver, whether experienced or inexperienced, is the real menace on the highway, and every possible effort should be directed towards the elimination of this particular class.

Any effective regulation must be so arranged as to provide means for continual checking of operators so that the careless or reckless person may be discovered before he has been responsible for a serious accident. The burden of operation, is placed on the careful driver who is practically committed in the operation of his machine to not only safeguard himself but safeguard the careless operator as well.

A suggested plan for relieving the careful driver, (those who are responsible for maintaining safety on the highway), from a certain amount of unnecessary burden would be to establish a preferred class of drivers of motor vehicles based on a successful passing of a stringent examination coupled with a record free of accidents in the operation of vehicles for a given period,—say three years. Having established a group of automobile operators of known reliability and experience, the next step in eliminating the careless or reckless driver becomes comparatively simple.

As it would be impossible to place observers to check all such operators of vehicles, the logical step would be to solicit the aid of the preferred class of known capable operators.

The plan suggested would be that when carelessness or recklessness of any sort are indicated on the highway any qualified observer should take the number of the vehicle, briefly state the details and forward this to a central bureau. It can readily be seen that, if such a plan or observation and reports were carried out, within a comparatively short

cases where he has broken or neglected the rules of safe driving such a record the state authorities should then be in a position tc this particular operator as to his record and steps could then b to either insist on a re-examination, which would be made muc rigid, or he be given warning that unless his record showed a improvement, his license would be revoked until he was able t factorily demonstrate to an examiner his ability to satisfactorily a machine.

Advantages of Plan

Such a plan as outlined would be comparatively simple and wou a two-fold advantage,—first in encouraging a desire on the part (ators of machines to secure the preferred class license and hold it was obtained, and second,—it would place the careless operat(position of using every possible endeavor to keep his record of op as clear as possible. Such drivers who would not automatic seriously concerned should be eliminated and the sooner the bet is this class which is a menace to everyone on the highway and should be shown no consideration whatever.

Prof. F. W. Salmon of the department of psychistry of Columt versity, advances the idea of a special examination of all drivers mental strength is questioned. In this case he includes victims of such as epilepsy, users of alcohol and narcotics, which he says p a condition temporarily that of a diseased or disordered mind.

Such an examination presents a difficult problem, but if applica a driver's license were obliged to present themselves in person while making the application, cases requiring medical examinatio be to some degree determined, and where cases exist making th of a license a hazard, it should not be issued.

In some of our eastern states, bills have been introduced requir owners to carry some form of public liability insurance. It is not in New York, Rhode Island, New Jersey, Maryland and Pennsylvani a bill has been defeated. A similar bill is now offered in Massacl and it is rumored that the bill which was offered in Pennsylvania, brought up again at the meeting of the next legislature.

In my opinion, such insurance is of vital necessity, for it wil some drivers from acquiring second-hand machines, whose financia is of the shoe string variety. In order to make this a positive m no license should be issued for a car until public liability insurar been acquired.

It appears that the best way to obtain standardization in safet and regulations, the adoption of candle power illumination, height c and type of lenses, safety road signals, etc., would be by a cong the states, with one or more delegates from each state to this co where all these devices, rules and regulations could be investigat from the chaff, types be selected for adoption in each state.

DISCUSSION

MR. S. W. BALDWIN (The Connecticut Company, New Haven, Conn.): We have had a drivers license law in Connecticut for a number of years. It provides that when a driver is licensed he shall sign his name on the back of the identification card, and in case of trouble he may be required to sign his name again and that has proven to be a very good method of automatically identifying the driver. Then there is another provision in our state law which provides that the owner of any machine which is unregistered, or the driver who is unregistered, shall have no right of recovery in case of accident. There you have an automatic enforcement which makes any fellow no matter how careful he is, or thinks he is, desire to be protected against the careless fellow, and therefore he does not wish to take the chance of having his life taken or arm broken and not get any recovery merely because he has not gone through the slight formality of obtaining that license.

MR. C. HOWARD STEWART (Laclede Gas Light Company, St. Louis, Mo.): We have a committee in St. Louis and it works successfully. We work with the police department. We have a select number of people who do not have police stars but constitute a reporting agency. They report to the safety council office and they have a very courteous letter written to the violator. In some instances they get a wrong number, but we have not had any trouble along that line.

MR. FRED ZIMMERMAN (Secretary of the State of Wisconsin): In Illinois the driver must dim his lights when he meets a car. In Wisconsin we say don't dim your light. There you have the possibility of an Illinois driver being arrested in Wisconsin, and a Wisconsin driver being arrested in Illinois. We hold that the driver needs all the light he can get, and when you dim your lights you do not have that necessary light.

Another difference is noticeable in the parking laws. One city requires that the cars be parked along the side of the street, another requires that they parked at an angle of 45 degrees.

ADJOURNMENT

Rubber Section

October 1 and 2, 1924

C. F. HORAN, Chairman
Manager, Safety and Hygiene, Hood Rubber Company, Watertown, Mass.

E. L. HEWITT, Vice-Chairman
United States Rubber Company, New Haven, Conn.

C. T. WILSON, Secretary
Kelley-Springfield Tire Company, Cumberland, Md.

CHAIRMAN HORAN: The first committee report I will ask for is the report of the engineering committee, which will be given by E. A. Hoener, of the Firestone Company.

REPORT OF ENGINEERING COMMITTEE

MR. E. H. HOENER: (Firestone Company): At the first meeting of the executive committee of the Rubber Section held in New York on December 10, 1923, the matter of the proposed code was thoroughly discussed and at the suggestion of Mr. S. J. Williams of the National Safety Council it was decided to make application to the American Standards Committee to become joint sponsors with the International Association of Industrial Accident Boards and Commissions for a national code covering safeguarding of rubber mill machinery. Mr. Williams agreed to present our application to the standards committee at their next meeting. The above action was taken on the basis that it would be better to secure the adoption of a code which could be adopted by the Industry at large rather than a code similar to the one contemplated by the State of New Jersey which could be applied to only a small part of the industry.

The American Standards Committee formally approved our application and the Rubber Section, National Safety Council, was made joint sponsor with the Board of International Association of Industrial Accident Boards and Commissions and authorized to prepare a national code on safeguards for rubber machinery.

On January 21, 1924 a meeting was held in the A. S. M. E. conference rooms in New York for the purpose of outlining the procedure to

be followed in drawing up the code. The general makeup of t mittee was discussed and a decision arrived at as to who s represented. The following gives a synopsis of the variou which are represented on this code committee: the Nationa Council, Rubber Section; State of New Jersey; State of Massac State of Ohio; various rubber machinery manufacturers; varic trical equipment manufacturers; insurance companies; U. S. Labor; Bureau of Standards; Rubber Association of America ican Society of Mechanical Engineers and American Society o Engineers.

It was also decided at this meeting that, due to the larg of the work contemplated, it would be satisfactory to compile in sections, the first section to cover the safeguards with pa reference to Mills and Calenders which, in the opinion of the Industry, constitute the greatest accident hazard.

Dr. Chaney was appointed temporary chairman with instruc notify all those who are to be on the committee of their appc and secure their willingness to serve.

In the meantime, the various members of the Rubber Sectic to continue making tests under the supervision of the eng committee.

During the next few months, efforts were made by those interested in the proposed code to have it include all in-runn machinery used for the manufacture of plastics. It was dec bring this up before the first meeting of the whole committee settlement.

On May 9, 1924 a meeting of the national code commit called by Dr. Chaney at New York for the purpose of selecting a nent chairman and secretary.

Mr. Congdon Appointed Chairman

At the above meeting Mr. Congdon, of the U. S. Rubber C was appointed chairman and Mr. E. W. Beck, of the same c appointed secretary.

It was proposed that at least two main sub-committees will pointed, one to secure data for the purpose of determining t nical data required in drafting the code and to be known as th ering committee and the other committee to work up the actu ing of the code.

The matter of the scope of the proposed code was then brou discussed and then put to a vote. The decision was for confi proposed code to rubber machinery only and not to includ plastics. A motion was made to discuss the New Jersey state c the method of making tests before the committee as a whole. decided to leave these matters to the respective committees.

Mr. Congdon appointd Mr. E. A. Hoener, of the Firestone Tire a Rubber Company, as chairman of the committee on engineering wi Mr. Dodge of the U. S. Rubber Company as chairman of the sub-co mittee on electrical apparatus.

All members of the engineering committee were asked to condu exhaustive tests on all of their mill and calender equipment for t purpose of determining just what could be done in the way of stoppi distances.

This engineering committee prepared test data sheets, one for mi and another for tabulating calender tests. These sheets were su mitted to the various members of the committee for comments. Qui a few helpful suggestions were received. These suggestions were i corporated in the two forms and on August 22, 1924 these forms, t gether with a letter explaining just how tests were to be conduct were sent out to a total of 46 of the larger rubber companies in t United States. To those companies who were not members of t National Safety Council, Rubber Section, a special letter was writt calling attention to the work being done by the Rubber Section a asking their assistance in getting the necessary data together. It w felt this might assist the membership committee and at the same ti out test data would cover a greater variety of conditions. Up to t present writing we have received complete data sheets from four fir although a great many others have promised to haev their informati compiled in the near future.

We have been keeping the chairman of the commitee which h charge of the actual drafting of the code in touch with our progre which has, no doubt, been rather slow due to the fact that only few companies of the larger companies have facilities for conducti the necessary tests. It seems to be the opinion of those interested getting the code drawn up at once and into effect that we should co fine our efforts solely to the most modern equipment and establish standard which can be adhered to on all future installations. This of course, much simpler, altho to date no installations have been ma which in any way indicate that large mill line units such as 7-84" mil 10-60" mills, 32x92" calenders and similar equipment which you w find in the most modern rubber shops of this country can be stopp within the distances specified on the proposed code. Some of t equipment has been installed within the past two or three years.

This committee has been acting on the policy as outlined by t executive committee of the Rubber Section and it is the writer's fi belief that we should continue as originally outlined.

Due to the fact that a great many of the larger rubber compani are increasing the efficiency of existing mill and calender equipme instead of making new installations, the matter of existing equipme must be taken into consideration even though the proposed code h a paragraph leaving the matter of how close existing installations mu come to the requirements of the code to the judgment of the sta

inspectors. This, in the writer's opinion, will prove very unsatisf as similar experiences on other codes will indicate. In fac American Standards Committee in their bulletin make specia visions for similar cases, under article No. 32, rule No. 12. It only necessary to specify the requirements of new installations b should also have some definite rule with reference to existing ment and not leave it to the judgment of an inspector who is none to well qualified to pass on matters of this nature.

There is no question but what this proposed code has resul various manufacturers checking up on their safety equipment and of the results obtained were very surprising both to the rubbe chinery user and also to the rubber machinery manufacturers an resulted in refinements on equipment which have greatly imp existing conditions.

We have on display suggested electric relay type of testing together with a mercury switch for use on old style mill lines may be belt driven or have mechanical operated brakes. device has not been fully developed as yet but it comes very meeting all the requirements for a rugged, accurate testing dev

The committee wishes to thank the various manufacturers of devices and electrical equipment for their co-operation in condu tests and securing the best possible testing device.

GENERAL DISCUSSION

MR. C. W. PRICE: Not only must a general manager put safety o map to start with, and do it in such a way, so unmistakably, that workman and foreman will know absolutely what the manager r to do and expects them to do, but it is coming to one point; he continuously so identify himself with it that not a man in the will forget for a moment that he is heart and soul interested in following it and expects every man to do his part and he is willi go the limit of limits with anything in his power and any mon the company, to keep the man from being killed or injured.

We sometimes think of safety as technique; safety is really a It is an attitude of mind. If a man is a safe man on the punch he would be safe on a rubber roll. If he was a safe driver of a and you took him off and put him in your plant, he would be a operator.

Every plant appreciates the value of putting before the wor each month their accident experience. When you place befo group of workmen a report which shows that 25 men were in and that, of those 25, there were two causes, you are talking something very specific that will impress those men, if it is pro presented. The trouble we found with all those plants was that would put up a little typewritten report which the average man wo notice, and if he read it he wouldn't be particularly impressed.

I saw the other day a graphic presentation. It was a large blueprint showing the various departments and the number of workmen leaving the department. The little workmen were on there and it showed them on the way to the first aid room and the hospital and home. There were three leaving one department, two leaving another, and so on, just humanizing the thing so that an average man who doesn't know anything about statistics and has no head for them, would read this and be interested.

And in addition to that it brought home to the workman—and this, I believe, should be done each time—what accidents mean to him and to the family. I mention only that one case.

Compensation Insurance

CHAIRMAN HORAN: In our particular company our management has had more interest in the cost of compensation and in the cost of insurance, since we own our own insurance company, than they did before when it was the business of some outside insurance company to pay our law suits.

The experience rating scheme in our particular industry never brought home the lesson as well as the absolute control of an individual insurance company has. I find that quite a number of our superintendents are now showing a great deal more interest in compensation costs when the cost comes directly from their own company than they did previously when we paid a blanket amount of money and received the protection of the insurance company.

First of all it has reduced accidents and secondly we consider the compensation act as having perhaps two viewpoints in mind. The first one is to save the economic loss and suffering to the employee and likewise to make it possible to put the employee on his feet at an early date.

There isn't any doubt but what we are doing more rehabilitation now, we are getting the employee back to work earlier because the cost of insurance to the department is just like the cost of everything else. We actually charge the cost of compensating accidents to the department itself. Formerly we charged 83 per cent per $100 a pay roll; whether they had any accidents or no accidents, that was the cost, but now the actual cost of compensating the cases is charged directly to the department, and the only way to remove it is to reduce the costs, to reduce the accidents, so I think we have done quite well on tying up definitely the cost of accidents—not the cost of insurance, but the cost of the accidents—and the departmental cost.

MR. E. W. BECK (U. S. Rubber Company): We at one time had a flat rate for most of our factories, of which we have several, of seventy-five cents or a dollar per hundred dollar pay roll, and realizing that the thing for us to do was to bring down our cost, because as you all know your compensation cost goes in to your actual production cost that is consumed in the purchase price, in order to meet competition,

we got busy and rated our factories, and we took as one of th factors the experience of that factory over the previous, say, three years.

We took their pay roll; we took their cost per thousand mar work, their cost per hundred dollar pay roll, the severity rate w the days lost per thousand hours work, and we established a f and gave our factories this formula.

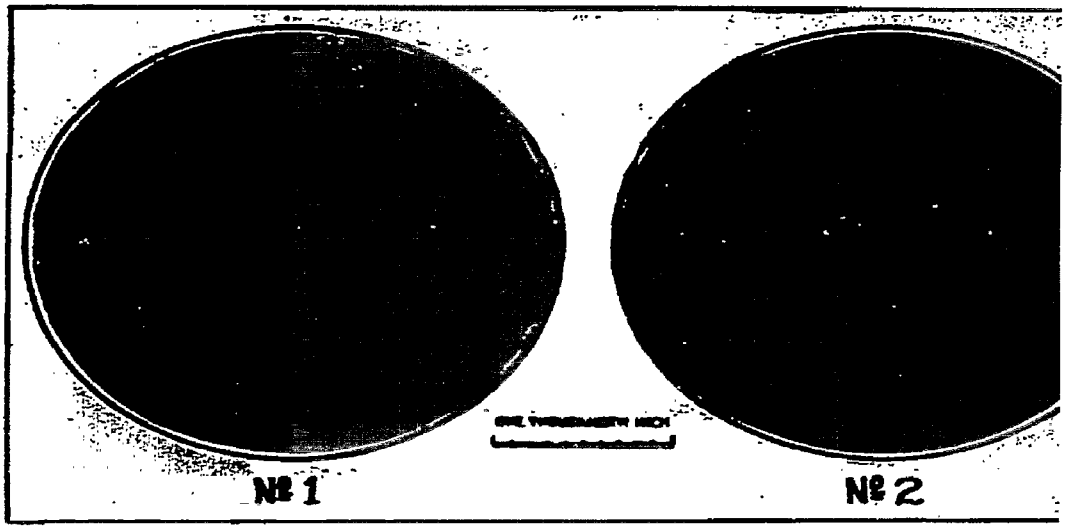
DUST EXPLOSIONS IN THE RUBBER INDUSTRY

Fred S. Hoxie, Engineer, Associated Factory Mutual Fire Insurance Companies, Boston, Mass.

Explosions in fine organic dust are a serious menace to l property and cannot be effectively protected against by automatic lers or other fire extinguishing methods in common use.

Hard rubber has been ground with roller mills for 20 years o without frequent or serious explosions. Within the past three years ball mills have been introduced and, where air is used for the dust from these mills. explosions are frequent. The rea shown at once by the microscope.

The roller mill grinds practically all the dust coarser than o thousandth of an inch in diameter while, with the ball mill a consi



No. 1.—Finest of the hard rubber dust from a roller mill. So called dust." Few serious explosions have been recorded from this type of Mill a they have been in use for twenty years or more. They apparently cann duce but a very small percentage of dust less than one-thousandth of in diameter.

No. 2.—Finer of the hard rubber dust from a ball mill. This dust i explosive. An appreciable proportion of the total product is of this o magnitude. Explosions are of common occurance when air is used for se dust from ball mills. The mean wave length of white light is one fifty-tho of an inch, therefore it is impossible to photograph with a common mir particles of this diameter or less.

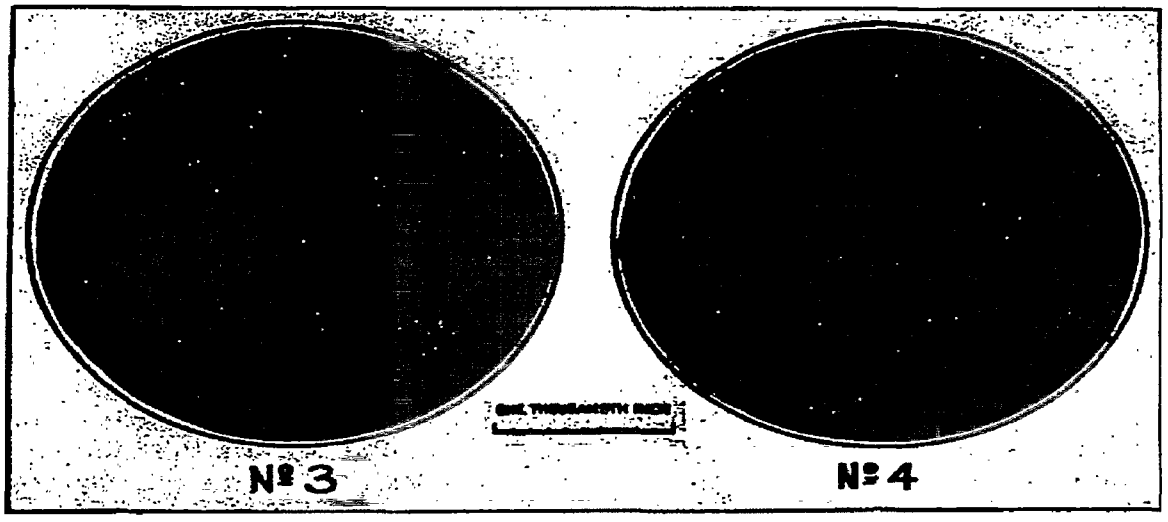
portion is in the order of magnitude of a ten-thousandth of an inch in diameter as shown in micrograph No. 1 and No. 2.

Organic material of an order of magnitude of one ten-thousandth of an inch in diameter, is highly explosive.

The remedy is to use an innert gas instead of air for handling this fine dust. Flue gas has been found to serve this purpose very well. A small amount of sulphuric acid may be condensed from this gas so that thin metal pipes are attached in time. It is probable that the acid as well as water can, in part at least, be removed by filtering through loosely packed steel turnings. The small amount of soot contained does no harm with black rubber. Carbondioxide recorders have been used to show the percentage of oxygen burned out of the air. No explosion has been noted with seven percent carbondioxide.

Colloidal and porous particles which have large surface area compared with their volumes may have gases and vapors attached to them in a thin film. Therefore, as the particle becomes very small, such a surface film of attached, or as it is called "absorbed," gas may form an appreciable proportion of the weight of the particle.

Such fine particles stick together in clumps (see micrograph No. 3). The absorbed gas or moisture film is probably a factor in this clumping. Moreover, when the particles are very fine the absorbed gas may be in sufficient quantity to influence the violence of the explosion, an inert gas like nitrogen or carbon dioxide reducing the explosion pressure and oxygen increasing it.



No. 3.—Dust from a corn elevator in which an explosion occurred, highly magnified. The larger particles are corn starch granules with which are clumped mould spores and particles from the corn hulls pulverized by abrasion in the conveyors.

No. 4.—Common Corn Starch granules at the same magnification as the rubber and elevator dust.

The fineness of particles are an important factor in dust explosions

So long as the dust remains in clumps, it behaves like coarser part but if a sufficient change in temperature or humidity, or an el charge causes the clumps to break up a highly explosive atmosphe formed from one which a few seconds before was harmless.

Micrograph No. 3 at unusually high magnifications shows such cl in dust from a corn elevator in which an explosion took place. It be noted that these clumps are composed of dust of about one ten- sandth of an inch in diameter attached to larger particles. Hard ri ground by a ball mill or other fine dust, as it becomes finer, at le reaches a maximum of effective fineness when it is in the neighborho five ten-thousandths of an inch in diameter, most of the dust finer one ten-thousandth of an inch forming clumps of a diameter of a five ten-thousandths of an inch with a coarser particle as a nucleus.

A maximum will be expected in the violence of the explosion whe dust is finest, whether as single particles or clumps of particles.

In many of the more violent explosions in grain elevators and dusty rooms there have been two or three distinct explosions—the one of insignificant violence, possibly from a slight fire or a hot be in a location containing much clumped dust which the heat was to break up and distribute, the fine dust thus instantaneously distrit in the air and ignited by the fire causing violent explosion. Some t this is followed by another and more violent explosion as clump dust throughout the structure are broken up by the heat or concu of the first explosion.

BETTER POSTURE WHEN SEATED

G. Raymond Tuttle, C. A. Cook Company, Cambridge, Mass.

Recently I was called in to confer with a committee which had appointed to study factory seating and the first thing we did wa corral from around that plant all the types of chairs or stools or not that were being used by the industrial workers.

My first suggestion was that we go into the different departm or take one department and make a survey of it and find exactly the actual conditions that we wanted to correct were and whe the height of the bench was correct or whether a job that was alw though to be a standing job could be turned over to a sitting Posture should be varied. That is, you should'nt sit all the time stand all the time. The best results are obtained where an oper can change their position either by standing up or changing it sitting position.

Unfortunately, in the industry we are dealing with people wh habits have been largely formed and if they are comfortable i usually because they are in the habit of it.

No chair should be used higher than 18 inches from the floor. W you get above 18 inches or possibly 20, for a very long legged per

you must provide some kind of a foot rest, and I advise putting a foot rest on the bench rather than on the base of the chair, wherever possible.

The best idea I have come across in regard to foot rests on benches is one I found used by the Dennison Manufacturing Company, and it has two adjustable brackets you can put on the bench with a board across them. You can tip it up and down or raise it up or lower it. It is an inexpensive affair and works very nicely.

Width of Seats

All seats should be wide enough to take the individual which we find averages about 15 or 16 inches; sometimes we will get a large person where we have had to build a seat 18 inches wide, but you keep the same depth always from front to back, which is 13 inches.

That means an operator must sit back against the back. It is uncomfortable to sit on the front edge, as so many do with the ordinary types of chairs. Then, again, we slope the seat three quarters of an inch to the back, which aggravates the comfort in sitting on the front; it makes it even more uncomfortable to sit right on the front edge. Of course, this rounding front here is all in keeping with the most approved designs in correct postures and the chairs are recommended and worked out by experts who have studied those lines and the round edge of the seat so that there is no pressure under the knees and it doesn't stop circulation.

After making a survey in your plant you will get much further with it if you appoint a committee to study seating. In the past, practically all industries have issued a requisition for a factory chair, and the purchasing department has looked up somebody or somebody has one and brings it into the plant, and perhaps the chair didn't fit the needs of the department in which it was used.

REPORT OF NOMINATING COMMITTEE

CHAIRMAN HORAN: Previous to this meeting and about a month ago a nominating committee was appointed. The committee consisted of Mr. Beck, Mr. Salisbury and Mr. Schneider. As I understand it the nominating committee nominates as officers for the coming year: chairman, E. L. Hewitt, U. S. Rubber Company; vice-chairman and secretary, H. H. Graef, Goodyear Tire & Rubber Company.

(The report was accepted by unanimous vote.)

THURSDAY MORNING SESSION

CHRONIC INSIDIOUS BONE AND JOINT DISEASE AS A CAUSE OF PROLONGED INDUSTRIAL COMPENSATION

Dr. H. R. Conn, Goodyear Tire and Rubber Company, Akron, Ohio.

The question of financial compensation for disabilities arising from injury or disease is extremely productive of disastrous misunderstanding

The injured workman is notoriously the recipient of public sympa and the unsatisfactory settlement of a single claim spreads discontent everwidening circles. We are therefore vitally interested in compen tion claims or anything which threatens the harmonious relation of ployer and employee.

Without health there cannot be the maximum degree of personal ciency; a statement which needs no substantiation before this coun Another assertion upon which we anticipate no controversy is that a l of efficiency attributable to disease is, by common shop usage, charg against the employer as an ancient injury or a negligence in factory giene. The workman, perhaps long in the employ of the company, w honestly believes his work or working conditions responsible for plight, and who is refused financial compensation, may pretty logica be expected to develop a resentment fatal to his contentment with place of employment. There is scarcely a more virulent cause of m understanding and bitterness between employee and employer, and tween them both and our state compensation boards, than the quest of financial compensation to diseased employees who allege injury the primary cause of their disabilities. The self insurer is theref accorded the doubtful privilege of granting compensation in innumeral undeserved instances, or protecting his purse with an admittedly t wall of medical fact. This latter alternative often means the sacrifice the good-will of a trained labor body, which is so essential to the c duct of a competitive industry.

It is unfair that this responsibility should be placed upon any fact management. We have the logical right to expect the solution from t medical advisory committees of the various state compensation boar We have a right to expect a uniformity of opinion as regards industr liabilities, and we should have the right to protest the frequent revers of opinion with which we are embarrassed.

New York, Pennsylvania and Ohio Rulings

Communications were addressed to the workmen's commission of thr of the larger industrial states, requesting an expression from them as their attitude toward a common disabling joint disease in which injury frequently alleged and compensation demanded. The medical examin for the New York commission answered the request with the followi communication which is quoted in full:

> "The Industrial Commission of the Labor Department of the State of New York has no official attitude or ruling as to whether or not hypertrophic arthritis may be aggravated by injury. It has always regarded this question as a medical one to be decided by the medical evidence in individual cases. As medical examiner for the department, I have always felt, and so testified, that hypertrophic arthritis, in itself, is never the result of an injury. And I have also said in testifying, that unless the trauma is so severe as to produce a fracture or a synovitis of a joint, that hy-

pertrophic arthritis is not aggravated by injury. In other words, I do not believe that an ordinary lifting strain may aggravate a pre-existing condition of this kind."

This statement probably expounds the prevailing unbiased medic opinion and represents a courageous attitude. The disease in questic bears a casual relation to injury which will be discussed later, but seems manifestly unfair to ask industry to bear the burden of the pr longed disabilities arising from a well recognized disease, even shoul such a disease be aggravated by miscellaneous injury.

The medical examiner of the workmen's compensation bureau for th state of Pennsylvania replied at direct variance to the New York con mission as follows:

"For your information, I will state that it is the attitude of the board to grant compensation in any case where it is proven that a constitutional condition has been aggravated by injury, even though it may have existed prior to the accident."

The chief medical examiner of the Ohio commission stated that:

"It is absolutely impossible to give any information which would be of value to you concerning hypertrophic arthritis. Each case must be considered upon its own merits, as there is no question but that the average case of hypertrophic arthritis may be aggravated by injury."

The Ohio reply we interpret as an attitude similar to that of th Pennsylvania board, a conclusion further substantiated by the followin Ohio cases which come to mind. A workman was found to be sufferin from an aneurism (dilatation and thinning) of the wall of the aort Syphilitic degeneration of the tissue of the blood vessel is recognized a the most notorious cause of this condition. The patient's blood reveale the presence of severe syphilis. Nevertheless he applied for compens tion on the ground that his work had induced his difficulty. The con mission awarded permanent total disability on the assumption that th occupational strain had aggravated his syphilis. (Case No. 103816. Ohio) Another workman developed encephalitis lethargica (sleeping sickness) He recalled a bump on the head. The commission admitted the infe tious nature of his disease but awarded compensation, quoting Denmark' decision that: "Injury, by reducing the natural resistance of the patien becomes an aggravating factor." (Case No. 120612. Ohio.)

Such opinions seem contrary to the purpose and intent of a stat industrial commission, for they place a premium upon perfect healtl without materially increasing the protection offered the injured workmar More important is the fact that they severely penalize the employer wh retains his veteran employees past the age of 50.

During the fifth decade of life we find the beginning of most of thos morbid processes which lead to the ultimate dissolution of the age The dissipations of youth become manifest; hardening of the arterie high blood pressure, and Bright's disease appear as retribution for th

long years of improper living; cancer in its various forms collec heavy toll; chronic ulcers, the result of enlarged veins, are a freq affliction; and syphilis casts its shadow over every refractory disabi all of these diseases and many more may induce incapacitations, conceived by the employee as injury. When such misconception is stantiated by the official award of compensation, from which there i appeal, the discharge of some 40 percent of employees at 50 years of seems economically justifiable.

Chronic Infections and Hypertrophic Arthritis

Mention of the most prolific source of disease susceptible to and ea confused with injury has been purposely withheld. We refer to the si pockets of pus, or areas of infection, which for years find a safe ha in the generative organs, the appendix, the gall-bladder, or more quently in imbedded tonsils, the sinuses of the head, or about the r of decaying or crowned teeth. The local effect of these areas or foc infection are often inconsequential. They choose apparently to con their depredations far from home, in the proximity of some distant j The slow and continued absorption of pus induces changes in the st tures about the ends of the bones. The smooth and gliding surface the joint become irritated and roughened, grating develops, and a inflammation makes motion painful and limited. In an advanced slender, sharp pieces of bone become evident in the X-Ray plate; cartilage disappears so that the joint becomes first painful and l motionless. As a rule, more than one articulation is involved, but erally a single one is complained of, the process not having advance the stage of pain in the other joints. The condition we refer to b the name of chronic infectious arthritis. This term arthritis must accepted as one applied to any acute or chronic inflammation of joint, and one which is more or less meaningless unless qualified a the type and the cause. Chronic infectious arthritis we recognize disabling disease, difficult to cure because of the irreparable damage to the joint mechanism. It is caused by the slow and continued abs tion of pus from hidden pockets, and is likely to select for its venge any or all the joints of the body. The workman is vaguely conscious the beginning disability, honest perhaps in his assertion that his tro was coincident to the continued performance of his duties, and loath to believe any connection is possible between his painless glitte gold tooth and his aching knee. In Pennsylvania and Ohio a plaus history of trivial injury, should his disease progress, entitles him to t permanent disability.

The Role of Violence

It must seem evident to the most casual observer that violence pla very minor role in chronic infectious arthritis. The demonstration of of infection, and the presence of bony particles about the joint migh expected to make the diagnosis easy. Such would probably be true it not for a similar disease in which foci of infection may or may

be present, in which the bony spurs are even more pronounced, and which repeated stress or actual violence seems to be the exciting cau This type of arthritis, which is known as hypertrophic or osteo-arthri is more insidious, more slowly disabling, and equally as difficult to c as its more feverish sister the infectious type. It is one of the old known diseases as many of the X-Ray plates of the ancient Egypt mummies show the characteristic bone changes. It is one of the comm afflictions of middle age, and is probably present to a slight extent 40 percent of the population who have passed 50 and enjoy overweig One of the Hunterian lecturers, in England a few years ago, estima that 30 percent of the inmates of British almshouses were there as result of the disabilities arising from hypertrophic arthritis. Our act knowledge of the disease is limited to certain definite observations to its frequency, course, and progress, and innumerable speculations to its true cause. At 40 or thereabouts the workman becomes consci of an increasing stiffness, the knees creak when ascending stairs, he sensitive to changes in humidity and develops a taste for warm cl days. The stiffness is most noticeable in the early morning hours a passes away, at first, after arising; as the disease progresses the stiffn is protracted to a later period in the day's activities. Pain is infrequ at first and the malady is apt to be regarded with levity. The spurs ab the joint margins slowly increase in size until they ultimately span cartilage and fuse to produce a permanently stiff and motionless joi Before complete fusion, such a joint is peculiarly sensitive to untow stress or excessive use, and unblushingly resentful of actual violen The pain, once present, is severe, disabling, and unholy in its persisten The disease elects, as a rule, the spine and the larger joints of extremities, such as the knee, shoulder, and hip structures, that ha endured for years the bulk of the mechanical strain of an arduous l When we superimpose overweight, round shoulders, knock-knees a flat feet upon these joints, we can almost with certainty predict development of hypertrophic changes.

Foci of infection are disputed factors in the production of hypertrop arthritis. Ely (California State Medical Journal, 1922 XX, No. 2) h recently suggested a possible connection, but so far we are forced acknowledge that the eradication of focal infection does not favoral influence the course. Diet, perhaps, bears some relation, for the t escape, and certainly affliction is more prevalent among the hea phlegmatic devotees of the heaping platter, who overeat and belch as an inalienable right.

Causes Recurrent Sore Back

To summarize, we have a disease of unknown origin and wide dis bution occurring at sites of long continued mechanical stress, activ excited by untoward use or trivial violence and capable of inducing lo and continuous disability. It is the most prolific cause of the recurr sore back, in which the length of disability is completely out of p portion to the alleged injury. It is commonly [illegible]

in that it ultimately destroys joint motion, is slow and insidious in origin, and is frequently misconceived as a frank injury. Certain sm differences exist, motion is lost in the infectious type through t destruction of the joint cartilage, while in the hypertrophic vari motion is limited by the magnitude of the interlocking bone spurs the joint margins. In infectious arthritis, preliminary to the growth the bony spurs there is frequently an area of bone absorption whi after the growth of the spur becomes filled in. This combination growth and destruction is typical of arthritis of the infectious type, a never exists in the true hypertrophic cases. It is the single posit distinguishing factor, and one which unfortunately disappears early the course.

Something of the confusion, existing even in the medical professi over these two diseases, is illustrated by the following case. A workm alleged a strained back which proved extremely resistant to treatme After repeated examinations, he was afforded by the state commission t benefit of a consultation with a well-known orthopedic surgeon. T consultant commented on a bone spur of the eleventh dorsal vertel and confessed his inability to distinguish between infectious and hyp trophic arthritis. He resorted to a discussion of the course of the disea ignored several suspiciously bad teeth, and prefixed his diagnosis osteo-arthritis with the word "trauma." The company surgeon's m was equally chaotic. Only two facts were certain; the history of trau was clear, and the bone spur was extremely evident. The fact that su a spur must have taken months to grow was not self-evident and diffic to prove. The commission had no choice but to accept the trauma portion of the diagnosis at its face value. A year's lost time and medi bills were awarded. (Case No. 121380. O.)

In directing the aforementioned inquiries to the industrial commissi of New York, Pennsylvania, and Ohio, hypertrophic arthritis was selec because of its extreme prevalence, its notorious tendency to cause p tracted and recurrent disabilities, and because of its localization joints repeatedly subjected to untoward stresses. The industrial co missioners and the medical profession are seemingly agreed that hyp trophic arthritis is a disease of unknown origin; geography, howev seems to determine whether or not its morbid processes are influen by injury. In the state of New York, the case just quoted would ha received sympathy. In Pennsylvania it would only have been necessa to prove that the workman was sick previous to his trauma, and sicl afterward. In Ohio, the prime consideration in determining the awa of compensation was not so much the presence of disease, as the est lishment of a positive history of violence. Such a diversity of opin is probably a reflection upon medical knowledge. It is, however, d cult or impossible to delineate with mathematical exactitude the spe lative influence of violence on diseases much better understood and qu impossible with conditions of vague origin. The proper solution pr ably lies in the establishment of a precedent uniformly adhered to u such time as science further advances our knowledge of disease.

Arthritis Deformans

Mention is necessary of a third type of chronic arthritis insidious its onset, perhaps aggravated by trauma and more hopelessly disablir than either of the previously mentioned varieties. Fortunately, tl disease is not common among industrial employees as it chiefly affec women of slight figure and nervous temperament during the second ar third decades of life. Great emotional stress, repeated pregnancie or prolonged worry are frequently mentioned as causes. These a speculations as the true cause is unknown.

There is appalling destruction of the articular structures, with di tortion and swelling in the affected joints. As the disease progress practically all of the joints become involved; the patient is bedridde helpless and in constant pain. The very evident deformities ha given this condition its popular name which is arthritis deforman Treatment is of no avail. It is among the most hopeless and horrib of afflictions, for it endures for years, often exhausting the financi resources of the patient, who exists in misery to die eventually in a almshouse.

Arthritis deformans is easy of differentation from all the other va eties of arthritis, for unlike the spur forming types which represe bone growth, the process here is one of progressive destruction.

It is conceivable that violence could aggravate the pain in such disease in its early stages but to award total disability on this a sumption would be manifestly absurd.

Tubercular Arthritis

Unfortunately the inter-relation of violence and disease in some the remaining types of arthritis is much closer. Arthritis induc through the invasion of a joint by tuberculosis, is like the other varieti previously mentioned, slow, insidious and difficult to differentiate its beginning phase. The process is primarily one of erosion, softe ing and destruction of the bone, with a white, doughy, spindle-li swelling about the circumference of the joint. The X-ray reveals first the softening and destruction, and only in the later stages repair does regeneration of the destroyed bone begin to take place.

The prime essential of treatment in tubercular arthritis is the co plete arrest of all normal joint activity. This rest, in cases where t spine and lower extremities are involved, must be complete and a solute and there must be no body weight carried by the softening bor Bare normal activity induces rapid destruction in tuberculous bo disease and further disseminates the infection. There is no single ty of bone or joint disease so actively and disastrously aggravated by u or violence. As further incriminating evidence against trauma, it mu be admitted that many eminent physicians believe the tubercle bacill elects for its depredations a joint in which the normal circulation a

reasoning for, certainly, tuberculosis is almost unheard of in joints th have suffered traumas of sufficient severity to induce fractures. Ho ever, normal use, occupational stress and actual violence do aggrava existent joint tuberculosis. If we accede then to the principle th financial compensation is justifiable where existent disease is aggravat by injury, tubercular arthritis developing during the course of industr employment must take a front rank, contradictory as it may seem amo compensable injuries.

Traumatic Arthritis

There are many other varieties of arthritis such as the syphilitic, t gonorrheal, the acute infectious and the suppurative types. Only t traumatic is of sufficient industrial importance to warrant considerati here. Traumatic arthritis has unfortunately been applied to a host joint pains, the result of conditions not permitting of easy diagnos The word traumatic has also been erroneously connected with bo hypertrophic and infectious arthritis. With the former it is unnecessa and with the latter unscientific. Traumatic arthritis is the frank resu of damage done to the smooth synovial lining of the joint by a violen so severe as to cause a destruction of the synovial cells and their ultima replacement by scar tissue. Excessive use ever after causes mild pa slight swelling and perhaps grating if the synovial scars are sufficient rough. Except where serious fractures have occurred through the joi traumatic arthritis is not tremendously disabling, and gives little troul if the patient's employment is such as to make the minimum dema of the affected joint. There is no treatment, and such disability as m arise is legitimately compensable. Those unusual cases which devel severe disability and pronounced spur formation should be regard as complicated with another type of arthritis. They will illustrate t extreme difficulty which confronts the compensation boards, and pa tially justify at least the payment of compensation on the grounds aggravation of an existent disease. Traumatic arthritis must not confused with the lame and disabled joint which arises out of th repeated performance of the same motion. Such a disability is tem porary and represents only the rightful complaint of an overwork synovial membrane. It is not a true arthritis and the disability induced is fleeting unless complicated by focal infection, in which ca it is probably the beginning of a chronic infectious arthritis.

Periostitis

Inflammation of the surrounding membrane of normal bone is frequent induced by trauma. Unless complicated by infection, a periostitis ma be expected to subside with scarcely less difficulty than a similar violen done any other tissue. Unfortunately, a simple periostitis frequent brings to light a latent syphilis, or a focus of infection, a combinati which invariably results in prolonged disability. Here the violen has acted not as a contributory element, but as the exciting cause. such an instance the silent focus of infection has been kindled to a

tivity by a primary trauma. The devitalization of the tissues incident to the injury furnished the opportunity for the beginning of a dormant disease process which might have smouldered on indefinitely. How different from the spine already afflicted with arthritis in which a trivial injury induces long incapacitation by theoretically exciting an established disease. Periostitis, frankly traumatic, or complicated by chronic infections, are probably more properly compensable injuries than any of the arthridides except the traumatic.

Osteomyelitis

True septic infection of bone, or osteomyelitis, frequently follows trauma in childhood and adolescence. It is a comparatively rare disease in later life, only occasionally following some systemic infection. The writer has never observed a primary case in an adult workman in which violence could be accused of bearing even a casual relation. Osteomyelitis is, of course, the dreaded complication of compound fractures, and must not be confused with the spontaneous variety which develops in youth without the actual signs of trauma. The disease causes widespread destruction of the bone substance, frequently results in deformity, and often produces stiffness of the adjacent joints. The ancient case, apparently healed, is peculiarly sensitive to violence, and frequently after years of quiescence flares forth with all its former virulence. Violence seemingly frees the infection, long dormant in the tissues, and the result is months of incapacitation. Osteomyelitis at the site of old compound fractures, while the result of direct infection, is not dissimilar in its tendency to recur. In general then, osteomyelitis is a destructive, deforming and disabling bone disease, induced by trauma in the young, the direct result of violence in compound fractures, and in all the ancient cases recurrence must be anticipated when trauma has been imposed. It is the perfect example of a pre-existent disease, subject to aggravation by injury, and as such furnishes so grave and potential source of disability as to have no place in industry.

Bone Tumors

Space precludes a discussion of the extremely rare diseases of bone in which injury plays an uncertain part, among which are Paget's disease, fragiles ossium and osteitis fibrosa.

Tumors of bone are, however, not so rare, and furnish a baffling problem where injury is alleged. Referring to the most dreaded of all tumors, the malignant bone growth known as sarcoma, we are forced to admit that the cause is unknown. Its characteristics, appearance, method of dissemination through the body, and its hopelessness are perfectly familiar. Its similarity to cancer of the soft tissues has long been noted. Cancer notoriously elects for its place of development a site of long continued irritation, such as the tongue of pipe smokers, the check opposite a jagged tooth, or the base of old ulcers. If then a member of the cancer family, such as sarcoma, elects the site of previous violence

at which to develop, the single known fact regarding the caus cancer prevents a refutation of trauma as the exciting cause. workman afflicted with sarcoma has but to recall a trifling injury, the very weakness of medical knowledge should eventually entitle family to full death benefits.

Fortunately, not all of these bone tumors are malignant, but r of them carry the stigma of an indefinite association with trauma. most common is the benign tumor, developing in the acticular extrem of the larger bones, and known as a bone cyst. These cysts grow, exp and weaken the cortex until fracture often results from trivial inju Union as a rule takes place without difficulty, and frequently the f ture apparently destroys the morbid process, a complete cure resultin

The X-ray often discloses a central bone tumor of a benign type, difficult, however, of differentiation from early sarcoma. This sin tumor is the direct result of violence, followed by an unabsorbed he rhage in the center of the bone, and is known as hemorrhagic osteo litis. Surgical evacuation of the contents suffices to effect a cure.

Since it is impossible to deny the malevolent influence of trauma the development of both malignant and beningn bone tumors, prompt sumption of the responsibility and immediate surgical interferenc warranted. It seems a far cry from a bump on the shin to the r malignant of bone sarcomas, but the following case illustrates the vantage taken of the profound ignorance of the medical profession on subject of cancer.

A workman developed a tumor on the left tibia. After nume vicissitudes he submitted to an amputation and eventually died Jar 1922. The autopsy showed that death was the result of general sarc which had probably originated in the amputated leg. Previous to demise a marked stimulation of memory took place. The afflicted called that some two and one-half years previously, while engaged saving the plant from fire, he had fallen over a truck and sustaine vague injury to one leg. He was particularly certain it was the The commission assumed that the generalized sarcomatosis had origin from the unknown tumor in the amputated leg. There was no hesita about connecting the tumor of the leg with the injury two and one years previously, and consequently the maximum award was paid widow. (Case No. 108776. Ohio.)

Summary

The burden of criticism for the present chaotic state of mind garding the possible evil influence of injury upon existent disease upon the medical profession. However, the contradictory findings opinions of state industrial commissions lack the stabilizing influe of legal precedents, and contribute to the confusion. We have t to show that the dividing line between frank disease, disease indu by injury and disease aggravated by injury is not clear and sharp, that the attempt to trace it leads us often into paths of false rea ing.

It is admitted impossibility to prove any disease free from the pos bility of aggravation by injury. If syphilis, sleeping sickness and sarcoi are adjudged susceptible to aggravation, we may with equal proprie include typhoid fever, measles and warts.

The issue is a far more vital one than the simple disbursement compensation checks. To attribute the disabilities arising from dis pations, focal infections and senility to injury, and to compensate the as such is to ask industry to assume the burden of state health ins ance, state medicine, and old age pensions. Such a condition approach one of the dear aims of socialism, and disturbs the established system medical practice. It places an unwarranted burden upon any competiti industry, and exceeds the legitimate attempt to compensate for l time and disability the really injured workman.

The solution is not easy, but neither is it impossible. Something cou be accomplished by the adoption of limited liability clauses. For instan the workman, compensated once for a combination of arthritis and ba strain, could be refused additional compensation for all recurrent a subsequent attacks. Such a ruling would relieve the employer of a temptation to do without the further services of his veteran a chronically diseased employee. Similar limited liability clauses ha been successfully employed for years by companies writing priva accident insurance.

Rigidly adhered to precedents and rulings by the various state boar would accomplish much.

Lastly, the ever growing group of industrial physicians and the medi examiners for the various state commissions should settle the disput evil influences of violence in a manner permitting the adoption of uniform code of liabilities.

REPORT OF STANDARDIZATION AND STATISTICS COMMITTEE

MR. A. M. PARTRIDGE (Chairman): During the past year this commit has tabulated two groups of accident statistics covering periods of s months, the first group containing figures submitted by 16 companies f the last six months of 1923, reports of which have been distributed members. Figures of the second group for the first six months 1924, which you now have, include those submitted by only companies which I regret to state is a backward movement.

The accident summary for the first six months, 1924, shows a f quency rating of 34.21 per million hours worked and a severity rati of 1.07 per 1000 hours worked; the last six months of 1923, frequen rating, 26.73—severity rating, 1.15; the first six months of 19

In the frequency rating the figures have fluctuated considerably in the severity rating there has been a downward trend or improvem during the eighteen months mentioned, which might mean that in zeal to prevent the more serious accidents we have overlooked adoption of measures to prevent the occurrence of some of the les ones.

A resume of causes of lost time accidents similar to reports shc in the past is here represented.

	1st 6 mo. 1922 Per cent. Total	2nd 6 mo. 1922 Per cent. Total	1st 6 mo. 1923 Per cent. Total	2nd 6 mo. 1923 Per cent. Total	1st 6 mo. 1924 Per cent. Total	Per c Reduc 30 mo
Handling Tires—Materials	33	37	33	29	25	8
Hand Tools—Accessories	17	14	19	17	17	0
Machine Accidents	13	14	16	16	16	3
Falling Materials*	..	..	..	10	11	.
Eye Accidents	10	5	4	5	6	4
Falls	6	7	6	7	6	0
Burns	2	3	3	3	3	1
Wire Cuts, Scratches etc.	2	2	1	3	2	0
Miscellaneous	17	18	18	10	14	3
	100	100	100	100	100	

**Classification first used in 1923.*

From these figures the inference is that education in accident p vention should be stressed among the first four classifications.

Handling materials shows a slight improvement, just the differe that miscellaneous increased, over previous six months which n mean that more careful classification is necessary. Accidents from t cause are usually of the "butter fingers" or "I didn't stop to thir type and require constant attention especially from the foreman a other supervisors.

Many accidents grouped under "hand tools" occur when employees using "knives and shears" and an intensive drive on these two kinds hand tools would prevent some of these accidents.

Knowing the conditions in many factories in our industry I do if machine accidents can be charged to lack of mechanical guards rather to the lack of concentration on the part of the injured or othe or in some cases poor supervision and lack of proper instruction.

These accidents while representing only one sixth of the total usually of a serious nature and are responsible for many days l time, which increase the severity rates and affect the insurance rat

One comparison is noted which should be given intensive stu that is "Eye Accidents." Back in 1921 these accidents comprised per cent of the total which percentage was lowered to 4 per cent duri the first six months of 1923, the next six months it rose to 5 per ce and for the past six months it is 6 per cent which looks as if the ba had been let down somewhere.

You will note that a new classification has been made, marked "fa ing material" taken from what in the past has been listed as "m cellaneous." Falling materials usually means "bad piling or storin or "insecure fastenings" and is responsible for about one tenth of c accident, this looks like poor supervision.

It should be borne in mind that the item "miscellaneous" listed during the last period at 14 per cent should be kept down as low as possible because of the fact that the real causes are hidden under this heading.

Better Methods Needed to Tabulate Accident Causes

One of the best known methods of preventing a continued recurrence of accidents is to show the causes in such a manner as to attract attention, i. e., to advertise them; in this way you invite suggestions and recommendation, the result being that from these sources something is developed which will eliminate or party correct the hazards which exist.

In the opinion of the chairman of this committee and other members of this section the present printed forms used to report accident causes and to submit frequency and severity ratings are at times misleading and confusing.

On the sheet marked "causes of accidents" is a list of various types of machinery and equipment at, near or around which the injured was working when the accident occurred.

When figures are set opposite these items the inference is that these items were responsible for the accidents whereas they might have been due to any one of several causes which do not show at all on the present form.

The accident causes are what we are most vitally interested in, for if we do not know the actual causes we are at once handicapped in trying to devise means to eliminate the hazards or correct the dangerous conditions.

Also on this form are listed several items which are results rather than causes such as "burns", "falls", "eye accidents", etc.

Some real causes are listed as "slivers", "wire cuts", "falling material", "handling other material" which don't mean anything unless you know where they occurred.

To me I do not believe the separation by months means anything to this section as a whole, it is all right within anyone's own plant. I would rather use these spaces to itemize the causes.

On the back of this form is an explanation "classification by causes", which tells of "lost time accidents" and "no lost time accidents" with no explanation of what constitutes a "lost time accident".

In explanation of how to determine the cause, the words "proximate or immediate" are used, which are confusing to some.

It further reads that if an accident is caused by more than one condition or circumstance, charge it to the one most easily prevented, this is confusing.

As an example this is given—"If a workman stumbles on a defective floor and is injured by an unguarded gear, the cause would be the gear, as he received the injury from the gear and probably would not have been hurt, had the gear been properly guarded", I don't agree with this. I maintain that the defective floor was the direct cause of the accident and falling against the gear or even against the guard provided for

Following this is an arbitrary scale of days lost to be charged ag a certain type of injury. This scale has nothing to do with acc causes and should appear on the back of the Summary form ins Also it does not always work out as satisfactorily as it was thoug would and I believe revision is necessary here.

From my own experience, I realize that this is a big undertakin any one man and, as the proper picture presented by our acc statistics is one of the most important activities this Section engage in to reduce or prevent accidents in the Industry, I w recommend that a Committee of at least three members be appo by the chair to revise these forms and submit a report at the meeting of the executive committee.

REPORT OF BULLETIN COMMITTEE

R. C. SALISBURY: We produced during the year 12 bulletins, tw the photographic type, submitted by the U. S. Rubber Co., seve the cartoon type, submitted by the Goodyear, and two photogr type by the Fisk Rubber, Federal Division. We also produced on of 18 rules.

The subjects covered were, "Falling Cores", "Stumbling Haza "Rimming Tires", "New Line Safety Stops", "Piling Material", "S ing of Trucks in the Plants", "First Aid", "Cleanliness" and "Lift

The material that we have at hand has become about exhau There remain some of the cartoon type bulletins as given to us by Goodyear, but these, however, are of general nature, and they sh be turned over to the National Safety Council perhaps for public and general use.

In other words, our supply of material is about gone and the inco chairman will certainly have to have some mightly good cooperatio the part of the members if we are to maintain a good service.

REPORT OF SAFE PRACTICE COMMITTEE

MR. SCHNEIDER: Probably those here last year remember that previous work had been to take various subjects and make out of t subjects safety practice pamphlets for the instruction particularl the newer ones in the rubber field, of accident prevention, and it found that these subjects were related more or less to engine subjects were related more or less to engineering subjects, and c quently the work was subdivided and the engineering phase was s what separated.

We had last year three subjects which were covered in pam form, namely "Raw Rubber", "Cores and Molds" and "Rolls and Fa and it appeared to be the opinion of the executive committee tha should follow in this line covering the various operations as we f them, and taking, of course, the ones of major importance first.

When the compounds are put through the mixing mills, a consider volume of fumes and dust are given off and it is essential that mills be so hooded and arranged with exhaust connections that operator will not be compelled to breath in or absorb through the p of the skin, material which is injurious to his health.

Properly designed mill hoods with correct ratio of air volume hausted to hood size, taking into consideration the materials which being mixed, will (and this has been demonstrated by actual installat in large plants) remove the injurious dust and fumes in a manner makes employment at this class of work safe for the worker.

This means much to the worker, and enables the employer to se for this class of work a much higher grade of help than can be sec for mill rooms not properly ventilated.

You can all realize that the employment of a more intelligent c of help not only speeds up production, but cuts down the possibilit accidents due to various forms of carelessness.

In numerous rubber mills throughout the country, improperly desi ventilating systems have been installed and while they do take of some of the injurious materials they are far from adequate. result is that mill rooms so equipped are dirty, unhealthy places in w to work and are considered by those concerned as more or less necessary evil. This by no means needs be the case.

Not only must the correct volume of air be exhausted through h over the various machines, but the air exhausted must be replace properly conditioned air. This presents a problem during the cold son of the year.

The first consideration when planning the air supply is to see this air is taken from a source which insures it not being contamin with dust or fumes of any sort.

Next, it is necessary that this air be drawn in or blown thr banks of heating coils which will insure its introduction at the r temperature. It is also necessary to introduce the air in such a ma as not to create drafts or blasts of air which will stir up dust in room which is being ventilated.

Design of Hoods

The design of hoods for the various mixing machines is a ma which must be given individual attention according to the condit existing, and it is impractical to standardize on a design of hood a mixing mill which would be suitable for any plant.

First, there must be taken into consideration the amounts of and fumes to be given off, and secondly, the hood must be so desi as to permit the greatest accessibility and not to interfere with workmen, or with other safety devices necessary on such machin

In the design of a mill room ventilating system, consideration mus given to the matter in which the fumes and dust are to be dispose after passing through the exhaust fan. Attempts have been mad

collect the dust by means of a centrifugal separator, but this method has failed owing to the extremely fine dust which is handled.

A filter may, of course, be installed to collect the entrained dust from the air current before it is discharged into the atmosphere, but, owing to the expense of this method, the one which is used to extend a stack from the discharge of the exhaust fan to well above the surrounding buildings, thus allowing the fumes and dust to be dissipated in the atmosphere, in the same manner that smoke is discharged from a power plant smoke stack.

There is not a bit of doubt but what an adequate ventilating system for a mill room is just as much a necessary safety device as the tripping device which is installed to stop the machinery in case of accident, and every rubber plant should be equipped with an adequate ventilating system for this department.

To insure the satisfactory operation of a mixing room ventilating system, the first consideration is to have the system designed by experienced engineers. The limits within which the design of the system may be varied and still insure satisfactory operation are very narrow. The determination of these limits is only obtained by long experience and the analysis of accurate data. It has been proven that given the proper scope in which to work, an experienced engineer can work wonders within the most offensive mill.

DISCUSSION

MR. HORAN: As a believer in radio I want to warn you against the use of the Cockrell electrolytic process of taking the dust out of the air you discharge from your compound rooms. I know some companies that have tried the electrolytic method of removing the dust rather than sending it through a cyclone separator, and it works beautifully in knocking the dust out, but it does not work nearly so well on the radio outfits within 10 miles of the dust collector. There is one point I have in mind, one question I would like to get some instruction on, that is the experience of the other fellows on getting talc dust out of the air.

We have tried everything including air washers and cyclone dust separators and what not. The only device we find that takes even some of the talc dust out is an air washer in which the liquid soap has been mixed with the water that goes through the air washers.

The soap bubbles take out the talc dust and the water doesn't. That is an expensive proposition to mix liquid soap with your talc dust. We had to do it in some places to get some of it out. I don't mean all of it or half of it. Possibly I don't mean more than 35 or 40 per cent of it. It is the only thing that we have found that will wet the talc dust or act as a filter medium, and an ordinary air washer won't do it.

The talc dust goes right through an air washer and you have just

and I would like to find out what the other fellows do on talc dus haven't given a very constructive idea, but I am looking for inform rather than wanting to give any.

MR. HOENER: I might say that Mr. Horan's views on it are the s as our experiences except in some cases where we have other c that go through the same duct with the talc dust. In that case find that some of the other dusts, such as lamp black, ec., have a dency to assist us in reducing all of the dust, but where we ha separate air duct that collects only talc dust, we have practically same trouble Mr. Horan has, and we never felt warranted in t the soap method. We are able to get some of the talc dust d however, with our air washer. In other words, we don't get a g deal but we get some of it.

MR. QUIRK (Morgan & Wright): In our plant we are using a of an enclosed mixing mill. The rear is guarded by a rising doc sheet metal. The whole mill is enclosed in sheet metal, and we found that the fumes and the dust rise greater up through the by the enclosed mill. At one time we used a cloth apron in the of our mill. We found the dust would get around the edges, and men to force air through would hold it back by means of a rope. S we put in the enclosed mills we have found it satisfactory and have eliminated a great deal of trouble.

THE RUBBER INDUSTRY FROM A LIFE INSURANCE STANDPOINT

Robert J. Vane, Jr., Supervisor of Occupation Rating, Statistical Bu Metropolitan Life Insurance Company

Many industrial processes have a detrimental influence on h and reduce the life span considerably. Life insurance companies t fore consider the occupation of applicants for insurance an impo factor in determining their insurability. They have prepared lis the trade processes considered harmful by them for the guidanc their agents in selecting prospects for insurance. These lists repre the crystallized opinion of the companies regarding the effect on h and longevity of particular trade processes. You will be intereste know what processes in the manufacture of rubber appear on t the degree of hazard thought to be involved and the nature of hazards. I have brought together and summarized these facts fr number of lists.

It should be stated that there are many ways by which life insur companies rate occupations. Some charge a flat extra premiu cover the extra hazard, some charge a premium of a man 5, 10, 15 years older, some have three or four mortality classes and others a flat percentage to the premium. For convenience, I have gro the ratings for the various companies as accurately as the data w

permit into four general classes. The first class includes those occupations involving an extra mortality hazard of 25 to 50 per cent above the average, the second, 50 to 100 per cent, the third, 100 to 150 per cent above the average, and the fourth, those occupations which are not acceptable for insurance.

All the processes of manufacturing rubber do not appear on each list. Some appear only on one, some on as many as five. The number of companies reporting the processes is given in the following discussion together with the degree of hazard and the nature of the hazards.

Occupations in the Rubber Industry Rated Hazardous by the Life Insurance Companies

Washing and Cracking Rubber. Three companies class these workmen among those with an expected mortality 25 to 50 per cent above the average because of the exposure to dampness and humidity. One company will accept such workers at standard rates.

Compounding. Compounding is rated among the most hazardous processes in the industry because of the exposure to lead, antimony, and other metallic poisons, as well as to aniline. Several companies will not accept any workman for any plan of insurance who is exposed to aniline but the majority class all the compounders together because it is so difficult for us to secure information concerning the substances handled by men in the chemical industries. The majority of companies class all compounders among those whose mortality is expected to run from 50 per cent to 100 per cent above the average. One company rates them among those who will run only 25 per cent to 50 per cent above the average.

Mixing Room Workers. The hazards in this department are thought to be similar to compounding but some companies do not consider the exposure so severe. Three companies place them in a group showing only 25 to 50 per cent extra hazard and three place them in the group having an extra mortality of 50 to 100 per cent the same as compounders.

Calendering and Warming Mills. Four companies place these men in the group 25 to 50 per cent extra and one company charges no additional. Nearness to the mixing room and possible exposure to heat are the hazards thought to be working against these men.

Vulcanizing. Steam vulcanizing, vapor and acid curing, press room workers, all are rated in the published ratings as having an extra mortality hazard of 25 to 50 per cent. The ratings agree very generally for all companies on vulcanizing. Exposure to many types of poisonous substances as accelerators and solvents in some processes and fatigue and humidity as well as dust in others are the hazards noted.

Dipping. Four companies rate these workers among those with an [illegible] of the hanging fumes

Cement Making and Cementers. One company declines insurance to cement makers while two other companies class them as having extra mortality of 25 to 50 per cent. Cementers are also classed 25 to 50 per cent more hazardous by three companies and one accept such workers at standard rates if conditions within the pl are known to be excellent.

Buffing. Two companies rate such workers 25 to 50 per cent m hazardous because of the dust. One company accepts buffers at stand rates if the dust is entirely removed.

Reclaiming Rubber. One company rates this process at 25 to 50 cent more hazardous and another rates it 50 to 100 per cent. Of cou those companies who will not accept for insurance those handl aniline or who are exposed to its fumes will exclude such rubber claimers as are exposed to it.

The foregoing cover the bulk of occupations which are charged extra premium. There are some others, including a number of spe processes but these are the main occupations. The large number men working on rubber garments such as cutters, finishers, etc., most men building tires are not rated.

It is, of course, apparent that there is not complete uniformity these ratings. Different men see the same thing in a different light in the main the life insurance companies are fairly consistent, howe correct they may be in their ratings for rubber workers.

I wish to call to your attention some recent mortality data which in the future result in changing our ratings for industries and occu tions as the volume of such data grows and more extensive anal are made possible. I refer to the combined experience of the life in ance companies with industrial concerns insured under their gr life plans. The inter-company group mortality experience was prepa under the direction of Mr. E. E. Cammack, vice-president and actuar the Aetna Life Insurance Company, from records submitted by a num of the larger life insurance companies. It covers the years 1913-192

These mortality data give us excellent material by which to ju the relative hazards in the industry. It is impossible, to be sure distinguish the particular occupations within the industry as all ployees of the company are insured under one group policy inclu the clerks, the semi-skilled and the skilled operators. However, if th are any hazardous occupations employing a large number of pers they would probably be reflected in the mortality rates for specific eases. I have selected from the industries studied the numeric important manufacturing classes including shoe factories, printing, a mobile manufacture, textiles and iron foundries, and the clerical ployees. The mortality of the last named will serve as a basis of c parison for the other groups as the clerks represent a class with specific occupational hazard.

To date, the life insurance companies have had a very favor group experience with rubber workers. In the main the death rates

lower for each age than for other selected industries. One notable exception to this general rule is found in the ages 40 to 45 years at which period of life the death rates for the rubber workers are higher than for practically all the selected industries. Possibly this unfavorable condition may be the result merely of the small number of lives exposed, although there were 13,000 within the age group which should yield fairly reliable figures for all causes of death combined. It would be very interesting to analyze the causes of death for this particular age period but it would be desirable to have a larged number of lives exposed before this is done.

Compared with clerical workers, the rubber workers have higher mortality rates up to age 45, after which the rubber workers have more favorable mortality rates up to age 70. In fact, after age 45 the rubber industry shows the very best mortality rates of all the selected manufacturing industries with one or two minor exceptions.

Turning to a consideration of the causes of death for the selected industries in the inter-company group mortality experience we find the same generally good experience for rubber workers for practically all causes of death. Fatal accidents alone were somewhat higher for the rubber industry. The rate for this cause of death surpasses that for all selected industries excepting iron and steel foundries. While this difference is not very great, it does show that there is a fatal industrial accident hazard involved in rubber manufacturing greater than that for the ordinary industrial plant. Confirmatory evidence of this is contained in the statistics of industrial accidents which are published frequently in the *National Safety News*. The death rate is lowest for rubber workers for cancer, diseases of the heart and circulatory system, diseases of digestive system and disease of the genito-urinary system and prostate. It is also the lowest for tuberculosis and for diseases of the brain and nervous system with the exception of the clerical employees. For diseases of the respiratory system, however, the rate is higher than for clerks, textile employees, and shoe company operatives. Possibly we see in this cause of death the influence of the dampness in the washing processes, soapstone, talcum and other dusts and the effects of poisonous and irritating gases.

Data Not Available

It is indeed regrettable that data regarding the nature of industrial accidents are not available for the rubber industry from the Group mortality experience. However, because of the fact that this study showed the industry to be suffering from a fairly high accident rate, I made an analysis of our records of death claims paid on Industrial and Ordinary policyholders to determine where the accidents were occuring. We have kept a record of every death claim where the death was ascribed to an industrial accident or disease since 1917.

There were in all 27 deaths among rubber factory employees. Of these only seven were ascribed to poisoning. Eleven deaths were ascribed

to falls, crushing, and machine hazards and eight to burns from e plosions.

Of the seven deaths from poisoning two were from lead poisoning one hose maker and one mixer. One case of chronic benzol poisoni was found—that of a female cable machine operator. In this ca there was a complication of pregnancy. One case of naptha and benzi in a cement mixer and three cases of fumes not specified were fou including a machinist, a laborer and a tire worker. Of course, it m well be assumed that there were more cases of chronic poisoning amo rubber workers which were not recognized by the physicians reporti the death to us but even if allowance is made for this understateme the number of deaths from poisoning is much fewer than we should ha expected.

The eight deaths from explosions were divided as follows: five fr solvents, two from steam vulcanizers and one not stated. It wou appear that those handling solvents are in as much danger from bur as they are from fatal poisoning.

I wish to say in conclusion that I have looked about for an explanati of the very favorable mortality experience of rubber workers compar with these other manufacturing industries and especially for an e planation of the few cases of fatal industrial poisoning which we ha on record. I suppose one possible explanation might be that men lea the rubber industry when they have become impaired and we do n have them classified at death as rubber workers. I do not think th is the whole explanation. In my opinion it is simply a reflex of combination of favorable conditions. I think we may account for very largely by the fact that over 80 per cent of rubber workers a engaged in plants employing over 500 men and further that these larg plants are giving so much consideration to the health of their employe You have even gone so far as to recommend that certain substanc be not used at all in the industry and the discussion of hazards h always been of the frankest sort, as I know well from the excelle report of the benzol committee to which I listened with great intere earlier in the week. All of this is having its effect. It shows th hazardous processes can be made safe and need not be covered u They are best overcome by frank discussion and cooperative study.

I don't know but what in view of these facts our ratings seem a litt severe, but of course we must be conservative until we have establish beyond a doubt that these newer findings are correct. One thing whi would help us to a better knowledge of the harmfulness of particul occupations would be a standardization of occupational terms within yo industry. We might then classify your occupations and study the m tality separately for at least those occupations employing a fairly lar number of persons. A standardized list would help us greatly.

ADJOURNMENT

Steam Railroad Section

FRED M. METCALFE, Chairman
Superintendent of Safety, Northern Pacific Railway Company,
St. Paul, Minn.

CHARLES E. HILL, Vice-Chairman
General Safety Agent, New York Central Lines, New York City

E. R. COTT, Secretary
Hocking Valley Railroad, Columbus, Ohio

TUESDAY MORNING SESSION

CHAIRMAN METCALFE: I think it would be eminently fitting and more than unusually appropriate, in view of the humanitarian nature of our work, were we to ask the blessing of Almighty God upon this assembly to guide us in our deliberations. Mr. L. F. Shedd (C. R. I. & P.) pronounced the invocation.

REPORT OF CHAIRMAN

During the year since we last convened in this way, aside from financial stringency in some regions, no untoward circumstances have arisen to affect detrimentally our efforts in accident prevention and in consequence I am happy to say that our railroads as a whole have made a most gratifying record in casualty decreases—in fact I predict that 1924 will be our banner year in this respect.

Ten years ago our specialized safety activities were regarded dubiously and not infrequently ridiculed, but in them there was embodied a great humanitarian motive which of its very nature was bound in due course to receive substantial recognition and encouragement. Thus within a short time our Safety Movement passed beyond that period of negative tolerance that was originally accorded it, to one of constructive cooperation. Figuratively, from a blossom of a decade ago, it rapidly grew into a wide spreading tree bearing a never failing crop of priceless human fruit. It was therefore with inexpressible satisfaction that many of you last June heard our friend, President R. A. Aishton of the American Railway Association, say upon the platform of the Salt Lake City convention of the A. R. A. Safety Section that that section was one of, if not *the* most active and progressive sections of his association.

Through the results of your efforts railroad executives and managers are becoming more and more impressed with the obvious relationship

of safety to production and with the almost limitless ramifications safety in the realms of railroad operation.

Railroad safety has a much wider meaning and scope than is general accorded it. In reality it is not a new thing. If viewed in its broa sense it is the sole basis for the existence of railroads for they cou not have continued to live had they not demonstrated their ability safely transport passengers and freight to their routed destinatio Safety in this sense has therefore been indissolubly lodged in the ope ating department ever since railroads began to be systematical operated.

When we analyze the functions of the operating department we fi the transportation department's main duty and obligation to be the sa movement of traffic. The employes' time card, showing the schedu time of trains, their meeting and passing points, etc., is almost whol a safety measure. Nearly every train order issued has for its expre purpose the insuring of safety. The most important duty of a train di patcher is so to direct the movement of trains as to keep them from colli ing and to handle train orders so that accidents will be avoided is t imperative duty of a telegraph operator. Passenger conductors a engineers are primarily safety agents, as their main concern and respo sibility is to handle their trains so that no accidents shall befall them the passengers which they contain. The safe movement of freight a the equipment in which it is loaded forms the chief duty of every freig trainman and engineman as well as of every man in switching servic Of the 400 odd rules in our transportation rule book over two-thirds pe tain to safety.

The mechanical department, in the building and repairing of locom tives and cars, has a most important safety role in which nearly eve man employed in our shops has an active part because upon efficie supervision and workmanship upon our engines and cars depend t safety of our passengers, of the men who work upon our trains, and of t freight which is transported.

Railroads' Success Depends On Safety

The principal duties of every man in the maintenance of way depar ment have a most direct bearing on safety because the first essential track and bridge and construction and maintenance is to have trac and bridges safe for train movements.

The telegraph department is another adjunct of safety, as witho reliable telegraph and telephone communication the safe movements trains would be almost impossible.

The signal department, with its tall lank sentinels whose uncann automatic motion of arm guides our trains to safety with almost i fallible accuracy operates chiefly in the cause of accident prevention.

A railroad's success, therefore, depends very largely upon the qualit of safety produced by the men in its employ from the directing head down to the humblest wage earners.

We men assembled here, representing the safety departments of the railroads of this continent, whose duty it is to see that our employees and patrons are protected against accidents, and thereby automatically stem the enormous waste involved in accidents costs, have a most important and responsible assignment—one that demands from us the best of our hearts and minds and consciences. It is for the purpose of better fitting ourselves to perform our tasks that we meet together in these annual congresses and expand our acknowledge of accident elimination through exchanging ideas and discussing and analyzing our problems.

One feature in our work that I believe needs added emphasis is that of closer co-operation between our engineering and safety departments. When plans are drawn for new structures, new yards and track layouts, graed separations, etc., it seems to me very important from a safety standpoint, that the safety director should be given an opportunity by his management to examine the plans and offer his recommendations before they are finally approved.

In our gathering here this year we shall miss the wise counsel and genial presence of the founder of safety on railroads—Mr. Ralph C. Richards—who has always been one of our most active and regular attendants and who recently officially retired from active service after continuously serving the Chicago and Northwestern Railroad for over half a century. Such a period of service stands alone as a mark of high honor, but when it is considered that during that period he rose through merit and integrity from the humblest to one of the highest and most important official positions on his railroad, his record becomes an object lesson in American citizenry and accords him the greatest tribute moral man can have. But even that exalted record is transcended by the bigness of his soul in conceiving and energizing that great railroad movement for the conservation of human life and suffering—a movement for which this nation owes him its everlasting gratitude.

I know I give voice to your thoughts when I say that each and everyone of you, with sincerity and affection, earnestly wish that his years to come will be ladened with that peace which passeth understanding as the sequence of a life well spent and a work most nobly done.

BETTER MANAGEMENT THROUGH CO-OPERATION—THE SAFETY METHOD

Henry Bruere, Third Vice-President, Metropolitan Life Insurance Company; Member, Board of Directors, Chicago, Rock Island and Pacific Railroad, New York City

No influence in American industry has so emphasized the importance of employee-employer co-operation as has the Safety Movement during the past 15 years. Both employees and employers have learned not merely to join in *wishing* safety, but in *acting* Safety. The most benevolent and painstaking employer cannot prevent all accidents to his employees if

those employees are indifferent or careless. An individually care employee cannot protect himself from injury if fellow workmen are ca less or permitted by the employer to be careless from want of discipl or education. The employer can neither protect his own interests, sati his own standards of humanitarianism, nor protect caretaking employe if *safe* practice is not made the *common* practice. It is elementary tl the safety method is the method of co-operation in which self inter is joined with concern for the general welfare.

On the railways, as in other industry, the degree of safety succ corresponds directly with the degree of co-operation that has develop Co-operation in safety does not develop nor continue unless it is ma interesting and profitable. The railroads with enviable accident reco make safety work interesting. Safety with them is as much the gam as despatching, braking, firing or driving an engine. More than that supplies a chance for team work that is often lacking in the detach and individualized operations of a railway. Safety is made interesti because it is made competitive. It is made profitable to employees rewards not of money, but of recognition and prestige. Good safe methods give those who participate a sense of contributing directly to worth-while result. They emphasize the dependence of each individ on the conduct of every other person whose activity may affect t result which he individually wishes to achieve.

Finally, it may be said, in this incomplete analysis, that the safe method involves initiative and persistent constructive leadership on t part of management. Management must not only do its part, but it mu encourage, stimulate and educate employees to do their part.

The safety method, therefore, involves a common purpose, a combi tion of altruism and self interest, recognition of mutual interdependen sustained and interesting activity, tangible benefits and manageme initiative in creating organized effort and keeping it going.

I find in these facts much to stimulate thought regarding the prese state of industry, particularly the railway industry with which we a at this moment concerned.

Success Depends on Team Work

So obvious is it that the success of the railways depends on the tea work between managers and operatives that a great deal of attention now being given to ways and means of promoting genuine intern co-operation in the industry. In different degrees and by differe methods, ultimately the truly successful railway manager will secu such co-operation. To those who are prepared to essay it, the tools l at hand in the principles that have already been worked out in accide prevention work. These can be applied to the larger problem of securi general co-operation.

Obviously, if you are going to have true co-operation, you must questions of management as well as in safety, have an agreed comm purpose among those who co-operate and that purpose needs to l unequivocally expressed. The big forces of organized labor opinion a

management must aim not only at success in the sense of black figu on the income statement and the balance sheet, and that is mig important, not only at acceptable public service, but at the welfare those whose labor makes the whole enterprise possible. Good manag ment should not imply ability to hold labor in check, but to win a lead labor and to promote its welfare by giving to the problems of men who make up the organization, at least as much executive skill is devoted to other phases of management.

It is possible, I think, to define a common purpose which will app with equal force to all elements of the railway enterprise, provided th is frank recognition of the proper selfish interests of both parties. M attention has been given to an example of co-operation recently develo in the shops of the Baltimore and Ohio Railroad. The workers in th shops undertook to improve the quality of their service, not merely the good and glory of the railway, but to secure for themselves bet conditions of work and more regular employment. The railroad ente into the scheme not merely to extend a fraternal hand to those w toiled for it, but to gain more efficient service, and hence, econom in engine and car repairs.

In safety work you don't ask the worker to prevent injuries to fellow worker to please his employer, nor do you ask him to sacri his own safety for the general good. On the contrary, you point out him that his first duty is to be careful of his own safety. Incidenta but directly, the employer benefits by reduced accident ratios.

In safety work there is a frank recognition of mutual interdependen The employer has certain responsibilities, the individual certain obli tions and the group of workers certain duties to perform. There m be the same recognition of interdependence in good management. gain this recognition you've got to do some educating in the facts of business. One very effective method of such educating and, at the sa time, stimulating better work, is through the use of budgeting. It possible for reasonable periods in advance, say three or six months lay down a program for shops and for road maintenance. It is possi to give advance information of capital outlays that will affect the empl ment of the force. At least, a minimum budget can be constructed operations. Budgeting makes it possible for the management to take rank and file into its confidence on the current outlook for work a also to stimulate proper rivalry in accomplishment.

To make the budget useful, it must be brought out into the light a made as much common property as the time-table. There is little rea in any business for secrecy, in these days of publicity. There is reason for secrecy in the railroad business where virtually all reco are kept in glass pockets for the benefit of the Interstate Comme Commission or other regulating bodies. Use of the budget for educat the working force must necessarily be a matter of slow developme cautiously and experimentally worked out. I suggest it as a means giving continuing interest to workmen in management results.

I think it hardly necessary to dwell upon the tangible benefits tha may be expected from genuine employee co-operation in promoting bette management. The railroads, with few exceptions, have ceased to b profitable enterprises. They are subjected to many restraints o executive initiative through official and labor regulation as well. Ther is no hope for them unless they succeed in making virtues out of the embarrassments. If I have offered the safety method as a suggeste way of release, it is not because I believe that a formula or a phras will accomplish what the railways sorely need. On the contrary, formula is the last thing to be desired because we wish more instead o less flexibility. There is no easy way out. The opportunity calls fo high executive talent, gifted with an understanding of the aspirations o the average man and capable of winning leadership by serving thos aspirations effectively. There is opportunity abroad for new great reput tions that will outshine those of the classical figures of the railroad worl the Hills, Harrimans, Huntingtons and Vanderbilts. There is no necessar antagonism between management and labor in the operation of th railroad, provided management takes cognizance of the human problem of this very human thing we call labor.

Human Relations

I have suggested as a start some specialization on these questions o human relations through the medium of the personnel department. C one large railroad my recommendation that this specialization h developed has been adopted. The experiment is well underway wit beneficial results. It needs go further and find its place in the forefro of problems which are regularly and thoughtfully considered by boards o directors, presidents, vice-presidents, superintendents and foremen. needs to span the gap now existing between the executives and th organized bodies of workers and bring the labor leader into camp. H intelligence and ability, instead of being diverted to constructing a who new series of outside enterprises, banks, manufacturing industries or wh not, should be invited to devote itself to the problems of the enterpri on which the welfare of his constituency chiefly depends, namely th railways themselves.

I may, perhaps, seem to hitch my wagon to a star in outlining m conception of the possibilities of co-operation between management an workers on the railways. Yet, soberly, I think these things can and wi be done. I have great faith in the abilities and good judgment of bot the managers of the railways and the men who, as workers, opera them with fidelity and skill. They have much at stake and so have w all, in the upbuilding of this industry. The outlook for success in genuin co-operation is certainly more favorable in this time of greater enlighte ment, than was the prospect for success in safety, when first you turne your attention to the job of instilling self-care, mutual consideration an a high sense executive responsibility, in a calling in which exposure

Let me repeat, honor and fame without stint, await those who first succeed in establishing the new co-operation based on a truly modern conception of management in which the welfare and progress of the worker becomes as much a test of success as the inescapable criterion of the balance sheet.

DEVELOPMENT OF SAFETY ON THE RAILROADS

Charles Frederick Carter, New York Central Lines, New York City

Self-preservation is said to be the first law of nature. Is it?

Some time ago it was my pleasure and privilege to ride from Cheyenne, Wyoming, up to Sherman Hill on the Union Pacific Railroad with the road-master on his motor car. We had front seats close to the rail where we could have an unobstructed view.

The only inhabitants of Sherman Hill are several million ground squirrels. When we came along, the whole tribe of ground squirrels was out partaking of a late breakfast. The instant they heard the motor car, each and every ground squirrel suddenly remembered an urgent engagement on the other side of the track. By thousands they started to cross the track, those on the south side to the north side, those on the north side to the south side. Some succeeded, some were killed, some didn't get there in time to be killed. Those that were too late sat up and barked their disappointment at us.

I have often observed the same frantic eagerness of various domestic animals to cross the track ahead of an approaching train or to cross the highway ahead of an approaching vehicle. Martin Johnson, the famous animal photographer, declares that when making an automobile safari in equatorial Africa, every animal of every species, big and little, upon hearing his approach immediately dropped the business in hand and devoted its exclusive energies to galloping across the road ahead of his car.

On that same trip, while crossing the State of Nevada I saw a crowded automobile coming toward the train. At that point, the highway was paralleled by the railroad for quite a long distance, then it crossed the track and continued beside it. The ground was level, the highway and the railroad were straight, there was not so much as a clump of sage-brush to obstruct the view, and a passenger train in open, level country on a bright summer day is rather a conspicuous object.

When the driver of that auto saw the train, he stepped on the gas in an effort to beat the train to the crossing. He miscalculated and did not quite make it. Instead, he ran into the side of the third car back from the engine. Unfortunately the driver was not killed. Like the ground squirrels, the occupants of the car sat up and barked their disappointment at the train. The driver got another chance, and he probably has made use of it by this time.

Human Squirrels

Later, I rode in the cab of a locomotive pulling a passenger train tween Youngstown and Cleveland, Ohio. Approaching the crossin saw the driver of a flivver making desperate efforts to reach the cr ing ahead of the train. He got across ahead of the pilot by five-eigh of an inch, as near as I could judge—or, let's say three-quarters of inch; I'm not a man to haggle over an eighth of an inch. When he across the track he slowed down to watch the train go by.

At the very next crossing the identical performance was repeated the driver of another flivver, the only difference being that the sec flivver won by no more than one thirty-second part of an inch. I w yield an eighth of an inch on that.

The engineer made some very interesting remarks on the subject automobile drivers, but I cannot repeat them.

Still later I was trying to cross a street in Chicago. In that city tra officers change the direction of traffic whenever they think they h caught the greatest possible number of pedestrians between curbs. T the taxis and trucks, held in leash, charge; and the one that bags greatest number of pedestrians wins the prize. Chicago is the o civilized community where pot-hunting is regarded as good sportsm ship.

These various personal observations are submitted as conclusive dence that self-preservation is not the first law of nature. Instead that, the great elemental urge which dominates the animal kingd including mankind, is to get across the track ahead of the engine.

Now what can you do? How can you contend with an elemental u that is universal? Is it any wonder that crossing accidents or cas ties have increased 233 per cent in twelve years?

I want to tell you what the New York Central is doing in the way trying to hold down crossing suicides. The New York Central is spe ing annually thousands of dollars in conducting safety rallies, in send speakers to address schools, Rotary Clubs and other gatherings, broadcasting radio talks on safety at crossings, in procuring the pu cation in newspapers and periodicals of articles on the same subj and it has distributed thousands of posters—an edition of 150,000 c single style, an edition of 100,000 of "Food for Thought," a folder desig for use in dining cars; it has distributed large quantities of blotters, a finally, it has paid for advertisements urging caution at crossings periodicals having an aggregate circulation of 5,000,000.

Can you imagine a railroad corporation spending money to dep itself of freight revenues on coffins and tombstones? That must be of the manifestations of incompetent railroad management about wh certain senators have had so much to say.

Four Million Spent in Year in Crossing Protection

I would like to say further that the New York Central Lines, tha the System, having about five per cent of the mileage of the Un

States. spends $4,000,000 in crossing protection in a year, and in addition to that, beginning the 31st of December last, they spent $21,000,000 in grade crossing elimination.

Those of you who are good at figures, and we all know that railroad men live on an exclusive diet of statistics, can figure out the average cost of eliminating the crossing. When you have done that, starting from that as a base, you can figure up exactly how long it is going to take to eliminate all the crossings in the United States if we open six new crossings to every old one we eliminate, as we did last year.

I want to take the opportunity to pay a deserved tribute to the man who took the first great constructive step in promoting safety on the railroad. Lorenzo A. Coffin, late of Willow Edge Farm, near Ft. Dodge, Iowa, certainly rendered his country a great service, a service that should have won immortality for his name, in promoting safety on the railroad. Instead of that, his reward has been oblivion, and he never sought nor received any financial reward.

Coffin drafted the first safety appliance act, led a campaign lasting four years to arouse public opinion in its support, and finally secured its enactment into law after a four years' crusade in Washington. The safety appliance act was a personal labor and a personal triumph for Coffin. His sole idea was to promote the safety of railroad employees, but it turned out that the conspicuous feature of his work was that it accelerated the evolution of the railroad. This seems to be a good place to call attention to the fact that all important equipment and practices which have resulted in greater safety on the railroad have been adopted, not for humanitarian reasons, but for sound economic reasons. The resulting safety has usually, if not always, been a by-product.

Lorenzo A. Coffin in his younger days was a professor in Geauga Seminary, Ohio. One of his pupils was James A. Garfield, afterward twentieth president of the United States; another pupil was Lucretia Randolph, who became the wife of President Garfield. Coffin later turned preacher and was chaplain of the Thirty-second Iowa Infantry. Then he became a farmer in Iowa. In 1881 when the Des Moines and Ft. Dodge Railroad was extended to Ruthven, he was appointed right-of-way agent.

Traveled on Freight Trains

One day he was confronted with the choice of waiting several hours for a passenger train or taking a freight train. He chose the latter alternative, and struck up an acquaintance with the hind man. In that region at that time the primitive railroads had two brakemen instead of three trainmen, and one of the two was designated the hind mand, instead of the flagman.

Before the end of that trip the hind man went in to make a coupling and had his last two remaining fingers crushed, leaving him totally incapacitated, to say nothing of the pain. Coffin did all he could to mitigate the brakeman's sufferings. He had known, of course, of the frequency of such accidents and worse, but the horror of it had not been brought home to him before. The mishap sickened him.

The next day he boarded a freight train from choice in order t he might ask questions. He became interetsed and thereafter trave principally by freight trains. Later, he was appointed a state railr commissioner. He continued his practice of riding on freight trains u every railroad man in Iowa knew the kindly, grizzled face (he was p 60 then) of "Father" Coffin, as they called him.

The Iowa laws required investigation of accidents to passengers not of accidents to railroad men, so Coffin undertook to look into a dents to railroad men on his own account. He worked alone, for brother commissioners refused to help. Coffin found that the grea number of railroad men were killed by falling from cars, and the n greatest number were killed in coupling cars. The obvious way to vent such accidents was to equip all cars with power brakes and a matic couplers. In those primitive days the only power known the little eight-wheeled locomotive that could not pull a setting hen her nest, while the box cars would not hold wheat enough to feed said hen's chickens. Firemen spent their lay-overs polishing the jack of their engines, painting front ends and shining up the bright work the cab, while engineers cleaned their headlights, filled the lamps did their own packing.

A brakeman had nothing to do but work. To make up a train quired highly developed acrobatic training, expert knowledge and a carload of thick links, thin links, medium links, extra long li crooked links, large round pins, small round pins, medium round p thick flat pins, thin flat pins and a basket of clips. In those untramm days the master car builder of each and every railroad followed the tates of his own fancy in designing equipment. The result was tha two cars looked alike, no two drawbars were of the same patter the same height above the rail. You propped up the lower drawbar chips or were flattened out like a pancake when the higher slipped the lower. Or if you escaped that fate you were likely to have fe fingers than when you started to make the coupling. When you ran of fingers you were out of luck. To make a cut you went between to pull the pin. If you were kicking them hard and the track was ballasted, as often happend, or the frogs were unguarded, you liable to be shy a leg or two after the operation, unless, indeed, you a subject for the coroner; but in these good old days coroners ref to be bothered with such common occurrences as the killing of a br man.

The Old Brake

The only freight brake then known was the good old armstrong h and it was out of order on two cars out of three. The brakeman only had to make all station stops, but he had to get out on top hold them down hill. In winter when car tops were covered with and a 50-mile gale was blowing as the train wriggled and bounced hoochie-coochied over the rough track, the brakeman could hardl blamed if he took an involuntary header off on the right of way wi

passed in daylight. If he happened to fall under the wheels there wouldn't be enough of him left to be worth picking up.

When Coffin mastered all these facts, he wrote a letter about the railroad slaughter and sent it to all religious and family newspapers. He went whenever he could find a chance to make a speech or get himself interviewed; he invited himself to all railroad conventions to talk on his favorite topic; he developed into a splendid press agent, and his experience as a preacher stood him in good stead in speech-making. He attended the famous Burlington brake trials in August, 1886, and he was the only railroad commissioner who stayed until the end. He was not daunted by the complete and ignominious failure of all the brakes, but returned to the trials the next year. Again there was complete failure, but Westinghouse returned three months later and scored a world-famous triumph with the air-brake. Coffin wept with joy when he saw a 50-car train thundering down a grade stopped within a distance of 600 feet.

Then he drafted the first safety appliance act ever written, submitting it section by section to judges of the Supreme Court. It was passed by the Iowa Legislature. Governor Boise signed it at once.

The Interstate Commerce Commission, which by this time had come into being, asked state railroad commissioners for information about accidents due to equipment. Coffin's term had expired, but that did not prevent him from accepting his own invitation to attend. He made such startling statements regarding the loss of life from equipment then in use that the Kentucky commissioner contradicted him with much heat but had to confess later that Coffin had understated the case.

The Interstate Commerce Commission recommended a law requiring automatic couplers and airbrakes.

Coffin had a bill already drafted, which D. B. Henderson of Iowa introduced in the House and W. B. Allison in the Senate. It was a four years' fight, with Coffin on the job every day Congress was in session to get it enacted, after all the usual tricks of politicians to make a little cheap capital out of it.

President Harrison signed the bill March 3, 1893. Coffin returned to his farm where he lived to a green old age. His last work in behalf of railroad men was to help found a home for the disabled at Chicago.

Further Development of Brake

Meanwhile, Westinghouse had steadily developed the air-brake, and the coupler had been undergoing the slow processes of evolution. The Miller hook had become the standard coupler on passenger equipment on all but one prominent railroad. It was built on the correct basic principle, but fell far short of requirements. On September 15-17, 1885, a test of automatic couplers was held at Buffalo under the auspices of the Master Car Builders' Association. At that time no fewer than 3,500 patents had been issued on car couplers. It seems incredible that so many wrong ways to do a simple thing could be devised, but the feat was

achieved. Of the 42 couplers tested, 12 were selected as meritorious. Even after this, years of laborious study, research and experiment were required to produce the modern car coupler.

Without automatic couplers and air-brakes operation of the heavy and fast trains of today would be wholly impossible. Without such trains traffic could not possibly be handled. Without adequate transportation the United States never could have become the great nation it is.

In short, the years of unselfish devotion which Father Coffin dedicated to promoting safety for railroad men, and which resulted in expediting the evolution of those essentials of railroad equipment which are designated as safety appliances, have proved to be of tremendous importance, not merely to railroad men alone, but to the nation.

What has been the result in saving railroad employees from death and injury, the only thing that interested Coffin? No precise answer can be given to that question, because accident statistics prior to 1901 are so unreliable as to be worthless. But that many thousands of employes have been saved from death or permanent injury by the universal adoption of automatic couplers and air-brakes no one who was familiar with railroading as it was practiced 40 odd years ago will deny. Neither can any one successfully dispute the assertion that the invention, development and universal adoption of these two appliances have done more than anything else to make railroading safe.

Perhaps Lorenzo A. Coffin's part in hastening this development will some day earn for his memory the monument it deserves.

SAFETY AND FIRE PREVENTION

F. T. Edwards, Marsh and McLennon, Chicago, Ill.

Safety and fire prevention bear a very definite and close relationship and any comprehensive study of one must necessarily involve consideration of some of the problems more directly associated with the other. The loss of 15,000 human lives annually in this country through the the agency of fire surely is convincing evidence of the necessity for most careful and intelligent study of fire prevention by safety men. The fire hazard to human life sometimes found in a single general or division office may offer greater potential tragedy, as well as financial loss in claims against the road, than all the high speed machinery in the shops of the system. Because of the broad scope of Safety and Fire Prevention work and the necessity for specialized training in each field it probably is undesirable in most instances to place the direct responsibility for both, upon the shoulders of one person, but it is essential that there be the closest co-operation for the solution of their common problems.

In theory the steam railroads of the United States need no instruction in the principles of fire prevention and fire protection; in practice many

in an understanding of the extremely simple methods generally employ by owners of large industrial plants to safeguard property from unnec sary fire waste, and the more important incidental losses that inevitat follow through interruption of business and the temporary impairme of facilities.

Annual Fire Losses in Railroad Properties

In this connection a few statistics taken from the last report of t Railroad Fire Protection Association, covering the annual fire losses the roads of this country, are of general interest. In 1922 (1923 figur are not yet available) a total of 9,216 fires were reported by 73 Class roads and their subsidiaries. These fires resulted in a physical proper loss of $10,183,459.59, or an average loss per mile of railroad of $50.85, increase in both the number of fires and property loss of approximate 20 per cent over the previous year. Successful fire prevention must measured by the reduction in fire losses and from the figures just quot only one inference can be drawn, namely, that the railroads of this cou try are not making the progress in this problem of property conservati that its importance demands. These figures represent the actual railro property loss only—they do not include losses paid by the railroads claims for damage to adjacent properties owned by others, nor do th include the consequential loss incident to the interruption of operatic This latter loss is estimated to equal, if not exceed, the physical lo Railroad men who have experienced the destruction of an importa interlocking tower, coaling station, storehouse, shop, engine terminal freight handling facility during a critical period of operation can w appreciate the meaning of consequential loss. Not long ago a lar summer hotel, constituting an important source of revenue, as well as essential unit, of a chain of resort hotels, owned by a railroad line doi its share of the highly competitive transcontinental tourist business, w destroyed by fire during the peak of the season's travel, upsetting pla of the traffic department and making necessary many expensive chang The consequential loss suffered by this road from the destruction of th facility is said to have closely approached the physical value of the pro erty destroyed.

Relationship of Insurance to Fire Prevention

Very often the vitally important factor is overlooked that althou the direct property loss can be recovered through properly applied fi insurance, the consequential damage cannot be insured. There is no ba upon which it can be estimated with any degree of accuracy before t fire. Therefore, it must be charged to capital account, or operating e pense, and in either case it represents an absolute loss to the railro company. In these days of high operating costs and comparatively lo net returns and with the demand for economy of operation in all of phase, adequate measures for the prevention of losses by fire are mere indicative of sound business judgment.

The success of fire prevention measures is reflected directly in lowe rates of insurance which are not a matter of guess-work but are base directly upon the loss record of the road over a reasonable period of time As the efforts of fire prevention show favorable results in the reduction o losses, the insurance cost is decreased in a proportion commensurat with this reduction.

Notwithstanding the fact that increased fire losses inevitably result i larger insurance premiums, it is of interest to note that insurance unde writers have taken an active interest in initiating measures for reducin fire loss; a board of engineers operating as an independent corporatior but maintained by insurance companies, have for many years taken a important part in establishing the standards for electrical installatio adopted by municipalities throughout the North American continent an accepted without question by associations of architects, construction eng neers and the insurance rating boards in all states.

This organization lays down the construction specifications for autc matic sprinkler devices, the most effective means known for reducin fire loss from interior causes and cutting down the premium charged fo insuring properties so equipped.

Common Fire Hazards

Any analysis of the fire prevention problem naturally must be base upon a proper understanding of the causes of fire and it may be wel to touch briefly here upon some of the more common hazards found i railroad property. First of all, it should be accepted as a proven fac that a very large percentage of all fires are the result of carelessnes somewhere along the line. The blame, however, may not always b wholly attached to the employe on the ground; some of it may be mor consistently placed on the officer to whom this individual is responsibl Probably nowhere is this element of human carelessness evidenced mor clearly than by poor housekeeping, which unquestionably is the direct o indirect or general cause of more fires than any other hazard and th greatest effort of all fire prevention work must be exerted along this line Stringent rules must be adopted to make good housekeeping a matter o daily duty with all employes and this can be done only through a thorougl appreciation on the part of both local executives and general managemen of the importance of safe cleanliness and order. Smoking and the care less disposal of matches incident to smoking are considered by clos students of fires to come probably first in the list of specific fire causes in fact, poor housekeeping and smoking, as fire hazards, are directly linke together, as the rubbish pile is quite often the recipient of the hal burned cigar, cigarette or the lighted match. The combined loss in rail road properties in 1922 from matches and smoking was reported a $387,019.36, and this figure no doubt is very low, as quite naturally positiv proof of fires from this cause is most difficult to obtain. There were 32

Poorly installed or poorly maintained heating appliances are estimate to have caused 1,005 fires with a resultant loss of $385,254.96. Fires fro locomotive sparks resulted in a loss of $909,025.46; 1,427 fires were att buted to locomotive sparks. Closely related to this is the loss of $16 662 due to 460 fires from hot coals.

Spontaneous ignition is estimated to have caused 221 fires, entailir a loss of $286,605. Fires from this cause also are directly associated wi indifferent housekeeping, as they are very generally due to ignition carelessly disposed oily waste, paint rags, or other oily organic refuse.

The careless burning of rubbish and material resulted in 120 fire causing a loss of $131,624.01. Defective electric wiring caused 282 fir with an aggregate loss of $187,654.45. Carelessness in handling ash and hot cinders resulted in 275 res, and 252 res are attributed to t careless handling of torches.

Measures Essential to the Control of the Railroad Fire Waste Problem

The steam railroad is a highly specialized form of industrial effor economy and elimination of unnecessary waste are bywords in the ra road organization, yet it is a fact that many of the most successful ar best managed American railroads have not employed the same exactir rules to prevent needless fire waste that are accepted as a matter course in safeguarding property interests of the company in every oth direction.

Comprehensive study of the problem leads to the conclusion that i solution lies primarily in recognition by the general managements of t roads of the financial importance of conserving the properties of whic they are custodians, against destruction through fire, an concrete man festation of their interest and their acceptance of personal responsibili by giving full support to the direction and enforcement of fire preventic measures. Employees must be held accountable for facts of carelessne which result in fires, but on the other hand without active display interest on the part of the management, recognition of individual respo sibility cannot be made an important matter with the men.

A general officer of a railroad company actively interested in the su ject of fire prevention, which is only another name for property conserv tion, and controlling the policy of his company with respect to fire pr vention standards can be, if he will, the most important factor in mai taining a normal fire loss experience on the company's properties.

This is a definite and carefully considered conclusion based upon long continued contact with railroads large and small in the Unite States and Canada.

Those who are identified with fire prevention and fire protection wor as a business, allied with fire insurance, can accomplish but little the way of eliminating the hazards that lead to fire waste without t sympathetic and intelligent support of the men who run the railroa with that support much good can be accomplished in applying to t properties of the railroad the same simple rules of safety that have d veloped out of the needs of the great industrial growth of the country.

Second, fire prevention must be accorded a proper position of im portance in the field of railroad operation and the work coordinated through one central administrative officer. Inasmuch as the activities affect all departments of the road, best results will be obtained if this officer reports to the chief executive.

The operating executive usually is too completely engaged in moving freight and passengers to give much time or attention to what may often seem a minor detail; all the more reason why that detail, meaning dollars and cents in the operating results, needs to be systematized and given a definite place in the big general scheme.

Systematic Investigation of Fires

Third, the adoption of a systematic plan for the investigation and special reporting of fires. The investigation of every fire loss, large or small, to determine the cause and fix responsibility, if any individual is at fault, is an essential in working out a sound fire prevention policy. A carefully recorded fire history is one of the best guides to the formation of a common sense fire prevention policy. The study of causes and placing responsibility for neglect or carelessness on the part of employees invariably has a most wholesome effect.

Fourth, by the systematic inspection of all railroad property by men specially trained in the best standards of fire prevention for the purpose of pointing out the causes of fire and outlining practical methods for their elimination or safeguarding of the hazard. Without systematic and regular inspection from an outside department and by men whose observation has been specially trained, the local forces become indifferent to every day conditions that eventually are productive of fires.

Largely as a result of the activities of the Fire Loss and Protection Section of the U. S. Railroad Administration during the war, most of the railroads now maintain some kind of a fire prevention inspection organization. Generally speaking, the size of this organization and extent of its operations varies with the size of the road, but practically all Class 1 roads today employ at least one man for the sole purpose of going over the line and pointing out the fire hazards. The working out of a scheme of co-operation between this department and the safety organization of the road, in which conditions for which one of them is responsible are reported to the other, will operate to mutual advantage. From the standpoint of fire prevention a plan of this nature is particularly helpful in the correction of housekeeping defects, the importance of which as breeders of fires cannot be stressed too strongly. Where conditions of this character are observed by safety men in the pursuance of their daily duties they should be called at once to the attention of the local authorities, after which the Fire Prevention Department should be advised. Ordinary conditions affecting the maintenance of fire extinguishing apparatus should be treated likewise. Just how far it may be practical to extend this plan of co-operation, in connection with special hazards of occupancy or building construction, will depend largely upon the fire prevention training and experience of the inspector. Great care

must be exercised that there may be no crossing of wires where questio of proper fire protection standards are involved; one error in this respec resulting in loss of confidence by local forces in the judgment of an i spector, may effectually precent the carrying out of an entire fire preve tion program.

Fifth, by the organization of division or terminal fire prevention co mittees with monthly meetings (in conjunction possibly with the safe committee) to foster interest in the co-operation of employees throug discussion of fire hazards and prevention measures. At least one of th important Class 1 roads has employed this idea with marked success, an there seems to be no good reason why its general adoption would n produce as good results in the curtailing of human carelessness by ed cation and instruction as has been achieved by the safety committe of the roads.

Modern Safe Construction Standards

Sixth, by the adoption and enforcement of modern safe constructio standards in the planning of new buildings, or when making additio to existing facilities. Expensive changes in present structures may n always be practical, but careful attention to the fire hazard feature whe laying out new facilities will do much toward the prevention of futu losses.

Of equal value in the railroad organization is a well defined schem of operation with respect to standards, water supplies, electrical insta lation, types of fire protection equipment, volunteer fire brigades at sho and terminals and maintenance practice generally. The subject is one considerable detail and necessarily involves a careful study of the pro erty to be protected, as the extent and character of the protection wi depend naturally upon the value and the importance of the property an nature of occupancy. Whenever conditions justify, a system of prote tion in which the human element is largely eliminated, such as automat sprinklers, is advocated. These features are really an integral part the building structure or equipment and should be considered on th same basis as heating or lighting, or any other facility essential to th operation of the property.

The fire risk cannot be ignored; it is ever-present and must be dea with, one way or another, efficiently or indifferently; to admit its reality to minimize its dangers by wise precautionary measures, are the firs steps toward the adoption of a policy; the formation and working out such a policy would seem to merit the thoughtful consideration of rai road executives.

That business interests generally are awakening to the vital necessit for serious consideration of the fire loss problem is evidenced by th extensive educational work now being carried on by the very activ insurance department of the U. S. Chamber of Commerce, one of th most representative business organizations of the country.

The safety departments of railroads have much in common with th cause of fire prevention and cannot be urged too strongly to lend thei

co-operation in stimulating a real and continued interest on the par of their managements, without which permanently effective results neve can be obtained.

REPORT OF MEMBERSHIP COMMITTEE

Robert Scott, Chairman

Number of Roads Holding Membership	8
Roads Joining	1
Atlanta and West Point Ry.	7-30-24
Western Railway of Alabama	7-30-24
Chicago & Illinois Midland	12-20-23
Chicago, Rock Island & Pacific	11-15-23
Cleveland Cliffs Iron & RR. Co.	5-13-24
Cumberland and Manchester RR.	5- 9-24
DeQueen and Eastern RR. Co.	2-29-24
Texas, Oklahoma and Eastern	2 9-24
Des Moines Union Ry. Co.	12-11-23
Erie Railroad Co.	4- 4-24
Grand Trunk Railway System	5-12-24
Midland Railway of Manitoba	4-30-24
Peoria & Pekin Union Ry.	4-26-24
St. Louis Refrigerator Car Line	1-10-24
Total	10
Roads Withdrawing	
Chicago Junction Railway	12-19-23
Kansas City, Mexico & Orient	4-25-24
Fort Smith & Western	2-15-24
Sacramento Northern	3-12-24
Total members this date	9
Increase over 1923	1

In behalf of this Committee, I desire to thank Mr. Cameron, and M Metcalfe, for their splendid support in carrying on the campaign for ne members throughout the year, and also other members of the Sectio for their assistance.

REPORT OF COMMITTEE ON STATISTICS

(Mr. Carrow, the Chairman, was called away from the Congress b business and Edward Crane, statistician of the Interstate Commerce Commission was asked to read the report.)

MR. EDWARD CRANE: The principal duty of the Accident Statistic Section of the Interstate Commerce Commission is to record the nun ber of accidents and resulting casualties in connection with the oper

In the presentation of our accident statistics, it is our aim to bring light those points which it is important for the safety man to know order that he may war against the loss of life and property resulti from railway accidents.

We hear a great deal these days of highway grade crossing accider and of the steps being taken to halt the upward trend in the yearly tot in casualties at grade crossings, and the subject is big enough to serve all the consideration that is given to it, but we must not in c efforts to eliminate casualties at grade crossings overlook other caus which are also taking their daily toll in human life.

In Accident Bulletin No. 92, covering the calendar year 1923, whi will be available for distribution shortly, there appears a train servi classification "Struck or run over at places other than highway gra crossings." There is a single item in this classification, "walking alo track," against which appear 930 fatalities and 793 injuries to perso It is usually necessity that requires the use of railway crossings, b it is more often convenience and thoughtlessness that convert a ra road's right of way into a public thoroughfare.

Some railroad men say, "We know that railroad tracks are used f Sunday strolls, by hikers, and by persons desirous of making short cu but what are we going to do about it?"

Gentlemen, is this a satisfying answer to so important a questio A life is a life whether at a grade crossing or along a railroad trac Nine hundred and thirty lives, practically a thousand a year! T subject seems to warrant much thought and still more action.

You will be interested in knowing the grade crossing figures for t first six months of this year. There were 958 persons killed at gra crossings, which is 37 more than the corresponding six months of 192 2,823 injured in 1924 against 2,759 for 1923, which is an increase of 6

In those accidents connected with train operation, in 1924 there we 3,015 persons killed, 23,301 injured; in 1923 there were 3,140 killed a 27,562 injured. That makes a decrease for this year in connection wi train operation.

In the non-train class, which includes the industrial or shop work, 1924 there were 204 persons killed, 47,224 injured; in 1923 there we 216 killed, and 57,839 injured, so that is some improvement in the no train or industrial class as well as in train operation for the first s months of 1924. But we are running a little ahead on the highway gra crossing accidents. In the year 1923 there were 2,268 persons killed grade crossings, and for the first six months of this year 958, so at th rate we will be a little short of last year in grade crossings.

DISCUSSION

CHAIRMAN METCALFE: There are very few railroads which report ac dents in the same manner. I frequently get reports from Mr. Adams so many injuries per million man hours. I get out a report of so ma injuries per thousand men in service. I do that because I believe

visualizes a little plainer just exactly what it means. If you have ten per cent of your men injured in a thausand, you can visualize that immediately. When you put it into man hours it is rather puzzling to the men in the rank and file particularly.

MR. WM. S. WOLLNER (Northwestern Pacific R. R., San Francisco): It seems to me that the greatest need in railway accident statistics is to make them comparable with accident statistics in other industries. It is true that the railroad industry is a big industry, but there are other big industries and while competition is good amongst ourselves, we cannot measure the success or failure of our work unless we know how well or how poorly we are measuring up against the steel industry and the lumber industry and various other industries. Some one at some time adopted the plan of calling any accident in which a man was incapacitated for more than three days on a railroad, a railroad accident. This is not recognized in any other industry that I know of. In other industries they usually use what they call the lost time period, that is the loss in some industries of the balance of the day and in other industries of more than the balance of that day. It seems to me that there is a responsibility on the Interstate Commerce Commission's Statistical Department or on some one else to compile comparable statistics, and we never will be able to do that as long as we retain our present system in the railroad world of calling anything over three days an accident. You can see how ridiculous it is. We will use the unit of one because it is most easily understood. A railroad reports one reportable accident in a month's period. We will say two railroads each report one reportable accident in a month's period. On one of these railroads that figure one represent a man who was injured for three days and one hour; on acother road it represents a man who was incapacitated for life. I would like to suggest to you the possibility of a complete change in the form of reporting railroad statistics so they may be comparable with statistics in other industries.

MR. CRANE: The book of rules under which these reports are prepared was gotten up by a group of railroad men. I presume they omitted those having disability under three days for the reason that it would encumber your statistics with a great many accidents which would be of a minor nature, and they simply took the three-day limit to get those of a rather serious nature, and threw out the others.

As it is now, we have about 370,000 accidents a year to handle. If we are to take accidents causing mere scratches and things like that, that would be under the three-day limit and it would greatly increase the handling our report. We would have to increase our clerical forces and I am afraid it would affect the railroads because they would have to do more work, but if the railroads think that this limit should be lowered and we should have anything over one-day accidents, which we do have in the case of passengers but not employees, we will be very glad to give it consideration, but our statistics have been going on since 1889, I think, and, of course, the value of statistics depends a great deal on the com-

parability of the figures for a series of years. If we can be shown that this change will be beneficial (and we want to help the railroads in any way possible) we will be glad to take it under consideration.

MR. HARRY ADAMS: As Mr. Crane has said, the matter of statistics is the barometer or the measurement of accidents, and the measurement was inaugurated, long before the majority of other industries gave it much thought, on railroads. I know that there are a great many industries that are using as a barometer a seven-day accident. To me it seems that we have set the pace to practically all carriers, and the barometer which we are using has a tendency to eliminate the minor injuries. The more than three-day reportable accidents is the information which we desire. I would be utterly opposed to changing the modus operandi of reporting statistics as now outlined by the Interstate Commerce Commission.

On the Union Pacific we keep a record of what we call lost-time accidents, which means that if a man becomes injured at 8:30 in the morning and cannot report for duty at eight o'clock the following morning, we count it as lost-time injury. If he gets hurt at 4:30 in the afternoon and cannot report for duty at eight o'clock in the morning, it is counted a lost-time accident, but I believe if you would go lower and make it less than a three-day reportable accident, you would clutter your reports up to a degree that would be at least astounding to the public.

MR. LEW R. PALMER (Equitable Life Assurance Society): The man hour basis gives you, I believe, the truest measurement of the exposure and that is what you are after, to determine the number of accidents in accordance with the exposure. As far as comparing your performance with other industries is concerned, you have an entirely different risk factor in the railroad industry as compared to other industries.

REPORT OF FILM COMMITTEE

MR. HARRY ADAMS (Chairman): About November, 1922, the National Safety Council proposed the organization of a film library. It was the Council's purpose to purchase six films at an approximate cost of $40,000, and in order to do that, it was proposed to seek a contribution of $200.00 from each of 200 members of the Council, thus creating a fund of $40,000 and make arrangements whereby contributing members could purchase these films at a nominal figure or rent them, as desired; non-contributing members would have to pay a higher rate if they desired the use of the films and non-members of the Council would have to pay a still higher rate. This idea was concurred in by 100 members of the Council and about 12 members of the Steam Railroad Section and the Council was able to raise about $20,000. A new proposition was then submitted by the Council that rather than delay the matter further, three films would be produced; one a public safety film, one an industrial film and one a steam railroad film. This was agreed upon by the subscribers

and the Council, about a year ago, completed, ready for use, their first film known as a public safety film and entitled "Ask Daddy." The second film is now under course of construction and will be known as an industrial film but will be adaptable to use in railroad shops. The Council now has under consideration a number of scenarios from which they are trying to select the one best suited for the subject for the steam railroad picture and it is hoped that this scenario can be selected and perfected in time to have the film finished before January 1.

The Council has been very much handicapped in two respects, first the securing of proper scenario for the picture which the steam railroads most desire and second, shortage of subscriptions from members of the Steam Railroad Section. However, it believes that when this picture is completed there will be an additional demand, from the railroads, for it and that in due time they will be able to build up a clientele that will permit them, financially, to go forward, increasing the repertoire of the Library.

At the Buffalo Congress, the Steam Railroad Section appointed a special film committee composed of: Charles E. Hill, general safety agent, N.Y.C. Lines; A. V. Rohweder, superintendent of safety, D.M.&N., Duluth, Minn.; L. R. Palmer, conservation engineer, The Equitable Life Assurance Society, New York; L. G. Bentley, general safety agent, C&O., Richmond, Virginia.

This committee was augmented by the appointment of: W. R. Spettigue safety agent, L.A.&S.L., Los Angeles, Cal.; J. F. Grodzki, general safety agent, O.W.R.R.&N., Portland, Ore.; C. T. Bailey, chief safety agent, O.S.L., Salt Lake City, Utah.; Robert Scott, superintendent of safety and insurance, A. C. L., Washington, D. C.; R. C. Richards, chairman, central safety committee, C.&N.W., Chicago, Ill., and Isaiah Hale, superintendent of safety, A.T.&S.F., Topeka, Kans.

A portion of this Committe has met twice in Chicago since the last Congress, consulting with the National Safety Council and aiding them as best possible under the circumstances.

It was decided that it probably would be better not to solicit carriers for any further subscription at this time—that they could be more easily sold the proposition after the film was available, as we know a number of non-subscribing steam railroad members are anxious for the film but prefer to see it before purchasing. This, of course, is an unfair way to look at the problem and it leaves a burden upon the few railroads who subscribe for the cause.

The picture of this series "Ask Daddy" is meeting with practically universal approval and is having a splendid sale. I predict the second and third will go as well and it would be encouraging and helpful for the National Safety Council to enlarge on the film library and I believe in time, with the honest spirit exemplified by them, we will have a splen

REPORT OF COMMITTEE ON CO-OPERATION WITH OTHER AGENCIES

(Secretary E. R. Cott read the report in the absence of C. L. LaFountaine, Chairman.)

At a meeting of the executive committee, Steam Railroad Section National Safety Council, Chicago, March 11, after a lengthy discussion o the duties of this committee, upon motion duly made and seconded, i was resolved to dispense with this committee following the Congres meeting in Louisville. This action was deemed advisable for severa reasons.

It was the opinion of the majority present that this committee shoul be composed of executive members of the National Safety Council instea of a sub-committee of the Steam Railroad Section. They were furthe of the opinion that, while this committee no doubt served an importan place when the Steam Railroad Section was originally organized, it possibilities now of any accomplishments are quite obsolete because o the fact that the National Safety Council, through its officers and loca councils, is in a much better position to handle this work and has beer doing it very successfully for the past few years.

There are also at the present time safety officers on nearly ever railroad, who are very active in securing the co-operation of other agen cies under their jurisdiction and we believe that they meet with bette success in a majority of cases because of the fact that they have a opportunity to personally meet the officers of other agencies while you committee would be required to handle all these matters through corre spondence.

For the reasons above related, your committee has not made an effort to obtain the co-operation of other agencies and we would s recommend and move that the committee on co-operation with othe agencies be dispensed with. (The Report was Adopted.)

REPORT OF PUBLICITY COMMITTEE

(Secretary E. R. Cott Read the Rejort in the Absence of Mr. Braden, the Chairman)

With the valued assistance of Mr. Bentley and Mr. Shedd, your com mittee worked as diligently as possible in the last year. We accom plished something and believe that our successors can get better results now that the ground has been broken.

So that the work would not be burdensome, we divided the country into three sections. Mr. Bentley handled all railroad news south of the Potomac and east of the Mississippi rivers; Mr. Shedd all news west of the Mississippi, and Mr. Braden all north of the Potomac and east of the Mississippi.

Mr. Bentley and Mr. Shedd forwarded to me items of all kinds, posters, leaflets, company magazines, etc. If necessary, the chairman would write articles in publishable form. Through the kindness and hearty co-operation of the *National Safety News* editor, Steam Railroad Section news occupied a conspicuous place each month in this magazine. At times the editor of the News found items we sent him of sufficient importance to use them under display heads.

Your committee also sent items that we thought would be of interest to the railroad brotherhood magazines. Copies of items were sent to the Literary Digest after they had been printed. On two or three occasions the Literary Digest saw fit to use these items as a nucleus for an article.

On two or three occasions we circularized the membership of the section, giving them specific information, as, for instance, when a selected committee attended a meeting at Miami, Fla., at the invitation of the National Association of Railway and Public Utility Commissioners.

Your committee would have been delighted to have in print about five times as much as did see the light of day. Our difficulty was in getting safety superintendents to send us material. About four-fifths of the matter which got into type came from the railroads east of the Mississippi. A more generous response from those west of the river would have been helpful.

The editor of the *National Safety News*, George Earl Wallis, is a real, sympathetic friend. He will make room in his crowded magazine for Steam Railroad Section news. He likewise is most helpful in directing us to other publicity media. The brotherhood magazines likewise have been most friendly and when space permits, will use Steam Railroad Section items.

Items submitted for publication should be short and snappy and written double space on the typewriter. This latter shows consideration to the editor, who can make notes and corrections much easier than in single spaced matter.

WEDNESDAY MORNING SESSION

REPORT OF NOMINATING COMMITTEE

MR. ROBERT SCOTT: The nominating committee has given serious consideration to the selection of officers for the new year.

We propose for the chairman of this section for the new year, a man who has not been a member of this section for so very long, but a man who represents a real railroad and a man who is well qualified to hold the position, a man who is intensely interested in the safety game and a man who knows it as well—Mr. Charles E. Hill of the New York Central.

For Vice-Chairman we have given consideration to a man who has

has put his best efforts into making our section just what it is, one c the best sections, if not the very best, of the National Safety Council- Mr. Arthur V. Rohweder of the D. M. & N. Railroad.

We propose Mr. E. G. Neumann, of the Union Pacific Railroad, fc the office of secretary of this section.

Note: The following additional nominations were made: for chairma Fred A. Mitchell; for vice-chairman, W. S. Wollner and for secretar L. T. Shedd. Upon a vote, the nominees of the committee were chose and the new officers were announced as Mr. Hill, chairman; Mr. Rol weder, vice-chairman and Mr. Neumann, secretary.

Report of Resolutions Committee

MR. BENTLEY: The committee met yesterday afternoon and electe Mr. Brennan as chairman. However, Mr. Brennan has contracted cold and has asked me to read the report.

The following resolutions are presented:

"WHEREAS, The Steam Railroad Section has received the most valu able assistance and cordial support of our parent organization, th National Safety Council, during the past year, particularly in the ma ter of improved bulletin service, safe practices pamphlets and increase allotment of space in the *National Safety News*, be it

"RESOLVED, That the sincere appreciation of the Steam Railroa Section is hereby conveyed to the general officers and the staff and t the executive committee for this most excellent service." (Adopted.)

MR. BENTLEY: "WHEREAS, The Safety Section of the American Rail way Association, at its fourth annual meeting in June, 1924, saw fit t adopt a goal calling for a reduction in casualties to persons in railroa accidents by the end of the year 1930 equivalent to 25 per cent, and

"WHEREAS, The Steam Railroad Section of the National Safet Council is in hearty accord with the aims and purposes of the Safet Section of the American Railway Association, be it

"RESOLVED, That the Steam Railroad Section of the National Safet Council will seek aggressively to reach this goal, and be it further

"RESOLVED, That the public be urged, through all other sections o the National Safety Council, to co-operate vigorously toward the attain ment of this goal." (Adopted.)

MR. BENTLEY: "WHEREAS, The Steam Railroad Section of the National Safety Council recognizes the value to its members of the statistical information compiled and circulated by the statisticians o the Interstate Commerce Commission pertaining to personal injuries in railroad accidents, be it

"RESOLVED, That the Section go on record as sincerely appreciating the value of this information, also the prompt and efficient manner in which it is presented, and be it further

"RESOLVED, That the secretary convey this resolution to Mr. Lorenz of the Interstate Commerce Commission at Washington, as an evidence of this appreciation." (Adopted.)

MR. BENTLEY: "WHEREAS, The Thirteenth Annual Meeting of our Section has been most interesting and instructive, revealing splendid work that has been done by our efficient chairman and staff, be it

"RESOLVED, That we hereby express our appreciation to all of these officers and committees, for valuable and whole-hearted service, and be it further

"RESOLVED, That our sincere thanks are hereby extended to all who contributed to the program." (Adopted.)

SAFETY FROM THE VIEWPOINT OF THE TRANSPORTATION DEPARTMENT

Edward G. Neumann, Secretary, Colorado Division Safety Committee, Union Pacific Railroad, Denver, Col.

Safety measures concern the transportation department in two ways: as a responsibility, and as a powerful, assisting factor in operating a railroad. More than any other, the transportation department is responsible for carrying into actual practice the wise provisions of safety rules and instructions, for included in its ranks are the superintendents, trainmasters, dispatchers, trainmen, enginemen, yardmen, telegraphers, stationmen and others from whom we expect the safe, speedy, and generally satisfactory handling of people and property to be transported. After the maintenance people have provided properly constructed and maintained tracks and structures over which the traffic is to be moved, and the mechanical employees have provided safe equipment for the business, the ultimate and direct responsibility for the finished product of transportation rests with the transportation men. The ancient and well established law of common sense and safety measures, when understood, believed in, and practiced, are important aids in accomplishing this work.

There is no need to discuss the utility of safety work. Viewed from any angle, humanitarian or financial, this activity has proven advisable and highly essential. Safety activity has resulted in improvements and corrections so that but few present day accidents and injuries are chargeable to the physical conditions of the properties. Corresponding progress has not been made in correcting unsafe practices. We have found it relatively easy to suggest that the railroad company expend money to improve the property where we work, but we have not, with equal zeal and frequency, suggested to our fellow worker that he refrain from unsafe practices. The future of safety requires that it shall be constructive and adapted to modern conditions, and to keep it so we must recognize the changing conditions and be ready to apply the safety measure before it is forced upon us.

The railroad man does not inherit safety ideas. These must be taug him, and regardless of the method used, we recognize that not on have we the task of implanting the safety idea, but we must wo against the tendency of railroad men to take chances. Safety must l built up in the minds of those who are to make safety possible, a where there are several thousand men to be reached, it requires pai taking efforts directed both to the individual and to the group. It is fallacy to expect that a few safety agents, even of the highest typ can establish permanent results among thirty or forty thousand e ployees. From which it follows that, even with a liberal apportionme of safety officers, their efforts must be backed up and carried forwa by a large army of others, who, while not bearing the title of safe agent, can win the case. In this large army is included every man w has supervision over another. We must first make certain these m are thoroughly imbued with the safety idea; for, without it, they a not well-rounded superintendents, trainmasters, agents, yardmaster engineers, conductors, etc.

Constructive and Destructive Forces

The forces that influence safety in the average man are either co structive and destructive.

Safety committee meetings, rallies, promulgating rules, publishi literature and posters are all means for disseminating information a inspiration, but for greater importance is the example, which has alwa been of more force than the precept. In actual practice, the value any paper or any speech cannot compare with the earnest, sincer personal contact of the officer with the employee; the man-to-man appe with a background of consistency in action by the officer who wou enlist the co-operation of the employee. It may appear a gigantic ta for a superintendent to personally interview every man on his divisio however, it is not impossible, for it has been done.

The destructive side includes, among other factors, those railroad m who, whether their jurisdiction extends over one or a thousand me act inconsistently with the principles of safety. My meaning is thi For approximately three hours each month a small portion of t employees attend a safety meeting—some of them for the first time, a through these few men it is hoped to reach many others. Granted th are favorably impressed by this brief contact with safety work, they g to their respective posts intending to adhere in their work to t principles they have heard advocated. During the following 250 workin hours they come in contact with their fellow employees, question ea other, and answer each other about safety work.

If one man among them has in his mind a completed safety structur built strong enough to endure the storm of incredulity and ridicule l loose by his doubting associates, his is a man's size job. Too oft he finds a woeful lack of harmoney between the precepts of the safe meeting and the demands of actual practice on the job. The officer wh in the public safety meeting urges men to ever bear in mind th

safety is first and most important now urges haste and short-cuts; and if not actually suggesting infractions of safety rules, he, by condoning such infractions, utterly destroys the safety idea which has been implanted. The officer does not mean to be inconsistent, but he is thoughtless, and fortunately there are but few of his type.

The railroad which employs me was a pioneer in safety and the results attained are little short of marvelous. Every possible aid has been given and every effort put forth so that safety shall be in reality the first law for every employee on the Union Pacific. We are convinced the achievements accomplished result from the requirement that every movement contemplated, whether small or large, shall first be subjected to the acid test of safety, and, if found inconsistent with that principle, it cannot be permitted. "Consistent with safety," means something to us. It is not a mere figure of speech or a meaningless slogan, and, as our officers without exception, believe and practice safety, it is required from us of the subordinate ranks. It is not difficult for us to regard highly this important part of our work, for we have the example of our leaders, and no effort or expense has been spared in giving us a thorough education along these lines. We have been taught, both in safety meetings and on the job, to build up and not tear down.

Common Sense Safety

Common sense is a real synonym for safety. With an example of absolute consistency by the officers, the men of the transportation department can be depended upon to give heed to the workable law of common sense and add their very substantial quota to the further upbuilding of the safety structure which is at once the joy and pride of the transportation department.

Safety first means thinking first. Encouraging progress has been made and men are using more intelligent thinking in their work today than in the past, but the major portion of our accidents are still due to lack of proper and timely thinking.

In the transportation department, the work of many men is such it does not admit of a mistake. For illustration, consider the engineer.

The engineer is speeding along at 50 or 60 miles an hour watching closely for signals. He approaches an automatic block signal. The arms of the signal is against him, in STOP position. The engineer looks at the signal. His eye sees it and the idea is started on its way—a command-to-stop idea. Somewhere it fails. The contact isn't made, and we have the phenomenon of a man looking without seeing. He looked without seeing as so many of us do, because his mind was so completely filled with such an absorbing thought and one so far removed from the scene of his activities, that it refused to move out.

Some say it can't be done, but all know it is done. Men have stood watching the descending travel of a steam-hammer, without removing their fingers before the fatal smash. Men have walked into the path of [illegible] and failed to step to safety.

When an accident occurs in which a worker meets with injury thro his own fault, we pull long, virtuous faces and point to our own white records, and ask each other, "What was poor old Bill thinl about when he got by that signal? What was he thinking about w he stepped in front of that cut of cars?"

What was old Bill thinking about? We suspect his mind was al as full of foreign affairs as our own minds, as we go about a busi which does not admit of a mistake.

Domestic affairs, with all their worries, financing homes, sickn children, charge accounts, the business of life, are pressing us for s tion at a time when we can ill afford to give them a thought.

We know these things are true. The solution is another matter. possible solution is to learn the meaning of the word "concentra which bears a relationship to the word "control."

We pick up a paper and read that some one forgot and someth frightful resulted. Some one suffered a mental lapse and lives were feited. How would it affect us if that news item read that some deliberately dismissed from his mind a life-and-death duty. and de resulted? Deliberately dismissed the important duty to make room the inconsequential, the trivial thing? "Forget" isn't the word, if would absolve the man from blame. Forgetting is the shutting ou one's mind the things we do not wish to remember.

It takes just one wild throw to muss up a lifetime record in a that you'll never be able to forget what happened. One so-called la of memory and you are through.

What is the answer? Learn to control the mind the same as learn to control an engine or a steam drill. It isn't an easy job. It ta courage and patience to master it.

SAFETY FORM THE VIEWPOINT OF THE CAR DEPARTMENT

W. A. Clark, General Car Foreman, Duluth, Missabe & Northern Railway, Duluth, Minn.

An analysis of the scope and branches of the Car Department will show that its members have to do with operation, production repairs peculiar to the maintenance of equipment.

Production or shop output under a regular schedule when building rebuilding cars.

Repairs, heavy and light.

Inspection and running repairs to equipment in yards and termin

The branches include: blacksmith, machine, carpenter, wood mill, pa upholstery, pipe, sheet metal and structural or the fabrication of parts in addition to the subdivision of specialized work.

Therefore, in studying the most effective method to interest and safeguard employees, it is necessary to adopt measures best suited to protect against the dangers peculiar to the different branches of the service.

Construction, the building or rebuilding of cars, presents extra hazards on account of the large amount of material that must be handled and placed convenient to the point where work is to be done. The carrying of plates or timbers and parts by cranes or trucks down congested pathways of shop aisles. The liability of plates slipping from hooks, the danger of burns from hot rivets, eye injuries from scale and chips. Crushing, bruising, slipping and falling from ladders or scaffolds are ever present.

General car shop work in the nature of repairs, both heavy and light, also presents unlimited possibilities for injuries. The operation of each shop will have problems of its own.

The shop served with cranes and where jacks are not used.
The shop that is without cranes and where jacks are used.
Inspection and repairs to equipment in yards and terminals.

Stumbling, Falling and Tripping Hazards

The supervisors in charge of new work or the rebuilding of cars must be ever alert to see that the maximum admissible floor space is kept free from stumbling, falling, and tripping hazards; that material is safely piled, and that proper and necessary scaffolding is provided; that goggles are furnished and worn when drilling, reaming, chipping, and riveting is being done; that riveters and helpers have a tight band or handkerchief around their necks to protect their backs and gauntlets or tight sleeves be used to prevent hot rivets from going up their sleeves.

In handling structural steel and plates with cranes, safety hooks should be used. One man only should give signals to crane operator, and when cars are moved to new positions by cables or cranes, operators should be instructed not to take signals to start or move crane or car along the tracks until some competent person is stationed at the end of car in the direction it is to be moved, to make sure that no one is in the way, or that no men are underneath, between, or in the hopper openings.

While handling material with cranes and carrying it from place to place in shops, a man should walk ahead of the load and clear the floor or warn those underneath to move from under until load has passed. Crane should also be equipped with a gong or klaxon to operate automatically while it is traveling or moving.

The operation of each shop or repair track will require protection peculiar to its individual problems, each must be met and provided for.

We have the plant served with cranes where jacks are not used, where cars are moved in and out with cranes or cables.

The shop that is switched or cars moved in and out during working hours by switch engines.

The shop that has no cranes and where jacks are used and cars switched in and out after working hours.

On repair plants both shop and outside tracks, all switches sh be locked during working hours and in the event of it being neces to switch tracks while workmen are on duty, a whistle or bell sh be sounded. Riveting hammers, rivet busters, blowers and rivet fo should be shut off or stopped. Men stationed at doors leading to from other shops at crossings, to see that no one crosses tracks u switching or the moving of cars has been finished.

Trustles, horses and scaffolding should be standardized, regul inspected and kept in a safe condition. All ladders should have sa ends and all scaffold planking have a bolt running through each en keep them from splitting. On each end of scaffold planking cl should be nailed to prevent planks from slipping off the ends of tres

Scaffolding

One man should not be allowed to move scaffolding by dragging horse or trestle in the direction it is to be moved. A man should b each horse and same lifted and carried or plank removed and scaffol relocated.

Scaffold planks should be selected with care, a good grade of lum used and they should be of a standard width and thickness.

If jacks are used for raising and lowering cars they should be regul inspected and kept in first class condition.

Absolute confidence should not be placed in the reliability of ja Horses should be used as an auxiliary in all cases where men hav go under car bodies. Also an absolute rule should be made that no be allowed to expose his body or limbs between trucks and frame car until proper blocking is placed between truck bolster and car under side bearings.

In a shop where cranes are used, no one should be allowed to go u a car while it is being held by crane or cables until proper horses blocks have been placed.

To prevent men from putting their hands on the inside of c hooks or taking hold of cables while lifting cars, a handle should put on the hook on the opposite side from the point, and all concer properly instructed in the safe method to handle hooks or cables.

When trucks are being turned over or turned upside down by use of cranes for the purpose of working on spring planks or chan men should stand clear as springs may fall out and crush their feet

The removal of stuck or wedged friction gears should be prop supervised. Inexperienced men should not be allowed to handle th

When removing supporting plates and couplers from cars, air j on trucks, or blocking should be used to prevent couplers and d gears from falling to the floor when nuts are removed from carrier and supporting plate bolts.

Extra precaution and care must be used in blocking box car bo to make them safe when trucks are removed on repair tracks not tected from winds. During high winds the number of trestles or ho should be doubled.

General Rules

No tools, car parts, knuckles or knuckle pins should be left on platform, ends, or tops of cars while cars are being repaired.

No passenger, baggage or caboose equipment should be sent to shops for repairs or men allowed to work on them until all torpedoes have been removed.

While cutting rivets with chisel bars or rivet busters, arrangements should be made to prevent the heads of rivets flying.

A good grade of handles for sledges and hammers must be furnished.

A suitable grade of steel should be used for chisels and drifts.

Striking truck springs with hammers or sledges to drive them in place is dangerous. When necessary to do this a block or piece of wood should be used between springs and hammers.

An inflexible rule should prohibit the practice of men putting their hands on center pins to guide them in place while lowering car bodies on trucks. Also blocks should be used under all conditions of service that require men to expose their bodies or limbs, under any part of car that may be raised or jacked up, or held up with a bar. This practice is the only one that will prevent crushing, and maiming should parts move, slip, or fall.

Car men should not be allowed to raise steel doors, bolsters or other parts with bars, and other men expose their hands or fingers until the part raised has been made safe by blocking securely, then should the bar slip the man with his hand exposed will be safe.

All tools should be inspected daily, defective ones removed from service and a place provided for tools that become defective or unsafe while being used.

That is, a tool that has become defective should not be placed in the workman's tool box, it should be removed to a place designated for defective tools.

Pneumatic hammers for car work should be fitted with inside triggers and safety retaining clips.

Air hose and fittings should be inspected weekly for loose clamps and soft inside linings.

The use of oil should be prohibited in mounting and repairing air hose fittings.

Acetylene and oxygen gas lines and fittings should be inspected and back pressure valves filled daily if necessary.

All defective gauges, regulators and torches should be removed from service and returned to the maker or company making repairs.

The mounting or fitting of gas hose should be done by or under the supervision of a competent welder. No one should be allowed to use the acetylene outfits until they have been thoroughly instructed in the use of regulators, gauges, and torches; the danger from oil coming in contact with oxygen gas; and the safe handling of gas tanks under pressure, and passed on as being competent by a regulator instructor.

Welders and cutters should be furnished with asbestos gloves and arm protectors, and goggles of the right shade to insure eye protection.

Cutters and welders should be chosen with due regard to ability fitness for such work, and thoroughly instructed in the care neces to handle gases under pressure and not allowed to work alone until t instructor is satisfied that they understand how the regulators, gau and torches should be used without endangering themselves or t fellow workers.

They should understand the importance of keeping oil away f oxygen hose, fittings and torches, and the consequences of letting sp burn holes in hose lines. In short, gases under high pressure are dan ous if not handled safely, therefore, every precaution should be use see that an unsafe man is not placed in charge of them.

Gas Generator Buildings

No open lights or smoking allowed.

Carbide must be kept in a separate dry room.

Oxygen tanks to be handled with care.

Traveling cranes should be used for vertical lifts or pulls only.

All grease and ice should be removed from shop floors and sand appl

Men should not be allowed to run, crowd, or use football tactics w checking out.

Machinery should not be cleaned or oiled while it is running.

All machines, belts, and motors should be properly guarded. Sa guards peculiar to each machine used and kept in place, and none competent or regularly assigned operators be allowed to operate mach or cranes. Special care should be given to the selection and trai of crane operators.

Floors of shops and buildings kept clear, free from holes and stu ling hazards.

Instruct men not to use common colored waste to wipe their ha or face. Wire pins and other rough particles may break the skin cause blood poisoning.

A first aid kit with iodine swabs should be available in all shops whenever a workman's skin becomes broken or abrased it should treated with iodine to prevent infection.

All employees should be invited and encouraged to make safety gestions with a special bearing towards the elimination of un practices.

A representative number of men from each shop or department sh be appointed on the safety committee. Regular meetings should held at least once a month.

A special committee of three should be appointed to make a l inspection of all shops and buildings once a month to check the co tion of tools and buildings, report to be made of their findings at e safety meeting, and an outside inspection committee consisting of to make an inspection of all shops or round houses at all outside po on the division other than where the safety meetings are held, re to be made of their findings at the regular safety meetings.

Electrical Appliances

All workmen handling electrical tools, motors and various appliances should be carefully instructed in the proper method of their use as well as the proper method of stopping and starting same.

Where portable electrical tools and appliances are used, shop should be equipped with safety disconnecting switches that are so interlocked with plug and receptacle that connection and disconnection can only be made when switch is in the off position.

All electrical apparatus installed in the shops should be so enclosed as to cover, as nearly as possible, any live or dangerous electrical parts of the equipment.

In the event of any electrical appliances becoming defective do not allow inexperienced parties, either workmen or foremen to attempt to make repairs. Blindness, burns, or death may be the penalty.

An electrician should be called to attend to all repair work.

Inspections should be made at proper intervals to ascertain that all electrical equipment is in good condition, and any defects immediately repaired. An inspection and repair report made out by the inspector to Chief Electrician and the reports forwarded to the Electrical Engineer.

Machine Shop

The handling of unmounted wheels is best done by the use of a truck designed to prevent wheels from over balancing or falling.

The element of risk is ever present when rolling them on their flanges.

Unmounted wheels should be piled and blocked to prevent them from falling or tipping forward.

Axles should be stored in a manner that will keep them from slipping.

Wheel borer, axle turner, bolt cutter, punch and shear operator must wear goggles while working on machine.

Lifts, hoists, cables, hooks, and slings should be kept in good condition.

Punch and shear machines, wrenches, hammers, or any object falling from the throat or head of machine, and striking the tripping lever may result in a serious injury, therefore, this particular lever should be covered or protected in a manner to make machine operative only when lever is pressed by foot of operator.

Air Brake Work

While cleaning brake cylinders use a safe clamp around piston sleeve with a ½-inch bolt. This will prevent spring in brake cylinder driving the non-pressure head and pinching workman's fingers or the piston from striking him while cleaning it.

Placing a nail in the sleeve in place of a clamp, is not a sure method of preventing injuries.

When testing brakes see that the cut-out cock is closed, and pressure allowed to escape from reservoir before making adjustments. This will prevent workman from being struck by levers. Also use a key bar in the key bolt hole to pull it in line, instead of attempting to do this with the fingers.

Air hose used for testing cars, or trains should have a drain cocl the hose head to reduce pressure before uncoupling and to pre particles of dirt being blown in the workman's eyes.

Pipe wrenches should be maintained in a safe working conditio prevent them slipping and injuring the operator.

Paint Shop

Ladders, horses, scaffold plank, burns from paint burners, ben gasoline, lye, caustic soda, and acids, slipping and falling from lad and roofs are the most prevalent causes of injuries to be gua against.

Blacksmith Shop

Burns from scale or handling hot iron, contusions from iron fal or being knocked from power hammer, and when cut at anvils, c from the heads of battered tools are the principal causes of inju None but competent operators should be allowed to operate po hammers.

Wood Mill

Wood working machines should be rigidly guarded. Guards kep condition and none but competent or experienced operators allowe use machines.

Operators of wood working machines should be taught the pr position of their hands. (A man trying to see what is going o other parts of the shop will not make a safe wood mill employee.)

Yards and Terminals

Inspectors, light repair men, air men and oilers working in yards terminals.

It is necessary to see that they are constantly reminded that swit must be locked or blue flags or lantern used before going betwee under cars.

Also to walk between tracks instead of between the rails while duty, and when it is necessary to cross tracks stop and look in directions.

The practice of car men getting on or off moving trains should prohibited.

Wrecking

Wrecking foreman should be thoroughly trained in safe practi The necessity of using outriggers and clamps, preparing a safe fou tion for crane before taking a heavy lift, properly blocking the c and having reliable men follow up and tighten wedges and bloc wherever the strain or load is removed from the boom. An effic lighting system for night work should be provided.

The practice of securely blocking overturned or leaning cars engines, before men are sent underneath, keeping men clear of ch or cables while pulling or lifting are a few of the things a wrec master must do if he is to keep his crew safe from injuries.

The head of the department should write a letter of encouragement or suggestions on the first of each month to each foreman and safety committee member commending them, advising or suggesting what should be done to promote safety work. If the days can be made safe the months will be safe, encouragement or constructive suggestions from the head of the department will be the source of an inspiration to those who come in direct contact with the real problems of safety work.

After all details of mechanical safeguards have been perfected it will be apparent that the ideal or true spirit of safety must come from the supervisors.

Success in safety work must start or emanate at the top. Enthusiasm for safety should radiate from the head of the department. Interest and success in safety work depends on the attitude of the supervisors.

The supervisory force must plan and lay the foundation if they aspire to build a monument to safety. No supervisor or safety committee member should allow any unsafe practice to go unchecked. The duties and responsibilities of supervisors must reach farther than guarding the machinery and providing mechanical safety devices.

After this has been done the men or workmen must be educated to the point that they will guard themselves. All new men should be thoroughly instructed in the hazards of the work assigned to them. This should be done by foreman hiring them and again by the foreman in charge of the department they are assigned to.

Education that must reach the individual, that will also enthuse the supervisory force with the spirit of service to humanity, that will appeal to all in a manner to show that safety should be their first consideration, that the workers are then the gainers, and as the individual becomes more careful the morale of the organization will also become of a higher order, when this is understood. Obstacles in the road to accident prevention will have disappeared.

The results will be a larger output and a better class of work will follow as the spirit and morale of the workers gain in honesty of purpose and effort to reach the ideal in accident prevention.

SAFETY FROM THE VIEWPOINT OF THE TRACK DEPARTMENT

W. G. Ashworth, Roadmaster, Northern Pacific Railway, Jamestown, N. D.

The question has often been asked why there is lack of interest on the subject of safety by supervisors? I believe it is due to the fact their minds are taken up with plans of work at hand, for which they are directly responsible.

Owing to the introduction of trucks, busses and automobiles, better water transportation facilities, and the increase in cost of materials and labor, which is cutting into the revenue of railroads seriously. Efficiency of operation is now the keynote of the railroad problem. Here is where safety is coming into its own and must be recognized as an

important factor or detail. Efficiency cannot be had unless the l are stopped in the waste of material and man power and, surely, sonal injuries are waste of man power.

In looking through personal injuries in the track department of Northern Pacific during the past six months, I have selected at rar a few cases which occurred.

A laborer was engaged in putting in ties and while another lal was driving spike, a piece of steel flew off the maul and struck his arm. Injury was due to defective maul.

Section men were handling rail. Laborer was working on top flat car and while the foreman was measuring the rails he put a s into his pocket and sat down on stake. The stake was too smal pocket and under his weight fell through, causing the laborer to backward to the ground.

Crew was engaged in loading rails. Crew consisted of 17 men; half threw their end of rail on car while men on other end were lag and did not throw their end of rail far enough, which caused the to bounce back, sliding to the ground and skidding onto laborer's causing slight cut on instep.

Extra gang was assisting in unloading rails from gondola car at d platform, using the rail loader. Laborer was standing near rail was being lowered to platform and when it struck platform it rolled on his foot, injuring his toe.

Man was cleaning out box car and in getting out of car he lost balance, spraining his left knee in falling.

Pulling spike from tie with claw bar; bar slipped striking man in c

Pulling ties out of track; slipped and fell, fracturing collar bone.

Loading rail on push car; caught fingers under rail, two fin crushed.

Pushed motor car; towing push car loaded with ties, to get it star in trying to board motor car, slipped and fell—push car ran over

On motor car slowing down for highway crossing, casting broke denly; lost balance, fell off seat backward and off car; head and sl der cut and bruised; back strained.

On speeder near roundhouse; ran through open switch; fe employee misjudged distance; warned by switchtender; man thr off and head cut.

On wagon of hay for stockyard; failed to secure proper hold and off rear of wagon; back sprained.

Causes

You can readily see, from these examples, we still have the old s of the greater proportion of cases due to personal negligence of injured party or negligence of fellow workman, as compared to defe tools or equipment. The same ratio will be found in any other de ment connected with the physical upkeep of a railroad. What is cause for this large differential? Why do not men think for themsel You have all asked yourself those questions many a time. From

sonal observation and investigation covering injuries in the track department, and it would be the same in all other departments, I have come to the following conclusions in answer to these questions:

1. Pre-occupied minds; thinking of something else not in connection with the work being performed.

2. Lack of discipline by foreman directly in charge. In neglecting to censure a workman when instructions given or rules prescribed are not adhered to.

3. Laziness, neglecting to do a piece of work in a safe way owing to fact that tools or equipment to make conditions safe are not right at hand.

4. Lack of personal contact between representatives of the safety department and the workmen. Too many go-betweens. The sincerity or seriousness of the subject being lost before reaching the men for whom intended.

The subject of safety on railroads is not an old subject, neither is it new. We have been carrying on in this work several years and I sometimes question whether we have made the strides we should have. But whether we have or not, it is a very evident fact that there is room for improvement.

It is very evident that the workmen must be educated more to think for themselves. Some will say we are doing that now. True, but something in the education is lacking or a greater improvement would be noted as to the number of personal injuries occurring each month. I know of no better suggestion than that safety departments be enlarged where necessary to provide more personal contact with the workmen, enabling the men to hear talks on safety by men giving their entire attention to this subject. They certainly can put the thought more forcibly to the men than any one giving safety work only one-fourth of their time, and perhaps not that. The cost of the department, of course, would increase, but I know from personal observations that such talks arouse interest, which tends to cut down personal injuries and in turn saves money. I would suggest a closer diagnosis of personal injuries.

Suggestions

When an accident occurs, it is a notice that something is wrong in one or more of these three things—material, method or man. Find the fault and make corrections necessary at once.

To the foreman in charge of crews I would make the following suggestions:

In pairing off men in hazardous work see that men are as evenly matched as possible physically and mentally. You wouldn't hitch a draft horse and a race horse to a heavy load and expect to get very far.

In the beginning of the maintenance year when forces are increased, when possible, pair up an experienced man with a man not so experienced. The experienced man can then watch and coach the inexperienced.

Demand discipline, and censure when necessary to maintain discipline.

In hiring men as new employees, watch closely for physical defec the man. A man not in good condition is a liability.

This should also be watched in securing extra gangs as it is al the old men generally, when a gang is mixed up in some accident, are usually hurt due to lack of agility.

Safety on a railroad must be met whole heartedly by each and e individual to be a success. There must be co-operation in all departm Get the safety habit and the rest will be easy, because "as a man thin so is he."

SAFETY FROM THE VIEWPOINT OF THE LOCOMOTIVE ENGINEER

Daniel J. Buckley, Locomotive Engineer, Baltimore and Ohio Rail Staten Island, N. Y.

For 36 years I have been constantly employed in railroad servic years of which I have spent as a locomotive engineer.

It seems to me that to get success in this safety work we must into it an absolutely unselfish spirit. Let us remember, also, that thr the assistance and the support we are giving our superiors, we ar proving our own condition. Let us remember that when we are tecting a neighbor or a co-worker, we are protecting his children. matter whose child it is, it is ours to protect. Let us remember, that in protecting those children and in doing this work, we are p up for oursevles a reward which we will enjoy long after our names faded from the lips and from the minds of men.

We have a great problem in the grade crossing. The idea of motor drivers nowadays is that the right of way belongs to the that gets there first, and for that reason whenever he sees the running parallel and he knows there is a crossing in the distanc steps on the gas to beat the train. He does beat the train, someti Motor drivers beat some of the trains all the time and all of the ti some of the time, but when we consult the records and find out within the past five years there have been upwards of 10,000 pe killed outright and almost 15,000 seriously injured, we know they beat all the trains all of the time.

On the Baltimore and Ohio Railroad we have made what we feel t a splendid record in safety and I will say that it is largely due to other than our chief executive, Mr. Daniel Willard.

Safety Achievements of B. &. O.

The Baltimore and Ohio began its organized safety work in 1910. Willard sounded the keynote when he said to the officials and thr them to every employee on that system that he wanted them to put sa before everything else in the discharge of their duty. He wanted a effort, an organized, a determined effort, one that would embody the that was in every employee from the highest to the lowest.

Those instructions were carried out through the able management of Mr. John T. Broderick and through the safety bureau maintained by the Baltimore and Ohio Railroad. Safety committees were appointed on every division. There are now 72 safety committees, composed of 1,127 officers and men on the B. and O. No matter whether you are a tinsmith, a carpenter, a locomotive engineer, or whatnot, you have a representative on that safety committee. That representative is the one whom you are expected to tell of all the unsafe conditions you discover on the company's property—unsafe practices engaged in by the employees or the traveling public. When they meet at regular intervals, monthly as a rule, they discuss everything for the betterment of the road, the safe transportation of passengers, and then steps are taken to correct or remedy any of those matters that need attention.

During the year 1923, there were 5,000 unsafe conditions reported and over 4,400 unsafe practices reported. At the close of the year they had all been remedied with the exception of 21 that had been dropped, and something like a balance of 400 uncared for. They have long since been taken care of. That it is expensive is shown by the fact that in the year there were 400 meetings held and upwards of 6,000 men attended those meetings. Every man was paid his usual day's pay. I'll wager to say the Baltimore and Ohio is spending $50,000 in wages alone in the support of the Safety Movement. I am speaking only of the wage side of it.

Are we making any headway? Let us examine into that. Comparing the year 1915 with the year 1923, the number of employees increased 50 per cent and the number of casualties had been reduced about 25 per cent. That is a splendid record, and we feel that as a whole on the Baltimore and Ohio System we have made for ourselves a record which is second to none in the country.

On the division on which I have been employed for the past 33 years we are handling between 10 and 15 million passengers annually, and not a passenger has ever lost his life, no one has been seriously injured so that death has resulted. I feel that that is a record that will compare favorably with the best that can be produced.

SAFETY FROM THE VIEWPOINT OF THE SHOPMAN

M. P. Capdeville, Machinist, Southern Pacific, Atlantic Lines, Houston, Texas

I have been a machinist for anumber of years, and assuredly long enough to realize the great benefits I and my associates in this service have received as a result of safety activities of this Council and Section and the increase in safety education generally which has followed their efforts to make working conditions in industry both safe and efficient, for I am one who believes that the two are so inter-related that they cannot be separated without both being effected. To be efficient one must consider all details looking to safety, and unless the workman figures

in the factors of safety as part of the job, continuity of occupation is to be broken and efficiency lessened because of it.

While fatal accidents in work conducted in shops properly and s equipped, are comparatively rare, there is however opportunity for time accidents because of the character of the work, the nature of materials employed, and the variation between human intelligence the tools of our trade. These accidents or their resultant injuries most cases, come from small causes, most of which are clearly avoid and within the control of the workers.

Familiarity frequently breeds contempt and some of us seem to bel that because we have "gotten by" for five or six years without desperate effort to be safe, that the process can be continued indefin and we unconsciously drop into methods and habits which represent line of least resistance, because it saves time, trouble and mental ef

In all shops you will find men of extremes. I know employees have worked for years without losing a day from injury and on the o hand, some happy-go-lucky chap who seems to put in a regular part of time in making out accident reports. The one man has practiced safet a factor of the job. The other never thinks of safety until he is an ob of first aid.

The general principle of safety is with all of us. We get it with first recognition of life; when we crawl, when we walk, when we rea that we suffer pain or discomfort from acquaintance with sharp e or hard surfaces. Yet when we have acquired this valuable knowle we often rise supreme in our own over-confidence, ignore our early les and invite disaster by an acquired carelessness and a disposition to t a chance.

It is in the details of safety that a jinx lies and to ignore these det creates the hazard.

The Guarding of Machinery

In the shops of the Southern Pacific, each machine is properly conspicuously guarded. Gears are enclosed, pulleys and belts fenced weights are in cylinders, openings in machine bodies covered v netting, drills and presses protected and set screws sunk. Grind wheels are fitted with glass screens, avoiding the necessity for gogg tools are reguarly inspected and made safe. pulley shafts oiled at lu hour, electrical appliances insulated, plugs and switches inspected, ja and air tools watched and all physical appliances made as fool pr as possible. Thus the hazard is reduced by the management working v safety committees, but what can be done to cure the evils of commis or omission when the human factor is the element to be conside except by education?

Rules provide against the use of gloves and loose clothing about mov machinery; that screens be used in chipping and against all flying pa cles; that proper wrenches be used; that goggles be worn in cer occupations, and a score of other proper methods be made part of day's work, yet it is from a non-observance of these rules and a disreg

of safe practices that the greater number of the injuries occur. Material falls from benches, from locomotive boilers, running boards, car roofs, because of careless practices. Men fall from scaffolds; while walking; while carrying material; from sloppy shoes, fall over objects placed in runways, and about their work because of disregard of proper clearance.

With only two eyes, workmen take desperate and unnecessary chances every day. In one year on our lines 524 accident reports were made out for miscellaneous eye treatments, 244 from injuries received while chipping, drilling and etc., but only 29 received while using grinding wheels. Fortunately very few represented real loss of time and only one or two classified as serious. Again—171 cases of sprains, 144 slipping wrenches, 194 hand tools, 139 falls of persons, 239 falls of objects, 186 splinters and sharp edges, 106 from nails, but only three from gloves or loose clothing and thirteen mild infections due to failure to apply for attention—all of these irrespective of time lost or not.

In Southern Pacific main shops, first aid stations in charge of competent nurses are located and their use is mandatory and of wonderful value in keeping down reportable injuries. Emery wheels are dressed and aligned every day, ladders are being eliminated in working about and on locomotives and double steps substituted. Safety zones five feet wide are features of all shop aisles, marked by white lines—these are kept free of material. Scaffolds are of extra strength and width and scrap material is not permitted to accumulate. In all departments, warning signs are placed to protect men working in hazardous locations. Men working on electric lines are protected by thrown switches and warning tag. In other words, every necessary safeguard is placed about the occupation, but what can be done to make a man always look where he strikes, properly adjust his wrench to the nut, block objects apt to roll; bend the protruding nail, and do the score of things so necessary to protect himself and associates?

The things I have mentioned are features of every well operated railway shop. The factors always present, but which differ as to location, are those which are represented by a generous and sympathetic co-operation between the men and the shop supervisors. Nothing is of more importance nor of greater effect as affecting shop safety as this element, so predominant on our railroad. The foreman and his men working together as a family—each considering the other in relation to the work and as man to man, will mark the high point in efficient and safe operation. The human side of work and life cannot be omitted nor disregarded. There must be mutual respect and esteem. These absent, and the result will be apparent.

Co-operation Is Needed

Then again the men must be brought to a realization that safety is not a mere phrase, an empty profession. There must be a constructive effort to make working conditions safe. Then we have a firm basis for demanding the establishment of safe practices. It is then a 50-50 proposi-

tion, and the men, sold to the benefits of both safe conditions and tices become real converts, ready to practice safe methods; to edu the newer and younger men, and to co-operate with a pride in the ac plishment of their establishment as a whole.

Satisfied employees are often the answer to many problems encount in shop work, and the output is frequently affected one way or the c by this fact. If foremen and men get on well together, and the empl knows his supervisor is earnestly interested in the safety of his men anxious to make a real record of efficiency they will back him up tc limit, but if the foreman is luke warm, or shuts his eyes to rule viola and shiftless methods, they take the same attitude and demoraliz follows. There must be a firm discipline, but it should be kindly. A must be maintained as a rule or the shop would be better off witho One regulation ignored and all regulations will suffer as a natural re

In the interest of safety, foreman should keep in touch with his know when they are injured, set up with the case both in the intere the shop and the employee and make the employee understand work is appreciated and that the shop needs him. There will be f days lost under this method and less disposition to take advantag slight injuries as a means to a prolonged lay off.

Southern Pacific is making a fairly good showing, even while not ing reached the minimum. In our Houston shops, there were 145 re able injuries in the first seven months of 1923 as compared with 67 the same period of 1924, a decrease of 78 or 54 per cent.

Our El Paso shops employing 1,000 men operated seven months wit a single reportable injury and making 1,079,526 man hours. Our Algiers shops worked six months of this year with only three report injuries, or 438,492 hours per injury, while all mechanical emplo worked 105,176 man hours per reportable injury in June.

Our record may not be the best, but we have been improving an the education of the individual worker becomes more intense, and fealty to the cause of safety greater because he realizes it is his we will make a better one.

Safety is the watchword of the times. The cause is progressing ev where and properly, so what greater incentive to safe practice can t be than the knowledge that human life, suffering, human happiness comfort are included in its precepts as well. Railroad shops are a part of railroading as we all know and mechanical ability somethin be proud of, then why should not all of us who labor, do so with the we have, giving as well as receiving and bending every effort to m our occupation safe, profitable and of value to the institution we se It does not require a college graduate to point the way to safety, for road is broad and before us if we will tread it. In my work as a sa committeeman I have for years done what I could to keep the sa standards all along the road well in sight, and the Lord helping m shall always do my best to keep the road open.

SAFETY FROM THE VIEWPOINT OF CONDUCTOR

H. E. Butler, Conductor, Nashville, Chattanooga and St. Louis Railroad Atlanta, Ga.

A train conductor is either an asset or a liability, and it seems to me that from every standpoint it is to his interest to be an asset. Aside from the principle involved it would be to his interest from a selfish standpoint. First, he should know, and then he should know that he knows, his duty. Then he should put it into practice continually, exercising at all times supervision over the men under him, not permitting them to select their own methods of doing things, unless those methods are in keeping with the rules and the practices of safety.

I will ask you gentlemen to pardon me for personal reference, but I wish to give you the benefit of my experience as the basis for my argument on the question of safety. I have worshipped at the shrine of a railroad for 39 years, coming through various classes of service to the position of train conductor. I have been in charge of a train for about 25 years, and in those years of service I am proud to say that I have only 10 demerits for indirect responsibility charged against my efficiency record.

Every man should strive to make himself an indispensable factor to his railroad, and it is not impossible for him to do that. If a man is not up to date and safe, he will be a fossil in the railroad world.

Co-operation is one of the things that I have found necessary to successful train operation. We must have harmonious co-operation.

The unconsidered act of a man, his failure to reason, may cause the loss of many lives and of much property of great value. The result of carelessness finds no remedy. A careless blacksmith in shoing a horse causes lameness. The careless workman in repairing the compass of a ship disarranges it and the ship loses its course.

Safety is founded on that bit of Scripture, "Love thy neighbor as thyself," and if you do you will recognize the right of your neighbor to be entitled to the same identical protection that you yourself are entitled to Give it to him. A man may say that he is a creator, that he is created as a creator and has the right to create. I grant you this so long as he doesn't create an unsafe condition that will injure either man or beast He has no right to do that.

Gentlemen, all our railroads have for sale is transportation. This transportation is sold to the public. The only property of a railroad company that earns money is the property on wheels, and that only while in motion. When a train is conducted safely from one terminal to another it is profit; otherwise it is loss. In view of the fact that our compensation comes from the pockets of the public, it is our duty to give back to the public value received for that compensation.

The inland transportation of our country is conducted by a railroad system which is described as "arteries of commerce," and today commerce and communication constitute the life and prosperity of a nation

and must depend mostly for successful operation upon the men who m the trains. Into their hands is entrusted the care of our internal c merce. It may be surmised that in the service of such great respo bility, those who engage should be men with the courage and the zea at all times at all hazards faithfully perform the duties allotted to th

Our railroads stand first among the railroads of the world, and to gu the safety of passengers and of property is every railroad's most portant obligation. Likewise it is the duty of every employee to be n zealous in guarding the safety of the lives of passengers. A true r road man will stand like a soldier on guard, appreciating the fact t he is on guard, not againts a hostile enemy but against a possible disas

Every company is operating according to a set of rules and inst tions specifying truthfully and clearly the tasks of employees. Into set of rules goes the knowledge of safe railroading which has been tau by years of experience, and it is only by each man's constant care watchfulness and by all engaged in the service faithfully obeying rules that safety can be assured and accidents can be avoided. A r road man's duty, therefore, is a clear understanding of and strict ob ence to rules.

I would invite your attention to precaution. That is one of the n valuable words in our rule book and if we would always be gover by that one word in the rule book accidents would not happen. T measure adopted beforehand would prevent mischief.

One of the greatest things that a man can do to secure safety on a r road or anywhere else is by training the mind. Our minds are like unto a vegetable garden. If the seed is sown it will produce its kind; i is good it will produce good; if bad, it will produce bad. If no seeds ar are sown, wild seed will gather there and flourish.

All the conveniences that we enjoy, all this busy, bustling, indust world of ours is the product of thought. No more searching the wo for pine knots to have a light in the home, no more making of tal candles, no more trouble with our kerosene oil lamps. Even the far can press a button at his front door and illuminate his home.

When we learn safety let us not be selfish with it. Let us teach i somebody else. Remember that the hand that places the delicate pi in the wrist watch is the same hand that pulls the throttle of the l motive; the hand that performs the operation on the human body is same hand that manipulates the bell cords. Every service that h performs safely is but the guided service of a thoughtful brain, and w we get safety spread through our system the thought will function t way.

Let us spread safety in places where the seed is not growing.

SAFETY FROM THE VIEWPOINT OF THE TRAINMEI

F. G. Kileen, General Chairman, Brotherhood of Railroad Trainn
Wabash Railroad Company, St. Louis, Mo.

There isn't any necessity of advancing new doctrines in regard safety. All that is necessary is keeping in mind the important det

and the great motto, "Play Safe." These details and principles never change. Safety isn't new. It is as old as the eternal hills. When Adam and Eve left the Garden of Eden they took with them into a new and strange world a sensation of fear and the instinct of self-preservation, and the combination of the two produced the spirit of safety. It was the child of necessity, born of hardship and danger. When the first man of the human race sharpened a stick in the shape of a spear for protection of himself and mate from the beasts of the jungle, he instituted the Safety Movement. In a crude way, the only way conceivable to his ape-like intelligence, he was preparing for the safety of himself and his loved one. And down through the ages the idea has grown and developed until men like you make a regular business of teaching safety and hold meetings like this to exchange ideas on the subject. I am of the opinion that the success of safety work lies with the individual, but there are certain cardinal principles in regard to safety that apply alike to all men in what-so-ever their walks of life, and if we are well grounded in these principles and observe them, we are of necessity bound to observe the hazards of each and every particular branch of industry and apply those principles to those hazards. It has been only a few years since we as a nation sent four million of the flower of the country over seas to fight a foreign enemy on his own battlefield. Some of them died, and some of them returned to languish in hospitals in this country. All of them performed a service. We said we sent them to save the country. We think they saved it; but did they? A country worth dying for is worth living for, and there is where you and I, who did not carry a gun, come in. It is our duty to carry on now that the war is over by living for the country. And how can we better do that than by preaching the doctrine of safety.

We talk of our great nation and forget that a nation cannot long remain great at such a terrible expense to its man power. A nation of cripples cannot long remain a front rank nation. It is your duty and mine as citizens to see that by preaching the doctrine of safety we instill in our minds and the minds of others the principles that prevent accidents.

Crossings

"Cross Crossings Carefully," is a good slogan. On my vacation I saw it with the picture of the locomotive and the automobile at almost every crossing. For many years the locomotive was the only end of the crossing game that I knew. Since then I have learned the motorist's end also. All of these slogan signs were placed on the poles facing the highways, where every driver, if he but used his God-given sense of sight, couldn't fail to see them. That placement was correct, but there should be a poster on the other side of the pole, so that every member of the train crew can see it. While there are many driving automobiles who should be in an institution for the mentally incompetent, that does not give us the right to kill them off. The highways under the law in most of our states belongs equally to the autoist and

the railroad, although the railroad is allowed certain priority of pass if proper warning is given of the train's approach and desire to the crossing. Let us educate the forgetful ones among the train ser men to the necessity of those warning signals. On this trip of mi crossed several crossings where the engineers were forgetful, or igno of the location of the crossing. A pound of steam expended in so ing the whistle for a crossing may save several lives, a lot of mi and a damage claim.

Speaking of damage claims reminds me that, often, from the t men's point of view, the railways seem more interested in avoiding payment of a damage claim than in conserving life and limb. I h had men tell me many times that the company was interested in sa only from a monetary standpoint, only because fewer accidents m less money paid in claims. These men may be right and they may be. Personally, I do not believe this to be true on the majorit railroads. I am from the Wabash, and I am conceited enough to bel that there is not one of the officers of that system but would sorry to hear that one of their men had met with an accident. T would feel sympathy with the family of that train man were h die, and it is the same with each of you. Strange as it may see have now and then even noticed humane qualities in railroad offic But what if the company is interested in the safety of its train men from a monetary standpoint? It really doesn't make any differe I would rather have the company interested in the safety of the t men on the Wabash because of the dollars involved than not to h it interested at all. My safety is a personal and individual thin thing in which I am deeply interested, and if someone else is interested in my safety sufficiently to prevent an accident to me I thankful for that interest regardless of the motive back of it. Furt more, I care not how many dollars the other fellow makes, so lon he leaves me with two good eyes, two good hands and two good f with which to make dollars for myself.

It is a habit among all classes of railroad men to put the bl for all accidents at the door of the company. *I would advise gentlemen in discussing safety with the train men to keep before t the fact that we are all a part of the company.* The interest of company should be the interest of each and every employee. I re sent some 2,000 men employed by a railway company and each every one of those men is a very important part of the company. railroad could not operate without them. When you say that an a dent is the fault of the railroad company you are saying that it is fault of each and every one of those 2,000 men, and of the other and women who work for that company, from the president dow the call boy, including the board of directors and the stockhold Accidents are not the fault of the company. Accidents are the faul some individual or collection of individuals connected with the comp It may be the president, a machinist, a track walker, or a train

Negligence and thoughtlessness cause accidents and both of them are the acts of individuals. If the trainmen's orders are mixed it is because some dispatcher forgot. If it is a bad rail that caused the wreck, it is because the board of directors did not appropriate sufficient money to purchase good rails, or because a section man failed to observe it and change it. If a brakeman catches a loose grab iron, some member of the car department wasn't on the job. All of these are individual acts. The law, of course, says that the company is responsible in damages, because the company is responsible for the acts of its servants. You and I must suffer for the acts of another if his negligence injures us.

Habit

It is a psychological law that repetition makes memory. It is a law certain by experience among railroad men, that repetition makes for carelessness. The constant doing of the same thing over and over again without dangerous results cause the train man to forget the precaution. Because he has never been injured he is lulled into a fancied security. This is, I believe, the cause of a large percentage of the accidents among train men. What Pope says in his essay on man with regard to vice is applicable to accidents in the railroad service:

> "Accidents are monsters of such frightful mein—
> That to be hated need but to be seen,
> Yet, seen too oft, familiar with their face,
> We first endure, then pity, then embrace."

When you make the train man fear an accident as he fears a contagious disease, when you can cause the average man to avoid an accident as he avoids contact with smallpox or diphtheria the problem will be solved. Accidents will be reduced to a minimum. They will be caused by conditions over which human thought, human care, and human ingenuity have no control and not as now by carelessness, thoughtlessness and neglect.

The thing that I want you men to most strongly impress on the train men is that safety is an "up to you" proposition. That each one of us is responsible for his acts, that when it comes to our own safety or the safety of our fellow man, each is the guardian of his own actions. We should become imbued with the idea that "the sin we do two by two we must answer for one by one." Any slightest act of ours may cause someone to be maimed. The act of another will cause us to be maimed. When the mother of Achilles dipped the infant Greek into the River Styx she thought he was invulnerable, but she overlooked the spot on his heel by which she held him, and thereon hangs the tale of the mighty warrior's down-fall and the triumph of his enemies. We mortals are not so well equipped as Achilles. We are vulnerable all over. We have more to protect than the heel, so we should be doubly cautious. Don't overlook any act, be certain everything is all right, *Be Safe*. Let us build a nation of men instead of a nation of cripples. Let us train for the future. Let us make ourselves and others safe.

THURSDAY MORNING SESSION

CHAIRMAN METCALFE: We have in the room with us this morn Mr. F. T. Singleton, Commissioner of Public Service of Indiana. I won if Mr. Singleton would take a minute or so and address a few rema to us. We are deeply indebted to officers of this kind throughout nation for a great deal of support that we get in our safety work.

MR. F. T. SINGLETON: I did not ask for this opportunity, but I am v grateful for it. Governor Branch, of Indiana, has directed the Pu Service Commission of Indiana to call a state-wide grade crossing sa conference for October 14 and 15. The desire is to create a permar organization that will function every day in the year for safety to serve life and limb and property for Indiana. I hope many of you may there.

SECRETARY COTT: So far as my records show, we have 57 railroads re sented at this conference. There are probably a few more, some of representing some two or three railroads. I have that information f a number of you.

I want to read to you the results of analysis of the occupations of sa officers prior to their becoming safety men. It is very interesting. majority of you gave me this information, which, of course, I keep c dential, and here are the occupations held by 63 safety officers prio entering safety work. These 63 men represent 237 different positic 1, messenger boy; 1, water boy; 3, call boys; 4, section men; 1, as laborer; 1, shop laborer; 13, clerks; 1, assistant chief clerk; 15, c clerks; 1, secretary to the superintendent; 1, secretary to the gen superintendent; 1, secretary to the general manager; 1, secretary to president; 2, stenographers; 2, timekeepers; 1, supervisor; 1, forema bridges and buildings; 2, rodmen; 1, assistant engineer; 1, construc engineer; 1, assistant chief engineer of construction; 1, assistant c engineer of maintenance of way; 1, civil engineer; 1, valuation engin 1, division engineer; 4, mechanical apprentices; 8, mechanical tradesm 1, car inspector; 1, roundhouse foreman; 2, shop foremen; 1, assis general foreman; 1, general foreman; 1, maintenance of equipment t nical educator; 1, supervisor of locomotives; 1, piece work inspector mechanical craftsman; 1, motive power inspector; 1, test departm inspector; 1, master mechanic; 1, testing engineer; 1, apprentice sc supervisor; 1, storekeeper; 1, general storekeeper; 1, car checker switchmen; 2, assistant yard masters; 5, yard masters; 13, brakem 14, conductors; 11, firemen; 6, engineers; 2, road foremen of engi 1, switch tender; 3, assistant train masters; 7, train masters; 3, assis superintendents; 4, superintendents; 1, general superintendent; 2, a tants to general manager; 13, telegraph operators; 6, dispatchers; 4, c dispatchers; 10, station agents; 1, inspector of stations; 1, station mas 1, freight trucker; 1, warehouseman; 3, cashiers; 2, inspectors of tr portation; 1, superintendent of transportation; 1, insurance inspector first aid attendant; 1, secretary to hospital board; 1, traveling car ag

1, agent's helper; 1, employing agent; 1, instructor of courtesy; 1, assistant marine superintendent; 1, engine dispatcher; 1, special agent; 1 chief special agent; 3, train rule instructors; 1, superintendent of insurance; 8, claim agents; 1, law agent; 1, attorney.

This means 237 different railroad occupations represented by 63 men now giving practically their entire time, thought and study to safety which is an answer to any one who says that the safety officers of the American railroads are not practical railroad men.

PRESENTATION OF SAFETY INSPECTORS' PROBLEMS

J. A. McNally, Safety Inspector, Wabash Railroad Company, St. Louis, Mo.

In my opinion the greatest problem confronting a safety inspector is the human element. If you have 5,000 men to look after, you have 5,000 problems to solve for, like the leaves on the trees, there are no two alike. It is very hard in some cases to convince the employee that the Safety Movement is for his benefit. Poisoned propaganda gets to him first through different channels, and when once the seed of doubt and criticism is planted into the mind and brain of the employee, it is indeed difficult for the safety inspector to destroy this seed and transplant the seed of safety.

Another big problem for the safety inspector, is to have the railway company officials back him up in different suggestions on unsafe conditions and practices, to see that, when practicable, all items will be given early attention. There is nothing that will cause the employe to lose heart and faith in the Safety Movement more than to have the company show a lack of interest and fail to correct the unsafe conditions and practices when called to their attention. On the Wabash Railway I have found it very difficult to get men to wear goggles on eye-hazardous work; they seem to prefer wearing them on top of their caps or in their pocket. I have appealed to these men at mass meetings and individually, for the sake of wives and children at home, to protect their eyes, but in going through the different shops I found men doing eye hazardous work and not wearing goggles. I adopted the only solution that I could think of and that was the use of discipline. It is a strange man indeed that would make it necessary for a railroad company to discharge him if he failed to observe the rules of safety. I believe a good many railroads are using discipline for violation of safety rules and are having wonderful success in reduction of accidents. With the exception of the goggle rule, the Wabash Railway has not used any discipline on reports coming through the safety department, with this result. In September, 1918, safety became a fixed department on the Wabash. The average number of men employed was 16 to 18 thousand with an average number of 212 reportable injuries per month. The

Another important problem for the safety inspector is gettin enginemen to comply with whistling rules, in order to prevent cr accidents. Until highway crossings are entirely eliminated we will crossing accidents, but they can and have been reduced to a great by sounding last blast of whistle right up to the crossing and, necessary, giving second crossing whistle signals. For a long ti has been a common practice for trainmen and switchmen to kick draw bars at time of coupling. This indeed was a big problem to but it has been accomplished on the Wabash Railway, without disc In order to do this it was necessary to have the superintendent, master, trainmasters and assistants, go right along with us to ke a continuous method of education, with the result that up to three ago the average number of trainmen, switchmen and conductors lost a hand, foot or life going between cars at time of coupling wa ning about six a year. In the past three years we have had onl man lose part of his hand by following this unsafe practice. I hav had considerable trouble at our freight houses, getting the men to run-boards from car to platform, but this problem was finally through the co-operation of freight agent and freight foreman.

Preventing Motor Car Accidents

The problem of preventing motor car accidents also confront safety inspector. For a long time we were having on the Waba large number of accidents to section men on account of tools falli and derailing car, men falling off car on account of no grab iro railing on cars and also getting hurt getting on starting car. By tional means, these accidents have been prevented. Tools are no mitted on front of car, grab irons have been put on all motor car the men are instructed to get on at the rear end of cars. The def tools for section men was another problem for the safety inspector. problem has been solved by the company by putting a supply tr service, making each point about every 60 days; previous to that when the section foreman had a chisel with good cutting edge, would not turn it in for repairs, regardless of how bad the head be burred, but by keeping after these men, explaining the dang burr head tools, I finally convinced them it was the safe thing to d

Another problem, and one of the hardest I have met, is gettin inspectors to live up to the blue flag rule. In too many cases the i tors, in order to save a walk and a little time, will put on a hose, pin lifter, crawl under and tighten a union in the air line, using t excuse, "it only takes a minute" and not protect themselves with flag. Again we used the successful method as in other cases, of h the man in charge directly responsible for injuries in his depart with the result that to see a man go under or between cars withou flag protection, is a rare thing on the Wabash, and accidents o nature are very few.

From September 1918, to September 1923, our largest number of ies was among the shopmen. With 5,500 shop employees the in

were running between 80 and 100 every month. In September 1923, we started a competitive system between shops, offering a safety banner for prize to the shop making the best safety record in a six months period. The result of this method was very satisfactory. The injuries to shopmen are now running about 15 per month. By an analysis of all shop accidents, we found 97 percent were due to thoughtlessness and carelessness on the part of the man that got hurt or some one working with or around him. By continuous pounding on this subject we are bringing shop accidents down to a bare minimum.

The problem of getting men to wear proper clothing and shoes has always been more or less difficult. Some of the employees, thought it was their business what kind of shoes or clothes they wore. We have been insisting that men wear one-piece suits of overclothes or, when wearing two-piece suits the jacket should be inside of overalls. Shoes should be heavily soled; men should not wear long flowing neckties, gloves or rings when working around machinery. The majority of men fell in line and it was only a question of time until all of them got in line.

In order for the safety inspector to make a good safety record it is necessary for him to have the fullest co-operation from every foreman. In my experience I found where the foreman did not push safety, there I would find injuries. The day is fast approaching when the foreman's chances for promotion will depend to a greater extent on his safety record.

We have often heard the remark, "As long as we have railroads we will have accidents." Probably so, but I firmly believe the time is not far distant when the accidents will be only those classed as unavoidable.

(J. A. McNally assumed the chair at the request of Chairman Metcalfe.)

DISCUSSION

MR. C. W. HAMMOND (New York Central Lines, N. Y.): Did I understand you to say that you don't take men out of service?

CHAIRMAN MCNALLY: We have not done so yet.

MR. HAMMOND: We find that it has been necessary at times on the New York Central to enforce discipline, with the result that it has decreased accidents on our lines. You say that you have about 20,000 employees with 20,000 whims. If that be so, we have 175,000 employees with 175,000 whims, and we are formulating rules that will make it obligatory for them to follow. We believe (and this has been my experience) that it is necessary to have rules for the government of the operating department.

CHAIRMAN MCNALLY: I didn't want to be misunderstood in explaining the discipline of the safety movement on the Wabash. I meant that if a man would turn in to his foreman or the train master a report that he saw a man violating a safety rule, our method would be to take the man into the office and talk to him. We have never had men go so far

as to violate this rule enough times to cause any discipline, b book of rules on the Wabash is to be obeyed, and any violation of rules would mean discipline. It does mean if a foreman sees doing something he should not do, after he has done everything to make a safe man out of him and doesn't succeed, then he ca discipline, but not through any report of a safety committeeman.

MR. RAIN (Santa Fe): I believe most railroads when they blue f to place the blue flag on the locomotive where it is placed now. We to keep the car man from being killed. In all fairness to the engi think that position should be changed either to a socket at the s his seat box or at his arm rest by the side of the cab so that he chance to see it.

CHAIRMAN MCNALLY: I believe most railroads when they blue fl engine also put a tag on the throttle. We do that on the Wabash tag is "men working underneath."

MR. RAIN: Is it customary for the man to tell the engineer?

CHAIRMAN MCNALLY: Yes.

Wearing of Goggles

MR. C. T. BAILEY (Oregon Short Line, Salt Lake City): We hav recently promulgated a rule in our shops requiring all supervisor visitors to wear goggles when passing through the shops, and pa larly with reference to the foreman. I had occasion to check one large shops recently, and I found 67 men working at hazardous with their goggles on. The superintendent of motive power came to the shops to make a visit. He took the superintendent of shops him, and as they entered the main shops the superintendent of m power said, "John, I forgot my goggles; I'd better go back out." didn't go through the shops without his goggles. We have found th examples set by the foremen and the supervisors in wearing thei gles has a very beneficial effect on the men. I believe that shou placed in effect in all shops.

MR. W. L. RICHARDS (Union Pacific): I would like to say a few in regard to our practice in regard to blue flagging locomotives. the application of the blue flag we have a little bracket that has spotwelded to the cab right underneath the window. When the insp comes along to put that blue flag up, he shouts in the cab, "Blue fla and under our bulletin rules no part of that engine can be move reverse lever or anything of that sort, while that flag is up. Whe inspection is made he calls "Blue flag down."

MR. JOS. T. PRATT Reading): The Reading has a clamp on the flag that fits right on the running board in front of the engi window. He can't help but see it.

MR. WM. F. JOHNSON (New York Central Lines, Cleveland): We our engineers; we also notify them when we take the flag out. In way we eliminate any possibility of an accident.

MR. W. L. BOSLOOPER (Michigan Central, Detroit): Do you have the list posted throughout your shops enumerating the different kind of work on which it is required to wear goggles?

CHAIRMAN MCNALLY: We are getting that up now. It will be covered by the new set of rules that will be presented to the general managers' association through the A. R. A. department. We have no special rules yet.

ORGANIZING AND MAINTAINING INTEREST AMONG COMMITTEEMEN

H. S. Corbin, Supervisor of Safety, Atlantic Coast Line Railroad Company, Wilmington, N. C.

Assuming you have the full support of the managers, superintendents and foremen, it is highly important that the secretary be a believer in the principles of safety as carried on through the organization of sofety committees. The secretary is an important factor in the work of maintaining interest among safety committeemen. His opportunities for doing constructive work in this direction are many, because he has the advantage of intimate association with members of his committee and other employees. The secretary should be made to feel he is part of the organization and that much depends upon his interest and efforts. Promptly notifying members sufficiently in advance of the date of meeting, posting notices of meetings on bulletin boards and other places where the employees congregate will help to insure full attendance of members and often bring visitors, which is without doubt necessary in maintaining interest.

On the Atlantic Coast Line Railroad the work of the secretary is regarded as of sufficient importance to justify bringing them together for annual conference. For these conferences a regular program is arranged and each secretary assigned a subject to be discussed by other secretaries. Minutes of the meeting, along with copies of papers presented and subjects discussed are furnished each secretary, who in turn passes them on to members of his respective committees to be read and returned with any comment they may care to make. Preparation of papers on specific subjects and the discussion of them arouses interest among the secretaries and broadens their knowledge along lines of accident prevention work. Members of the committee are brought closer to the subject and their interest is maintained.

One cannot over-emphasize the importance of the personnel of a safety committee, which later must determine the amount of interest necessary to maintain within the organization. Committeemen should be selected by the employing officer, assisted by the foreman or some supervising officer having intimate knowledge of their qualifications to serve in such capacity.

In addition to the committeeman's knowledge of unsafe conditions and hazardous practices, he should possess certain personal qualifi-

cations. First, he should be a believer in safety and capable
vincing others of its real value. Second, he should be a leader o
free of prejudice, hardness of heart, spirit of grudge, and by h
action set the example for others to follow. He should convin
men he comes in contact with that his appointment is not f
purpose of reporting other employees to their superiors. Inste
object sought is to correct unsafe conditions and hazardous pra
to show that the interest of the employee is identical with that
employer. The two are inseparably connected and may be co
thought of as one. It must be understood that what is needed is
degree of co-operation—a better understanding of one another.

Methods of Maintaining Interest

There are many ways of maintaining interest among safety com
men. To begin with, it is well that you satisfy yourself that th
selected to serve on the committee has the interest of the safet
at heart. Then, to maintain that interest, requires constant eff
the part of the chairman, the supervisor of safety and the g
safety committee, or the central organization. In dealing with th
ject I have used only such thoughts and suggestions as have be
into practice on the Atlantic Coast Line Railroad. Members of
committees should be given something to do other than mere re
of unsafe conditions and practices. They must be given a more
part in the work and made to feel that the success of the com
depends upon the individual support of each member, the suprem
being to arouse interest in the work among all employees to the
that they will realize that safety is just as important to them
work they perform.

Of the many agencies for arousing and maintaining interest
committeemen I know of none more justified than the supplying of
bers with information along educational lines, such as data conc
accident prevention, frequency of certain classes of accidents an
parative statements with other months of the year, and other or
tions working in the interest of safety. Pamphlets supplied b
National Safety Council and information gained through the co
of the *National Safety News* provide helpful information for
workers and may be used to much advantage in promoting a
interest spirit.

Another feature of vast importance is a monthly news let
information for safety workers, which should consist of contribution
members of safety committees, information concerning certain c
of accidents, noticeable by their frequency, their causes, and m
for overcoming them, also articles taken from railroad magazine
plant publications that will excite interest.

Knowledge in every occupation is the surest basis for success.
value of educating employees in accident prevention lies in their
matically watching out for ways in which men are injured and c

to realize that more men are injured through lack of thought than through mechanical causes.

Nothing has been said of the many other ways previously suggested on this subject, such as well prepared bulletins and the attractive manner in which they are posted on bulletin boards, safety rallies, proper and prompt handling of suggestions by chairman, discussing of safety in brotherhood meetings, rotation of committees, membership cards, safety emblems and awards for special accomplishments in connection with the Safety Movement, all of which may be used to good advantage in maintaining interest among safety committeemen.

The Safety Supervisor

To my mind the safety supervisor, or inspector, has a large part in maintaining interest among safety committeemen. He has opportunities for direct contact with supervising officials and keeping informed on the whole subject of safety as it applies to the different shop plants, terminals and sections of his territory. He stands next to the workers and handles detail that the superintendent and master mechanic know little about, thus enabling him to secure the co-operation of the officials in devising ways and means for awakening and maintaining keen interest on part of members and committees. For, as we all know, the functioning power of a safety committee is dependent upon the degree of genuine interest which its members have in the work. The safety supervisor should be sufficiently interested in his work to keep informed as far as possible regarding accidents, and should secure statistics pertaining to accidents, showing character and causes. This information when properly used should stimulate interest and give a broader view of the possibilities of the committeeman, and should develop a spontaneous impulse for greater activity.

Originality is one of the many qualifications for a safety supervisor. Failure to employ original methods will in time bring about a feeling of lack of confidence in one's self. No one who lacks confidence in himself can hope to win the confidence of others. The safety supervisor should not be afraid of being considered egotistical. However, it is not wise to make one's belief in himself conspicuous, or unpleasant. A certain amount of levity and humor will often help out of a difficult place, and bring around the fellow who is hard to reach in any other way. Sometimes, though, the mistake is made by not taking ourselves and our work seriously enough. If we are inclined to look on our work as a joke it may be pretty certain that those we come in contact with will regard it as such. They will refuse to take us seriously when we approach them on a really serious matter.

DISCUSSION

MR. BAILEY: I would like to ask a question with reference to rotation of membership on safety committees. About what period do you consider sufficient service on the safety committee?

MR. CORBIN: We consider once a year. We change every yea

MR. JOHN J. HEAVEY (Erie R. R., Huntington, Ind.): What is eral practice in the selection of those committemen? Does the committeeman select his successor? I would like to get an ex from some of the superintendents on that point.

CHAIRMAN MCNALLY: The Wabash lets the retiring commi select his successor every six months.

MR. CORBIN: On our road the master mechanics and the gene men or the superintendents and train masters, in other words th vising officials, select their committeemen because we feel th are better informed as to the man who is most capable of servin committee than probably the men who are retiring from the co

MR. HAMMOND (New York Central): It is our belief that th agent is fully qualified to know who should serve on that commi haps better than the shop superintendent. Therefore, when a n mitteeman is put on a committee, the safety agent is consulte who would be the most logical man to serve.

I think that one way of keeping the interest of the committeeme be to have good, short, snappy meetings rather than long, dr ones. I have oftentimes attended meetings that would consume ei nine hours' time, whereas another superintendent or division would handle approximately the same amount of work in three hours. You probably agree with me that when you sit in mittee meeting for eight or nine hours you begin to become so restless. It is our belief that a good, snappy meeting, not ove any debts but getting busy and doing the work in a limited le time, is much better.

I think a great deal of thought should be given to the personne committee.

MR. LOUIS HANSEN (Union Pacific; Omaha): We find that by c these committeemen every three months we stimulate more among the men. That gives them all the chance to go on as agents.

CHAIRMAN MCNALLY: How often do you hold your meetings?

MR. HANSEN: Once a month. We have about a four-hour sessi changing every few months these men all get a chance to serve.

MR. J. R. NUTTER (Louisville Div., Pennsylvania): We chan committee members every three months, and the man who has as a member of the committee becomes an ex-officio member for l he takes the same active interest in the safety work while he is officio member as he does while he is an active member. As an tion of the interest on our road, I would like to say that we of our local committee here this morning.

Holding of Meetings

MR. F. W. MITCHELL (N. Y., N. H. & H., New Haven): How o you hold your meetings on the Pennsylvania?

MR. NUTTER: Once a month.

MR. LENDERKING: (Baltimore & Ohio): We hold our metings once a month, and we elect the members to succeed one another every six months. We permit, however, the retiring member to select his successor. We feel that the man who serves on a committee is better acquainted with the feeling of those with whom he works, consequently we believe that we get better results by having each member select his successor.

In our safety meetings we are supplied with propaganda or letters portraying what has occurred on the various divisions in the way of accidents. That is disseminated by the chairman, and we find that it is frequently a topic of conversation in the shops and other places.

MR. BOSLOOPER: In maintaining interest, I think the division or shop superintendent who is chairman of the committee should be persent and require the heads of the departments who are members to be present also, instead of sending substitutes. Otherwise employee members lose interest for the simple reason that the substitutes have no authority to assume responsibility for the correction of conditions or other items that are brought up.

MR. CORBIN: We feel that on the Coast Line when we allow the master mechanics and the general foremen and the superintendents and the train masters to select their men who are to serve on the committee, we are placing a certain amount of responsibility on these operating officials for the result that they are expected to obtain, which is just as important as if they were going to employ a new man. If a man is retired out of the shops or retired on account of old age you certainly wouldn't ask him to find another man.

MR. J. F. GRODZKI (Oregon-Washington R. R. & Navigation Co., Portland): I would like if the safety committeeman appoints his successor or whether that successor is appointed with the knowledge and advice of the head of the department that is represented by that committeeman. Does he just appoint the man who comes and serves on the committee?

MR. HEAVEY: I will answer that for the Erie Railroad by saying yes.

MR. LENDERKING: When a conductor retires he appoints or elects a conductor in his place; likewise does a brakeman or engineer or fireman.

MR. GRODZKI: Is that done with the approval of the head of the department?

MR. LENDERKING: Yes, and voted on by the members present.

MR. D. E. SATTERFIELD (C. & O. Ry., Richmond, Va.): We have no hard and fast rule, but it is customary with the committees on the C. & O. to have the retiring committeeman not elect but suggest to the chairman who is the superintendent of the shops or the superintendent of transportation, his successor.

MR. H. H. LARSON (Union Pacific, Omaha): On our railroad we leave the selection of the members to the supervising officer of the department that the committeeman is to be selected from. We feel that should be

the supervising officer's prerogative. He knows more about the v employees than some employee that is serving even in the same d mnt. In other words, one employee might be friendly toward a and select him to serve on this committee, whereas he would getting the best man according to the supervisor's judgment.

MR. T. R. MCCAMPBELL (Big Four, Indianapolis): I feel we ou have the division officials who are on the safety committees pres these meetings. On our railroad we have experienced some trouble those lines, and I don't see how we can expect the craft members of committees to take the interest that they would if their superior o were present.

On our railroad we select the committeeman, with the approval safety agent and the division superintendent, frequently recommend the retiring officer. I think that plan works well; in an experimenta we leave a man on for a period of a year. Above all, I think a comn man well selected is about three-fourths of your interest maintain that representative.

ACQUIRING A SAFETY CONSCIENCE

W. L. Allison, District Safety Agent, Baltimore & Ohio Railroa Chillicothe, Ohio

In searching for information for this article in the records and a of safety literature, I perused many of the back numbers of that spl magazine, The *National Safety News*, and I was amazed at the com nessness of safety data of every description, covering every pha safety in our national life—government, civic, social, industrial educ health and sanitation, railroads, electricity, automotive, mining m and so forth, splendid talks and articles on different phases of s by men with years of experience and research behind them, and th it all has run the finely woven thread of the safety conscience. I d blush because I may have drawn deeply from this well of informati contributing this article. It has been a revelation to me and shou to any one who is thirsty for safety knowledge. We live and whether it be through our own experiences or through the reading teachings of our fellow men.

Self preservation always has been and always will be the firs of human nature and for that reason national safety and individual s are, in a large sense, of an involuntary nature. No person takes unn sary chances with his life under normal circumstances and no natio knowingly take a step that might remove them permanently from position among the powers of the earth. Man's existence has al been one in which he was forced to overcome hardships. In the days, especially so among the pioneers of America, a man had to the dangers of savages and wild beasts in order to eke out any sort existence. His home was a veritable fortress against invasion, be he realized the importance of personal safety.

Through trials and vicissitudes, through wars and rumors of wars, through steady growth of population and industry, this nation has taken its place as one of the great powers of the earth. But it cannot yet be called a nation with an acquired safety conscience.

Slowly awakening from its lethargy, where it has dwelt in the valley of neglect, this mammoth population has raised its head and listened to the clarion call of safety sent out from the mountain top. Writhing from the wounds inflicted by that grim brother-hood, the demon carelessness and the silent reaper, the nation has started to fight back. An army of workers, representing practically every phase of our government, social, industrial, public and home life, have enlisted under the banner of safety and arrayed themselves for battle.

A few short years ago, fatal and non-fatal accidents were considered as part of the day's work and taken as a matter of course. On the railroads, the old rail who could nail a foot board of a flying switch engine, doing its 20 miles per hour, throw a link and pin together a fraction of a second before the draw-bars bumped, make flying leaps through the caboose door on local, leaving town on a smoke order one minute ahead of the fast line, was secure of a job and looked up to by his younger coworkers. He was identified by the number of missing digits on either hand. He had acquired the swank of a veteran railroader, but was miles away from an acquired safety conscience. Collisions, head-on and rear end, were numerous with consequent deaths and injury to trainmen, which brought sorrow and anguish into their homes, but hardly caused a ripple of safety conscience in the minds of officers or men.

The attitude of employers and managers in practically all industry has changed from putting the responsibility of accidents up to the misfortune of the workman, to assuming at least a part of this responsibility and to realizing that they were morally obligated to provide safe working places and safe working conditions. Government officials and railroad managers, realizing the importance of the Safety Movement, sounded the call to battle. A national safety conscience was slowly awakening, by necessity, if you will, but let us believe more by the milk of human kindness that is planted in the hearts of men. And on the banners of these advancing columns, held high so that all the world might see, was inscribed a famous slogan, the slogan of Safety First.

What is its meaning? It means the saving of life and limb; the reduction of the number of dependents; the reduction of the number of fatherless. It means an effort to banish grief, sorrow and privation.

It is a nation-wide movement. It seeks to prevent accidents on railroads, in factories, in schools, on streets and in the homes.

Back in 1912 a little band of men, appalled by the waste of life and limb, the death and misery of innocent victims throughout the country, and recognizing the need for organized Safety work of a nation-wide character, were gathered together by a common impulse of Safety security, and the National Safety Council, under whose auspices we meet here today, in annual congress, was organized as the cooperative effort

the conservation of life by the prevention of avoidable accidents—trial, public, home; to maintain a headquarters office as a clearing of safety information; to assist communities in organizing perm campaigns of public and industrial safety; to encourage standardi: of safety devices, safe conditions and practices; to hold annua: gresses, and, to be the cooperative, non-commercial adviser of the ı wherever the welfare of the citizenship is threatened by accident

"From a meager membership of forty in that year, today ther approximately 4,000 members, including railroads, civic groups, co. tions and commissions, communities, educators, engineers, public of and others, who are contributing freely of their time, thought, effor money to extend this humanitarian movement to all phases of m life."

Who can say how many lives have been saved, how many acci causing needless pain and suffering have been avoided, how many h have been brightened and kept intact through the efforts of this spl organization? And who can say that the spirit of safety consc which dwelt in the hearts of these few men and caused them to look prophetic eyes into the future and the need of such an organization not continued to be our guiding star and call forth our best and sinc efforts in meeting the daily problems in safety work?

Cities and Towns Are Organized

Cities and towns, villages and communities are being organized welded into a great human fighting machine to combat the evil of lessness and neglect. The *National Safety News* has gained in circul and in importance in the safety world and is spreading the gosp safety throughout the length and breadth of the land. Safety bull safety practice phamphlets, the information bureau, safety films and s engaging the attention of hundreds and thousands of workmen an public at large. The safety calendar, national safety codes, con tions to editors of employees' magazines, public and publicity se and education sections, all show progressive work. As stated in September issue of the *National Safety News*, the principal develop during the year in public safety has been the initiative of Secreta: Commerce Hoover in bringing together seven national committees cluding the National Safety Council, to study and report upon street highway safety problems.

The unselfish spirit of safety conscience has even prompted thi ganization to send a representative abroad to the annual meeting o: International Labor office of The League of Nations in far off Ge Switzerland, to cooperate with the 42 nations of the Leauge, establis cordial relations with many of the safety representatives of these nat

The records in the reduction of fatal and non-fatal injuries to rail employees in all departments, stands forth as a monument to the u ing and unselfish devotion of those made responsible for the prom tion of this great idea. Opposition was encountered when men

asked to refrain from doing things they had been accustomed to doing all their lives. Unsafe and dangerous practices were daily taking a toll of life and limb and the call to change their unsafe methods of performing their work, had to be accompanied with explanations, patience and perseverance. Ignoring questions asked and the issuance of arbitrary orders is fatal to successful safety work.

The managements realized that the essential thing was to make the reasons so plain to the understanding of employees, that they would voluntarily adopt the principle of safety and the work has been conducted along educational lines for that reason. They appealed to the safety consciences of employees and extended the work to precautionary measures to make safe working conditions. Education along this line has caused employees to realize that the work is fundamentally sound, and railroad workers, today, are cooperating to protect themselves and their fellow employees from needless risk of injury.

The fine attitude and sincere desire of railroad executives to promote safety among the employees on their respective railroads, is exemplified by the fact that they stand solidly back of their safety departments and insist that this work be given first importance.

Back in 1912, soon after Mr. Willard came to the Baltimore and Ohio as its president, a slip of paper was placed before him with this question on it: "Where do you place Safety in relative importance among the ends to be sought in the operation of a road?" He read it and instantly wrote underneath it, in big, bold letters: "*Above everything else.*" That ringing slogan has been used with good effect to decrease fatalities, injuries and accidents on our road.

Safety Meeting of A. R. A.

As a result of many years of intensive safety work on the railroads of this country, as a result of the practical experiences and teachings of men grown gray in safety work, and the recognition that prevention of injury and death to employees is our unescapable obligation, it is my privilege to call to your attention again a resolution that was adopted at the fourth annual meeting of the Safety Section of the American Railroad Association at Salt Lake City, Utah, on June 24th, of this year:

> "Whereas, it is developed that there are three major factors in Accident Prevention Work, which ought to be emphasized to those within whose province these factors lie, namely, inspection of equipment and property, investigation as to accident causes, and supervision over the performance of men—
>
> "Therefore, be it resolved; That an energetic and unrelenting campaign shall be maintained to the end that
>
> There shall be a continued and faithful inspection of all devices on engines, cars and cabooses, on motor and hand cars, of machines and tools and all other conditions upon which the Safety of life or limb of employees depends, and prompt repairs or change made when necessary.

That all officers, foremen and others in supervisory capacit be forcibly impressed with their opportunities and responsi for the Safety of their men, which may be discharged throu careful training of men, strict guardianship over men, and co tious investigation as to accident causes with appropriate ac prevent repetition."

It is my thought, gentlemen, that if the meaning of this resoluti understood and conscientiously carried out on the railroads, ac would be relegated to the limbo of lost things, and the goal striving for would be attained.

That the public at large is slow to accept the teachings of Safe develop a Safety Conscience, we have daily bitter evidence.

This is an era of breaking records, breaking heads and incide breaking hearts. The Juggernaut of the age rolls remorselessly on

What was designed to be, and probably should be, one of mar greatest blessings and progressive movements, rapidly is com represent humanity's deadliest menace. Years ago, men gave thought of the avalanche of motor driven vehicles that now cl streets and highways, and introduce new hazards to the public. Ohio State Fair, Columbus, O., recently, the first Oldsmobile stoc built in 1900, chugged its one-cylinder way about the Fair Ground all sides stood the latest models of the automotive industry, with ful motors and glossy coats. In 1895, with a registration of three h motor vehicles, there were 500 persons killed and about 1,000 inju highway grade crossing accidents in the United States.

In 1923, with an automobile registration of 15,222,658 on Dec 31st, 2,268 persons were killed and 6,314 injured. More than 80 pe were riding in motor cars when killed or injured. Figures re made public by the United States Chamber of Commerce, reveal t the first six months of this year, 8,100 persons were killed in vehicle accidents throughout the country. Should the ratio of sla be maintained through the second half of the year, we may conte better than 16 full regiments of human beings going to their do victims of speed and carelessness.

Observations of B. & O.

In the summer of 1922 and continuing until the present year, a railroads of the nation combined in an effort to reduce highway crossing accidents by promulgating a Careful Crossing Campaig every driver of automobiles, other vehicles and pedestrians were ur requested to join for Safety. As a further means of reaching the th less and careless drivers of automobiles and warning them of the c they sometimes wittingly or unwittingly take, the Baltimore and Railroad Company adopted in November, 1919, a plan of taking observations of motorists approaching and crossing the tracks at Observers were stationed at such crossings, and upon a card they ca was noted the license numbers of the machines, which were driven

the tracks without regard for Safety. The result of these observations from November, 1919, to July 1st, 1924, was as follows:

No. of drivers observed	No. of drivers failing in Safety	Percentage of failures
2,100,664	344,709	16.4

A check was made recently of important crossings on different railroads at widely separated points to determine the degree of care exercised by drivers of automobiles. Twenty-five per cent failed to use reasonable car, and five per cent were extremely reckless, using no care whatever. Assuming that there are 15,000,000 automobiles in use this year, this means that there are 750,000 reckless drivers, all of whom are train wreckers. The reckless motorist is regarded by the railroads as the greatest menace to the safe operation of passenger trains. In nine years, beginning with the year 1915 and ending December 31st, 1923, a total of 15,873 persons were killed and 42,545 injured in highway crossing accidents, these figures being taken from the Interstate Commerce Commission reports and are therefore authentical.

Gentlemen, here is something for us to shoot at. A yearly average of nearly a million drivers, apparently without a safety conscience to guide them, are daily leaping the chasm of death.

But a star of hope is seen shining from behind clouds of doubt and uncertainty. This utter disregard for human life and its privileges, has served to cultivate a sense of national responsibility and forces the ethical obligation home to men in government, social and industrial life. It has forced a plea for adequate protection against preventable accidents, which, if unchecked, will send future generations in increasings numbers as martyrs to the juggernaut of wholesale carelessness.

Sixteen states have, through various public service commissions passed laws requiring motor vehicles, operating as public carriers, including school busses, to stop at railroad crossings. Five states have laws requiring all motor vehicles to come to a complete stop at railroad crossings. Louisiana has a railroad-crossing stop law for automobiles to go into effect on the first day of November. In states where these laws are being enforced, gratifying results have been accomplished. A proclamation, issued by Ohio's governor, summoning a Grade Crossing Safety First Conference, to assemble in the Capitol at Columbus in July, resulted in the forming of a permanent organization, known as the Ohio Association for the Prevention of Grade Crossing and Other Highway Accidents, with branch organizations being organized in every city and town of any size in the state—the mayor, safety director, presidents of Rotary and Kewanis and Auto Clubs, and the railroad agents being made the nucleus of such branch organizations. Copies of the proceedings of the July conference at Columbus have been sent to sister states for their consideration. Indiana's governor is calling a similar conference for some time in October, this year.

Never before, in the history of Safety, has such activity been displayed in public and industrial life as during the present year and this greater

stress on safety education, will be the means of helping the p acquire a more safety conscience. The newspapers of today, thro medium of cartoons, editorials and so forth, have proven a most asset in moulding public opinion to the blessing of Safety.

Once we have impressed the boy and girl of today with the portance of habitual Safety, we have made the man and woman o row, disciples of this great cause. Educators and public health are recognizing the importance of the education of our yout safety and health lines and these have been added to the curric public schools with gratifying results.

DISCUSSION

MR. BABCOCK: In almost all big shops we have gang foremen, foremen, gang leaders, and so on, who have the authority t orders for their men who desire material, and we have decided can depart from the idea of confining the posting of our bulletin safety bulletin boards. These gang foremen and men in the sup capacity who have the authority to write these orders usually little desk, maybe just a board, some have a sloping board with a some have a pretty nice desk and some have rather exclusive q Around those places they have spaces available to put bulletins.

You know and I know from personal experience that some b are rather lengthy. A great many employees take advantage c lengthy bulletins and use that as an alibi to kill time.

MR. M. P. CAPDEVILLE (Southern Pacific): We have a glass bc hind which we put our bulletins. Also in connection with that w monthly reports from each department showing on this bulletin This gives the foreman of each department an idea of what th man is doing so he can try to do better than the other departmen

MR. ALLISON: In order to develop safety interest among the em in May of this year we conducted a no-accident campaign on all divisions of the Baltimore and Ohio Railroad. We offered a silver cup to the division on the eastern lines that had the best record this month's campaign, and a silver loving cup to the division western lines having the best record. A cup was offered also best division on either the eastern or western lines, so there wer cups in all.

As a result of this campaign, we succeeded in reducing the fa non-fatal accidents on the Baltimore and Ohio Railroad in May a pared with the same last year's period 64.3 per cent, so you s campaign was well worth while.

In November of this year we are going to conduct a no-accider paign. This other campaign, by the way, was conducted on all th sions of the Baltimore and Ohio. In November the campaign among the shops of the Baltimore and Ohio, and we are going to

it into two separate groups of shops. Those shops working over 50,000 man hours will be in one group and the shops under 50,000 man hours will be in another group. We are going to offer two cups for this campaign. If we go on month by month during the year and just conduct our regular safety work, the interest dies. We need a stimulus in our accident prevention work. These campaigns arouse a certain amount of interest and stimulus in the minds of the employees that brings their attention to the vital importance of safety. I think we have been very successful in conducting these campaigns, and we expect to continue them in the future.

MR. HARRY ADAMS: I want to say to you that in 1923 the Union Pacific had 165 grade crossing accidents and 65 per cent of them were caused by vehicle drivers hitting the sides of our trains. Out of those 165 grade crossing accidents there was only one attributable to the employee's negligence. It occurs to me that all grade crossings are safe if the drivers of automobiles will regard them as an unsafe proposition. I am in hearty accord with the movement that is being made in the various states to bring about a stop, look and listen law and thereby give the railroad the right of way that it has and to respect the franchise it has.

GETTING THE COOPERATION OF LOCAL SAFETY COMMITTEEMEN, LOCAL OFFICERS AND LABOR REPRESENTATIVES IN CORRECTING UNSAFE PRACTISES

D. E. Satterfield, Safety Inspector, Chesapeake and Ohio Railroad Company, Richmond, Va.

What is co-operation? I have seen its results and felt its effect. I regard co-operation as the cornerstone of human civilization. It is that which we must build upon if we are going to be substantial and firm.

The employee has a right to expect direction. correction and inspiration from the officers. These three ingredients properly compounded will produce what I term co-operation.

Men observe every move their officers make, and there is no class of men under the Stars and Stripes more alert to words and acts that the American railroad men. They want you to hand it to them straight from the shoulder.

The safety committeemen get their inspiration and their direction or instructions and corrections in many cases while actually in safety committee work. They are pretty well balanced fellows, but the safety committeemen usually follow their local officer. I don't say that is always the case, but they unconsciously follow to a great extent.

During the World War, an Indian who had become civilized, was drafted. His old farm neighbor met him on the road one day and said. "Tom, how do you like the war?"

"No like much."

"What's the matter with it?"

"Too damned much salute and not enough shoot."

I want to say to local officers, local committeemen and labor sentatives for the sake of man and the God who created him, sho

INTERESTING THE INDIVIDUAL IN SAFETY WOR

J. A. Clancy, Safety Representative, Personnel Department, New New Haven and Hartford Railroad

I have five factors which I believe will help to interest the indi in safety. The first is publicity. We believe no one would atten launch a boat without water, and what water is to the launching boat publicity is to the launching of a safety campaign.

Anything is legal in the publicity line from a brass band to a p of injured employees. Safety rallies, safety bulletins, magazine ar and the organization of safety committees are essentials.

The personal touch is of the greatest value. I believe that the per touch is the real thing in interesting the individual. We do every we can to talk to the men and to spread our news among them, t low up any suggestion that has been made, and especially to bring t attention of the interested employee the conclusions of his safety mittee.

Next we have timeliness. Everybody knows that nothing is so o yesterday's newspaper, and nothing is so dull in a safety meeti reading January's report in April. January's report, to be effe must be read in February.

Timeliness in suggested repairs by safety workers should als duly considered. "Nothing done" read at safety meetings has more to stifle safety enthusiasm than any one thing I know, wit possible exception. Perhaps you have noticed that all the members in and sit down; everybody is enthusiastic about safety and the keyed up.

The next thing is education. We believe that, like charity educ begins with ourselves. We go out and try to tell the tower man ho run the tower when we don't know what we are talking about might better shut up. We believe also that by studying the why wherefore of accidents, it will help us to prevents their frequenc virgin field surrounds us; it is up to us to develop it.

We believe that the education of the employees does not stop "Look out for the nail in the board." We believe that a consi course should be adopted and that it should build up a safety stru that will proceed with the employee from the application blank to sion papers. Remember that it is only the safe employee that get pension papers.

We believe that confidence is a big asset in trying to interest employee in safety. We believe that safety can't go far if even a s

percentage of the employees have the impression that the company will kill it if it runs into any money. I believe it is a good thing to advertise what we spend in correcting unsafe practices, and let everybody know just what we are doing. The safety inspector should be of the greatest importance in promoting confidence among the employees. We believe they should go out among them and with constructive safety talks inspire them with the confidence they should have. We believe there are many good reasons why every employee should have implicit confidence in our safety work. It would seem that knowing any particular grievance would automatically supply the remedy to restore the confidence of the employee.

Then we have salesmanship. We believe the safety inspector, in fact all members of the safety department, should be above reproach in their character, integrity and honesty. We believe that it doesn't take exceptional ability to sell safety. Safety has more A-1 selling features than any other article on the market, and it has absolutely no competitor worthy of the name.

We believe that publicity, timeliness, education, confidence and salesmanship should be big factors in safety, and we also believe, as far as salesmanship is concerned, that any safety organization that has a fair chance and that does not show a marked reduction in accident prevention should immediately consider a reorganization of its selling forces.

COFFIN RESOLUTION

MR. BENTLEY: I am sorry to report that Mr. Brennan, who was chairman of the committee, has left the city, but with the able assistance of Mr. Adams and the incoming secretary, Mr. Neumann, and Mr. Scott, we have compiled the following resolution:

"WHEREAS, The Steam Railroad Section of the National Safety Council assembled in Thirteenth Annual Congress, in studying the history of the Safety Movement on American railroads, is reminded and again deeply impressed with the unceasing efforts through many years of the late L. E. Coffin, affectionately known to railroad men as 'Father' Coffin, who as a private citizen and railroad commissioner of the State of Iowa, battled for improved working conditions for the American railroad man and through whose efforts sentiment was crystallized and legislation enacted making a notable improvement in the working conditions on American railroads, and

"WHEREAS, It is felt that without some definite action the devoted efforts and achievements of this man of sterling character, may not be accorded fitting place in history for the credit due him for bringing about the abolition of the link and pin method of car coupling and replacing it with the automatic car coupler and the consequent safety appliance act, as a result of which many lives have been saved and injury and maiming of railroad men has been greatly reduced, therefore be it

"RESOLVED, That the Steam Railroad Section of the Nationa Council make record of its gratitude and appreciation for the work of 'Father' Coffin who labored as a pioneer in railroad safe overcoming seemingly insurmountable opposition, not for selfi but that his brother man might pursue a necessary vocation decreased risk of life and limb, and be it further

"RESOLVED, That it is the sense of this section that some pe indication of our appreciation should be provided so that future tions may have called to their frequent attention the memory o whose life was an inspiration to all who believe 'I am my b keeper'." (Adopted.)

(ADJOURNMENT)

Taxicab and Delivery Section

September 30, 1924

F. P. WALKER, Chairman
Secretary, General Necessities Corporation, Detroit, Mich.

C. R. SMITH, Secretary
Patterson Transfer Company, Memphis, Tenn.

CHAIRMAN WALKER: I will ask Mr. Smith, the Secretary, to give us a brief report on what the Section has shown in the way of increase during the last year.

SECRETARY C. R. SMITH (Patterson Transfer Company, Memphis, Tennessee): The Secretary has attended to the usual duties of the office. On October 1, 1923 the membership was 41; 34 new members have been obtained during the past year, making a total of 75. There have been seven cancellations, making a total of 68 members of the Taxicab and Delivery Section.

CHAIRMAN WALKER: That seems to be a pretty satisfactory sort of growth; while it is not by any means as much as it should be. The potential membership in this section should be not less than 2,000. It might not be possible to get it out of the taxicab interests alone, but certainly out of other large interests having a large fleet of delivery trucks on the street.

HOW WE GET DISCIPLINE THROUGH SUPERVISION

C. A. Reilly, Yellow Cab Company, Philadelphia, Pa.

Our experience is based on the operation of 745 taxicabs in Philadelphia, manned by a force of from 1,200 to 1,500 drivers. This force naturally increases in the winter, and is smaller in the summer. This fleet averages about 70,000 miles per day—over 2,000,000 miles per month.

Philadelphia is a vast gridiron of numberless small streets, intersecting at right angles. There are few boulevards, and most intersecting streets are of equal importance. The lay-out of the city, therefore, makes right angle collisions at street intersection probably more numerous than in other cities. Poor paving, and trolley cars on practically every street also add somewhat to the highway hazard.

Selection of the Driver

The first step in making a safe driver, is to select the right ty making this selection, we use merely the old-fashioned method of up the man" aided by a few home-made rules. We know the met poor, and we stand ready to adopt a better plan when it is offer

Our Home-made Rules, are as follows:

An applicant must be not less than 23 years of age; must hav class references from former employers for the past three years; have a knowledge of the street lay-out of Philadelphia, and be o appearance.

We prefer married men.

We give every applicant a physical examination, and beyond th employment manager simply uses his own judgment.

When we have accepted an applicant, he is put through an int training course.

The new man who has never driven before is sent to what w the Polo Grounds, where there are at least 15 or 20 cabs in operati

The Polo Grounds is a vacant lot, with one instructor in char is here decided whether or not the man will be suitable to the co as a driver.

He is shown the gear shift on a cab that is jacked up off the g He does nothing else for one day, but change gears. When the i tor is satisfied on this point, he is put on a cab, on the ground, man of a few days more experience. He rides in front for one-ha to see the cabs in operation. The lot is so full of moving cars, t gets a very good idea of actual street traffic.

He is then put at the wheel, with an instructor at his side, who t him how to steer and control his car. After having gone throug and proven his ability, he is taken off the Polo Ground to the where he is shown how to operate a car up and down hills safe O.K'd. by the instructor, on the hills, he is then put on a cab in He must drive in the heaviest kind of traffic—here is where he g real test. We take him down to the river front, where traffic is posed mostly of heavy trucks.

From 8 A. M. until 3 P. M. daily these men are instructed as desc then, at 3 P. M. drivers are taken to the schoolroom, where they r lectures on the taximeter, company rules, policy, safety, etc.

When satisfactory to the chief instructor, the student must p state test for drivers. When this license is granted, the driver is his number, and sent to the garage nearest his home to begin wo

Special supervision is given to new men for the first few wee instructors who are detailed for this purpose at each garage. T done by means, principally of heart to heart talks between the ma the instructor.

Merit System

We handle our drivers entirely on the merit system. A man re merits or demerits in accordance with a code.

The merit system makes it possible for faithful employees to be rewarded from time to time for loyalty, punctuality and obedience to the company's rules.

All drivers breaking the rules of the company, under such a system, are treated alike. A driver who violates a rule punishes himself by lowering his merit rating, and this reduces his bonus at the end of the month.

The amount of each driver's bonus, is based on his earnings for the month, and his merit rating. The more merits, the higher the bonus percentage.

Any driver having less than 15 merits to his credit at the end of any month, will not participate in that month's bonus. The loss of 50 merits at any one time, or the loss of all merits to a man's credit will automatically discharge him. We work our merit system for all it is worth. We will do almost anything for the man with a good merit rating.

Supervision

A garage superintendent who, by the way has been promoted from the ranks, is the drivers' immediate supervisor. He is required to apply all discipline. Everything is done to strengthen the superintendent's authority, to make the drivers' dependent on him, and to assist him in studying and advising his men.

If a driver thinks he has been treated unjustly, he has the right to appeal to the general manager, or the assistant general manager, who will personally attend to the case, and either sustain the superintendent, or cancel the demerit penalty.

Street Supervision

Yellow Cab of Philadelphia believes in almost relentless supervision of its service. This supervision extends to drivers on the streets, and for that purpose the company maintains a force of inspectors, each with a car. It is their duty to turn in an observation report for any driver who may violate the rules, while on the street.

This observation report gives the cab number, time, place, dates of offense, and all the necessary information, including the name of inspector who turns it in.

This report is sent to the main office, where it is pasted on a company form, and is then sent to the superintendent.

If the observation report is a traffic violation, it is turned over to the safety department. An analysis of the driver's record is made, and recorded on the bottom of company's form, and sent through to the superintendent, where the driver must tell his story, how and why it all happened, on the bottom of the form. The superintendent imposes the penalty. The driver accepts the penalty, or appeals, and a complete report with all papers attached is filed in the man's folder.

Employment Service Record

We try to teach our men that their service record is of great importance to them, and we keep it in the greatest detail. By his accumulated

We keep the man advised of his standing by means of monthly re
much like the little cards your children receive at school.

The service record is one of our most important; it gives inforr
about the driver from the day he entered our service. It ha
address, number of dependents, nationality, seniority number, effic
education, and his garage. Accidents, dates of offenses, numb
demerits, suspended or charged, special merits, total merits, ac
file number, number of accidents, monthly earnings, number of
worked, and just as much more about the man as possible. A
to be useful, must tell us all about a man—his attitude, his abilit
his general characteristics.

We have in our files, the detail service record of over 4,000 f
employees. Many of these apply for re-employment. Such are rev
by the re-instatement committee.

Re-instatement Committee

This committee includes seven: namely, general manager, ass
general manager, employment manager, one garage superintendent,
inspector, chief clerk, and safety supervisor.

This committee goes very thoroughly into each record, makes fu
investigation if necessary, and determines if the applicant shou
re-employed.

Once a man's re-instatement has been refused by the committee
decision is final, and the man is permanently barred.

General Safety Work

We find the posters received from the National Safety Council
helpful and effective. They are posted in our garages, and in boot
our stands in out-lying districts.

We use pay-envelope stuffers. This has proven a very good w
touching every man, as it is not possible to get all men together a
time in the taxicab business.

We occasionally publish posters of our own, dealing with some sp
question or local problem.

We try to keep our house organ alive, with plenty of readable
shots."

Effective results have been accomplished in our garages, through
dent board competition. The garage must list the number of accid
and the one with the least number is awarded a banner, with the
of the garage on it. In this way, everyone knows the garage with
least number of accidents, and how his particular garage stands in
competition.

We keep our drivers primed on safety. The name of a driver ha
an accident is placed on the board the next day. We knew a drive
offer ten dollars to have his name removed from the board.

Drivers' Safety Council

One of our latest steps for greater safety, has been to appoint a s
council composed of three drivers from each garage, who have

records, and who are good bookers. These men have demonstrated that in this business it is possible to be safe and successful.

Let it be understood that the safety council has no direct authority over the drivers; what is said, is said as one fellow workman would speak to another.

A meeting is held twice a month, and the subject of safety is discussed.

The safety council, is in constant touch with all drivers, on company stands, and those they meet while traveling on the streets. They are known by the safety button they wear.

The drivers of the safety council never find it difficult to strike up a conversation on accidents, which leads to safety meetings on the stands or in the garages. We arrange to have six to ten problems for each meeting of the safety council. While the plan is new in our organization, we expect considerable help from it.

General Welfare

We find it impossible to discipline a driver, or cause him to live up to the company rules, unless he really wants his job. So, Yellow Cab Company of Philadelphia tries to make its driving job the very best of its kind through good pay, square deal methods, free life insurance ranging from $300 for the first three months up to $1,400. Sick benefits of $10 a week for 13 weeks are paid, free dental service to employees and their children, free legal advice, cash loans, etc., are offered the men.

DISCUSSION

CARL H. CHRISTINE (Public Safety Engineer, St. Louis Safety Council, St. Louis, Missouri): I would like to know if you have the figures on the cost of making an inexperienced driver into an experienced one, and if so the comparative cost of your test of your experienced driver before you hire him and what your experience has been in the use, of the experienced and inexperienced driver.

C. A. REILLY: I have no figures on that. I can say roughly, it will cost us about $200 to educate a man. I find the new driver is to blame in most accidents in our taxicab business. For the first month or six weeks they are very careful; they get confidence after six weeks, but along about three months they start stepping a little faster than the average driver. If we can keep them five or six months and educate them then the danger is past.

E. B. LEFFERTS: (Automobile Club of Southern California, Los Angeles, California): I would like to ask, on your windshield, are you using the green colored glass or the white?

C. A. REILLY: Green.

E. B. LEFFERTS: How long have you had it in use?

C. A. REILLY: Two months.

E. B. LEFFERTS: Has it shown any dimming of the vision?

C. A. REILLY: Not as yet.

E. B. LEFFERTS: They use that same glass in watch crystals and after possibly a year they find they begin to cloud and a decrease of vision.

C. A. REILLY: We have not any trouble as yet. We have only t out on one cab and on that it is used in the windshield. We ha come to a decision on it yet. It protects our passengers from sha glass. For cab windows we are using Pyralin safety glass.

(The Pryalin window, Mr. Reilly said, was made up first f material standpoint and second, from a construction standpoi safety purposes. A specially prepared fibrous Pyralin material i stituted for either plate or reinforced glass. It is somewhat e quite flexible, tough, and at the some time, rigid enough to hc shape without objectionable warping or distortion. It has a t strength of approximately 8,000 pounds per square inch which ma impossible to break through, even when one is thrown against i great force. It is much lighter than glass.)

CHAIRMAN WALKER: The trouble with the watch crystals, there means of buffing the surface of the crystal. I believe that will be come in this case by the buffing wheel. You can get away from the surface by the rebuffing.

E. B. TOLSTED: (Green Cab Company, Cleveland, Ohio, and T Tolsted, Inc., Chicago, Illinois): I would like to ask about the fire h

C. A. REILLY: It is inflammable, but slow burning.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN WALKER: At this time I wish to appoint as a nomi committee, George T. Kinney, Carl Christine and E. B. Tolsted.

(The report of the nominating committee will be found in the meeting of the Taxicab and Delivery and Ice and Refrigeration tions.)

SECURING THE COOPERATION OF TAXICAB DRIVI FOR SAFETY

L. L. Miles, President, Louisville Taxicab and Transfer Compan Louisville, Ky.

Securing the co-operation of a taxicab driver from the standpoi safety is the same as securing it from the standpoint of business. go hand in hand. We must be sold on safety ourselves in order t our organization to operate safely.

I started in the taxicab business in 1918. I became a safety bc after I realized what it was costing me in money to have accidents. immediately set about trying to stop them.

We believe the first step to take in securing the co-operation o organization is to be frank with our men. In all our dealing with we take them into our confidence, show them what we are trying t and how we are trying to do it. We have meetings and give actual figures of how we run our business. We show them what it n

to them, and arrange it so it will mean something to them from a monetary standpoint to prevent accidents, and we find a very happy response from the co-operative standpoint.

I think drivers speed because it is a habit. We can form a habit of speeding just the same as we can form any other habit.

One can have bad habits or good habits, it does not make any difference. Get your men to form the habit of driving carefully and they will do it unconsciously. Speeding is relative. We teach our men that we have a standard for speeding, for one reason and one reason only. If I would ask you gentlemen here, half a dozen of you, to write on a piece of paper what you term speeding, I venture to say your answers would vary five to 20 miles, as your different opinion as to what speeding is.

WHY ACCURATE STATISTICS ARE ESSENTIAL TO SUCCESSFUL ACCIDENT PREVENTION

W. G. Beard,* Director of Public Relations, Yellow Cab Company, Chicago, Ill.

How any industry can hope to make a dent in its accident rate without guidance from a carefully prepared set of statistics is beyond me. Yet, many have tried and still are trying it. As a matter of fact, we tried it ourselves at the very outset of our safety work.

But we speedily discovered that any intelligent safety work had to be based on something more substantial than faith and hope or a fervent prayer that nothing untoward might happen to make things worse instead of better.

Safety work has to be specific—a definite end to attain and a definite means to attain it.

We have found that safety is a commodity which can be bought and sold like any other commodity that has a commercial value. The question of obtaining comparative safety is purely a matter of price. The more safety you want, the more you have to pay for it.

Now 100 per cent safety may not be impossible, but in the taxicab industry it is improbable. Our operation is unlike that of a factory or workshop, where most of the dangers can be guarded against mechanically. Protection can be built around a dangerous saw or fly-wheel.

On the other hand, the operation of the taxicab is entirely a matter of individual mental processes and physical skill.

You cannot build a fence around a man's mind to keep it from straying into dangerous paths. You might educate him and form habits of safety, but a general safety education is a slow process. You can preach night and day without getting far. And by preaching, you are more likely to entertain or annoy your subject than you are to make him over.

To really attain any degree of safety, you have to be particularly specific about what you want your driver to do.

*Read by Mr. Kennedy in the absence of Mr. Beard.

But you can't be specific with him unless you know exactly what kind of safety you are most in need of. That is where your statistics come in. They will tell you what kind of accidents you are having in greatest abundance so that you can decide which particular class of accident you want to try to stop first.

Really, statistics in accident prevention are the counterpart of cost abundance so that you can decide which particular class of accident you is; how much it is costing in human suffering, good-will and money and to a greater or less degree, how much it will cost to correct it.

For example, when we got out of the Sunday school class era, we compiled a complete set of statistics which showed among other things numbers of accidents in every class; their causes; seriousness of injury; drivers who had them and their money cost to the company.

Concentrating on Specific Accidents

Tabulated, they were grouped into classes and they showed us that plain, every day bumped heads, caused by a little too much speed over a rough road or a raised crossing formed a considerable item in our monthly list of personal injuries. In addition to anguish caused to our customers, the tabulation showed that on the average, a bumped head cost $15 to settle.

With this $15 figure as a starting point, every bumped head gave the safety and accounting departments a headache.

Statistics showed us a definite kind of accident that we knew was preventable. We therefore bought the safety rights on it by changing slightly the spring construction of our cabs.

Another habitual personal injury the statistics turned up was the insignificant pinched finger. That cost an average of $18 and we bought the safety rights for $1.03 per cab by installing handle bars alongside the doors which effectively prevents passengers from putting their fingers inside the door-jamb.

One by one, statistics have shown us the most flagrant of our accidents and have pointed out the men who were responsible for them. One by one, we have worked on a means of preventing them and one by one, we have eliminated the men to whom accidents were habitual.

Once we determined speed was to blame for most mishaps, we began a drive against it—not only among our men, but throughout the city. We literally spent thousands of dollars in our effort to get the speed of all automobiles regulated. Fifteen thousand dollars was spent in advertising alone, urging the police to enforce a 20-mile-an-hour pace on all motorists.

We constructed the Michigan avenue signal light system at a cost of more than $33,000 to further regulate drivers. This system has been in operation one year and, according to statistics, has saved 49 human lives. Before its installation there was an average of one fatal accident a week in the stretch of two miles it covered. In the year of its operation, there have been only 3 deaths.

We believe that without statistics, safety work is futile. With the figures, you can isolate various kinds of accidents and treat them separately.

Safety is a practical business and to put it into a place where you can put your finger on results, you have to have figures. We have cured many forms of accidents, but we cured them individually and not by general sermons and decalogues.

As I said before, safety is a commodity. Balance its cost against the price of curing it and you have its value. But you cannot get anything out of it unless you have intelligent statistics to work from.

SAFETY: OUR FOREMOST PROBLEM*

Geo. T. Kenney, Director of Safety, Yellow Cab Company, Chicago, Ill.

In the operation of a great taxicab fleet like that of the Yellow Cab Company of Chicago, the foremost problem is that of safety—that is, the daily operation of our cabs without accidents, serious or otherwise.

Experience has taught us that this problem of safety has no single solution. We find that safety involves not only the taxicab driver and his equipment, but also traffic conditions and regulations.

Of course, the first and most important step for both the patrons of our company and the public which shares the streets with our cabs is the selection of safe drivers.

A motor vehicle is no safer than its driver, and with a person of low intelligence or one who is habitually reckless, it is only a matter of time until an accident happens.

The task of securing safe drivers and detecting potential accident makers among present and future employees is one of the most important problems confronting the Yellow Cab Company or any other taxicab operator.

Our first effort in the direction of safety starts in our employment department. Utmost care is taken in the selection of new men, and an applicant must measure up to certain standards; otherwise he is rejected. Preference is given to married men with driving experience and no man under 21 years of age is employed under any circumstance.

Every applicant, before he is taken on, is personally interviewed by our employment supervisors and is carefully examined as to his antecedents and past employment. His record and references are thoroughly investigated by a trained corps of operatives retained for this special purpose.

False statements by the applicant with reference to himself or his antecedents are sufficient cause for rejection.

Intelligence and mental tests are required of all applicants. The Yellow Cab Company early saw the possibility of hidden defects in an applicant's mental make-up and in this connection the need of some

**A paper prepared for the government and read at the Congress by request.*

scientific method of finding these defects and selecting its drivers accurately, was recognized.

Psychology having given ample proof of its value in this regard, Mr. John Hertz, president of the Yellow Cab Company decided to apply it in the selection of our drivers. Dr. A. J. Snow, an authority on industrial psychology, was retained, and under his direction a laboratory for making these scientific tests was installed in the Company's main garage. These tests are now being given to all applicants for positions as drivers, and also to drivers now in our employ. Dr. Snow, in conducting these tests, rates the applicant or driver from three different angles, namely: intelligence, carefulness, and reaction to sudden danger.

Must Pass All Three Tests

If a driver passes all three tests satisfactorily, he is presumed to be a safe and competent person to operate a taxicab, providing that his physical examination does not disqualify him. The Yellow Cab Company recognizes the importance of a thorough physical examination for all applicants for positions as drivers. No matter how alert and how skillful the hand that guides the steering wheel, they cannot offset the menace of a heart which may fail under the stress of a traffic emergency.

In the company's medical clinic, the applicant is given a physical examination calculated to detect defects in sight and hearing, heart and blood pressure, and any man who is impaired in this regard is not permitted to go to work. It is hardly necessary to add that abstemious habits and a sense of moral responsibility are required of all of our drivers.

Having selected a man of good character, sound physical health, careful habits and presence of mind, the next step is his training.

Too much emphasis cannot be placed on the importance of this stage of the development of a safe driver. Our instructors are selected from among our most experienced and expert drivers. The instructor himself has been taught the best methods of imparting the specialized knowledge to the student driver, and a standardized method of instruction is followed.

We find that our school for drivers not only trains men to become loyal, satisfied and efficient employees, but reduces our labor turn-over and makes for greater safety.

The Yellow Cab Company maintains a training field on which street conditions are reproduced. Here the student driver is given his first experience at the wheel of a cab. His training continues here until his ability to drive is assured. He is then permitted to drive with the instructor at his side on the public streets. His reaction to a street sign, a traffic signal or a pedestrian suddenly stepping from the curb is noted.

The time a student spends on a school car, of course, depends largely upon his ability to acquire the company's method of driving. Under no circumstance is he permitted to go out on a cab alone until he has satisfied our chief instructor as to his ability to drive safely.

Before application is made for city and state licenses for the new man, special road tests are given him by the chief instructor and, in the event the student fails to meet the proper requirements, he is returned to the school car for further training.

Selection of Instructors

In selecting its instructors, the Yellow Cab Company has not lost sight of the fact that the daily grind of building the personnel often leads to irritation or impatience, and in this regard, we have attempted to select the type of men who are not easily ruffled, because irritations and impatience, we have learned, very acutely effect the future conduct of every man riding in the school car.

We aim to impress upon the new men the advantages of safe driving. In easy conversations while he is on the school car, the instructor talks safety to him, hard and often, and impresses upon him that the men who reap the benefits of Yellow Cab employment, are the ones who live up to the rules of the company and avoid accidents.

After the new driver is assigned to a cab, these intimate talks are given him from time to time by the garage manager or his assistant. In this connection, we have discovered another factor to be considered in the human side of taxicab safety—that is, the handling of drivers. This involves the subject of industrial relations—working hours, shifts, and other elements involved in the drivers' employment to be determined.

All disturbing influences which are liable to take a man's mind off his work are removed insofar as it is possible. In other words, we try to make a man like his job, to be happy and contented.

Some thought must be given also to the man's home life. We find that domestic discord takes a man's mind off his work and is apt to make him careless, with the result that some of our accidents have been traced to this source. In this regard, we find that our welfare department is a valuable adjunct.

We have assigned to each of our 14 garages, a welfare worker, who operates in conjunction with the garage manager and the medical department, under the direction of a welfare superintendent. This work is carried on unostentatiously and without any offensive features to the employee.

Incidentally, the Yellow Cab Company provides free medical, dental, nursing and hospital services to its employees and their families, which, no doubt, makes for safety.

Sight has not been lost, either, of the fact that consideration for the feelings of employees on the part of executives and supervisors makes for better relations and safety. When we have occasion to discipline or reprimand a driver, we do it in such a way that it makes him see the error of his ways without arousing antagonism, because we have learned by experience that an employee nursing a grudge is apt to become unsafe. Some accidents due to a driver's carelessness, have been traced to an undiplomatic "bawling out" by some overzealous superior.

Elimination of Class Distinction

The company tries to eliminate class distinction without sacrificing any of the respect that a driver should have for a superior, and officials of the company can be heard, when they are speaking of the company as a whole, calling it the Yellow Cab family.

While it is a very common thing to hear the heads of big corporations alluding to their employees in such a manner, it is extremely doubtful that very many corporations place any sincere regard on the appellation but this is not true of the Yellow Cab Company. Officials of the company are sincere in their efforts to live up to the spirit of this distinction and, in truth, regard the employees as members of one big family.

In a word, we aim to have our drivers free from worry of any kind. We attempt to remove every unnecessary burden from their shoulders and try to keep them in a state of mind calculated to make them alert and "on the job."

In addition to the services already mentioned, the company provides free legal advice to all employees.

When one of our drivers becomes involved in litigation of any kind beyond his control, lawyers are provided to defend the action, if of course, he is not involved criminally. Drivers arrested for violation of any police regulation, city ordinances or state law having to do with the operation of motor vehicles, are defended by the company where it appears there are extenuating circumstances.

It often happens that a man may escape punishment in court for some infraction of the law but that does not necessarily clear his record with the company. He is usually disciplined and sometimes even dismissed when it appears that he did not exercise due regard for the law. Of course, we make no attempt to defend men who boldly flaunt the law, and in this respect, the Yellow Cab Company often assays the role of prosecutor and causes the arrest and punishment of offenders. We urge our drivers to have a wholesome respect for the law and duly constituted authorities.

We have given consideration to the condition that invariably arises when a man becomes involved in debt. We try to encourage our drivers to live within their means and keep out of debt. We discourage the buying of luxuries on the installment plan and we do not permit them to patronize "loan sharks."

On the other hand, we encourage thrift and saving and assist them to save. We encourage them to become stockholders and partners in the company and help them to do so by permitting them to buy our stocks at the prevailing market price on a liberal partial payment plan. We loan them money, too, at a nominal rate of interest and without carrying charges. This, in itself, has a tendency to discourage borrowing from the so-called "loan sharks."

Provision has been made for disbursing funds to the driver during a period of sickness and for compensation in the event he is laid up from an injury incurred while not on duty and not covered by our compensation insurance. Our benefit association to which all employees are

required to subscribe to membership, pays him the same amount that h would be entitled to by law were he injured on duty.

Providing a Safe Cab

Having exercised every care in the selection of a safe driver, we ai to provide him with a safe cab. Under no circumstances is he ever pe mitted to take out a vehicle which has not been inspected and pronounce in fit condition.

Our cabs are returned to our garages after every shift where the are tested before being sent out on another shift. A cab with "slow or defective brakes, loose wheels or with any mechanical defects mu have the attention of our service department before it is again pe mitted on the street.

As proof of our efforts, we point with pride to our safety record esta lished in the operation of approximately 2,800 cabs which cover mar millions of miles yearly.

It is not only profitable for us to maintain such a record but we mak it profitable for our drivers. They are paid on a commission basis und which plan their incomes are proportionate to the amount of effort the expend in behalf of the company.

All employes participate in the net profits derived from the operatic of our cabs. Twenty per cent of the net profits are divided each mont among the drivers. They are given to understand, too, that the size these dividend checks depends in a large measure on the balance she of our claim department.

The driver is made to realize the fact that every accident costs th company money, cuts down profits and in turn, affects his share of th profits.

Further encouragement to safe driving is provided by our bonus sy tem. We give our drivers a bonus each week for safe driving and th driver having an accident during the week does not participate in th non-accident bonus that week. This, of course, places a premium careless or reckless driving.

Our drivers also participate in an attendance bonus based on a six-da a-week and a full ten-hour day together with a booking minimum $50.00 per week. Time lost because of an accident very often results the surrender of this attendance bonus and thereby places anoth penalty on the culpable driver and makes for safer and more efficie driving.

In our safety talks with the men, we aim to emphasize the differe penalties attached to indifferent or careless driving. We show the where accidents restrict their earning power. Likewise, we deal wi the human and criminal phase of careless and reckless driving. We this in talks at safety meetings, with illustrated posters, bulletins, wi moving pictures and through company publications.

Supervision of Men

Company policy provides for a strict supervision of our men at a

through the co-operation of our many agents at our 135 stations or stands distributed throughout the city and our outside superintendents and safety supervisors who patrol the streets day and night in Yellow Cab roadsters.

Company rules provide certain requirements of drivers with reference to the safe operation of their cabs. These rules have to do with the speed they are permitted to travel, and the use of skid chains during wet weather. We also require our drivers to raise their wind shields when it is raining or snowing so that they may have an unobstructed view of the road at all times.

It is the duty of our agents, road superintendents and supervisors to see that drivers comply with these rules and other company rules when they are on the streets.

We do not use speedometers on Yellow Cabs for several reasons. Our experience in the use of speedometers on taxi cabs has taught us that they do not make for safety. We have found that drivers pay little attention to them, that they do not function efficiently at all times and in many instances, have encouraged speeding.

In the actual operation of cabs on the street, we find that the biggest element of danger to safe driving that we have to deal with is speeding. It is the cause of most motor vehicle accidents.

By speeding, we do not necessarily mean that the driver who has had an accident was driving in excess of the number of miles per hour allowed by law but was operating his vehicle at a rate of speed which precluded the possibility of him stopping it when an emergency arose.

With respect to the speed limit we permit our drivers to travel, we have attempted to enforce or rather encourage a maximum speed limit of 20 miles an hour, but hereto, we find that the conflicting policies of the various police organizations is a stumbling block to strict enforcement of this 20 mile rule.

On the south park system where 30 miles an hour is allowed, our drivers insist that they hamper the orderly movement of traffic by keeping within the company limit and are actually in danger of having accidents and do have accidents.

It is a fact that many of our drivers have been reprimanded and even "bawled out" and threatened with arrest because police insisted that they were slowing down traffic by adhering to our 20 mile limit. This condition often provokes complaints from our customers, that "the driver is asleep" and allowing everyone to pass him. Such a condition, of course, is dangerous and not in keeping with safety.

Influence of Patrons

We find that our patrons have considerable bearing on the efficiency of a man's driving. Many of our customers avail themselves of the use of our cabs because they are in a hurry. They invariably insist upon the driver traveling at an excessive rate of speed. Of course, most of our drivers are anxious to please their customers and very often throw discretion into the discard.

We urge our men to take their customers to their destination without delay and at a safe rate of speed, but, of course, some of them disregard rules and follow the instructions of the passenger.

We attempt to discourage our patrons against fast driving and carry on propaganda through the newspapers and in our cab publications, calling attention to its dangers. However, some will insist that the driver disregard rules, laws and everything else for their accommodation.

On the other hand, we find that many of our customers are not only anxious to co-operate with us but are an influence for safe driving on the part of our men. It sometimes happens that a driver who is inclined to "take chances" is corrected in this regard by a word from the passenger.

We have also given consideration to the things which are apt to distract a driver's mind from his steering wheel and the road when he is on the street with his cab.

We do not permit our drivers to carry on conversations with their passengers and discourage passengers from attempting to converse with the drivers. It is a rule of the company that when the passenger indicates a desire to talk to him, that the driver pull to the curb and stop his car.

Drivers cruising for business must watch the road and also be on the lookout for prospective customers. In order to lessen the hazards of driving while cruising for business, we insist that our drivers travel at a slow speed.

We try to discourage cruising and encourage our drivers to "play" our stands and stations as much as possible.

We do not permit smoking on the cabs for the reason that we consider it a distraction.

A driver who indulges in intoxicants while working is taken off his cab immediately and dismissal from the company's service invariably follows.

Knowledge of City

We recognized the fact also that a thorough knowledge of the city, or rather the territory in which we operate, is indispensible in the safe operation of our cabs. It has been our experience that a driver who is not familiar with physical makeup of the city is potentially unsafe.

In other words, a man who does not know the location of all through streets and boulevards, etc., can hardly be expected to observe the law with reference to stopping at these through streets and boulevards before crossing them. This holds equally true of street car, grade crossings and other places which might be considered hazardous points.

Our school of instruction has made proper provision for training new men to know the city. In this connection, it may be interesting to know that company rules provide that drivers make use of through streets and boulevards whenever it is possible.

We discourage the use of arteries on which street cars travel but

to "ride the rail" for obvious reasons. Neither do we permit our dri ers, except of course, where they cannot avoid it, to use streets pave with creosote block during wet weather because of the hazard of acc dents.

We have been moderately successful in "selling" most of our 5,7C drivers on safety. We have been able to show most of them that spee in itself, is a very small factor in rapidity of city transportation.

For example, sometime ago, we took two of our cabs, driven by exper enced men and put speedometers on them. We made 500 test trip over what, in Chicago, is the average distance of a taxi cab ride—little over 3.3 miles. One of these men never exceeded 20 miles a hour, the other man drove as fast as he could wherever he could.

When we tabulated the figures at the end of the 500 trips, the averag was a trifle under one minute difference.

In selling our ideas of safety to our men, we have also aimed to sell the on the theory of courtesy to everybody else. Courtesy covers the entire fiel of safety in automobile operation. It covers everything.

We have developed our safety angle, not so much on any set of rule but on a system of publicity to our own men in which we have tried t get them to follow one rule—to drive a taxi cab safely, and successfully we tell them, they must follow the Golden Rule.

The Golden Rule of Driving

In other words, we seek to have them drive their own cab the wa they think everybody else ought to drive theirs. We do not permi them to cut in and out of traffic, not merely because it is unsafe to d so, but also for the reason that it shows discourtesy on their part t other motorists. By this rule, we have not only reduced accidents, bu we have increased the friendship of Chicago for the Yellow Cab Com pany tremendously.

Courtesy to pedestrians on the part of our drivers likewise has it good results in the matter of safety. We insist that our drivers shov regard and exercise proper care toward people who are walking on th streets. In this connection, you will invariably find that the Yellov Cab driver not only slows down at street crossings but very often stop and holds up other vehicle traffic to permit the safe passing of pedes trians.

Automobile traffic and taxi cab traffic, we find, is daily becoming mor of an engineering problem in Chicago. It is not so much a matter o getting cabs into service as it is keeping them moving safely in th congested districts which naturally are the most prolific sources o taxi cab business.

We have two facts to face which at the first, seem to be insurmount able obstacles in solving the traffic tangle.

First, each new day sees from 100 to 500 new motor cars added t the procession and second, it is a physical impossibility to widen all ou streets to keep pace with the increase in motor traffic.

After studying these traffic conditions, we have come to the conclusion that the orderly movement of vehicles, rather than more room to move them in, is the solution of the problem. Traffic control rather than wider road-way is the thing.

We have found that the synchronized lighting system placed in operation on Michigan Avenue in Chicago about a year ago by the Yellow Cab Company, with the approval of the South Park Board, is not only solving the problem of traffic on that busy thoroughfare but is also one of the greatest factors in the safe movement of traffic. It has worked out so successfully, although there was pronounced opposition at the beginning, that the South Park Board has agreed to reimburse the Yellow Cab Company for the expenses incurred in its intsallation.

Today everyone who uses Michigan Avenue, whether they drive a car or not, is in favor of this synchronized lighting system of traffic control It has reduced automobile accidents more than 75 per cent in this area

DISCUSSION

S. L. KING, JR. (Equitable Auto Company, Pittsburgh, Penn.): I would like to ask Mr. Kenney if the drivers are compelled to pay their fines for traffic violations. Since we have had our drivers pay their own fines we have practically eliminated their traffic violations. The question is now up to know whether they pay their repairs when they have an accident.

CHAIRMAN WALKER: We promulgated a rule about four years ago that any driver having an accident through his own carelessness, and of course we had to set up machinery to determine rather definitely whether it was really his own carelessness or not, would be expected to pay the cost of repairs. Some cases, with a serious accident, it was almost impossible of course to enforce that because a man having a collision might result in $200 or $300 of expense, and it would be a pretty serious hardship on him to make him pay that amount; so when we have those kind of cases we compromise. We have an agreement drawn up in legal form,—it is not a very formidable looking document—and in that agreement he agrees to pay for any damages that may be caused on account of his own carelessness. That obviates a difficulty we had prior to that time because we had nothing on which we could legally make him pay. He signs this agreement before he starts to work for us.

ADJOURNMENT.

Joint Meeting of the Taxicab and Delivery and Ice and Refrigeration Sections

October 1, 1924

F. P. WALKER, Chairman
Secretary, General Necessities Corporation, Detroit, Mich.

CHAIRMAN WALKER: We will permit the nominating committee of the Taxicab and Delivery Section to retire a few minutes if they are not ready to report.

KEEPING SAFETY BEFORE THE EYES OF DRIVERS

Leo D. Woedtke, Manager, Protection and Safety Department,
Fred T. Ley & Co., Inc., Springfield, Mass.

To begin with, the safety director in any firm which operates a fleet of any kind of automobiles, either pleasure type or trucks, or both, should start with himself and get down to the plane or level of the paid driver's mind, so as to see the picture as it appears to the driver and not as may seem to the Executive or office man.

These drivers do a pretty stiff day's work on the streets and highways and the mental strain plus the attiude of the public, the press and the courts has a strong tendency to put the paid driver on the defensive.

Many times the driver is forced to use unsafe equipment and take unsafe chances under penalty of discharge, or at least disfavor, on the part of some executive or boss who stands between the driver and the head of the firm and the safety man.

I have had occasion to talk to a great many groups of employees engaged in many different occupations, including chauffeurs, truck drivers and chauffeur salesmen, and I have always found the paid automobile driver a very keen minded cynic who, when warmed up on safety, will give the average professional Safety man, like our-

selves, a real lesson on the finer points of what actually causes automobile accidents.

Therefore, suppose you get all of your drivers together at a meeting, and be sure and have the meeting held on the company's time, if possible, or if you must have the meeting outside of working hours, then at least furnish a light buffet lunch and cigars. Do not have any form of entertainment at this meeting, but make it a business session. Be certain that you have each and every driver present, whether he drives a truck or pleasure type of car, even if you must have two or more meetings in case you work day and night shift.

Have with you at this first meeting, without fail, the boss or bosses who are directly in charge of the drivers and from whom the drivers take their orders as to their work and the cars that are assigned to them to drive.

Also be certain, without fail, to have present the boss or foreman of the garage where the repairs and adjustments are made. Finally, if possible, have the head of the firm, or some responsible executive with authority, present simply as a guest and an onlooker.

Open up with a talk on why the driver should be interested in Safety, using all the angles, including the public, the employer, the driver's own safety, etc., and lay your own company's accident record squarely before the men. Explain why you want the drivers to help cut down your accident record on behalf of humanity and for their own safety, their family and loved ones, and also to improve your accident cost or insurance rate, etc.

Law Enforcement

Call attention to law enforcement in your community, the attitude of the courts and the registrar of motor vehicles in your state, and stress the fact that a driver in jail, or with a revoked operator's license, is not worth a nickel to any employer, etc.

Conclude with explaining that the employer will do his part on safe equipment, repairs, adjustments, good brakes, steering gears, lights, etc., and work your drivers up into a round table, free for all discussion.

At this point be prepared for a real shock and a K. O. punch at your own and the company's pride. The driver will warm up and start to hammer hell at the cars they have to drive and the conditions under which they work, etc. Be sure and take the time to analyze these kicks of the drivers, even if some of them seem unreasonable or bitter or unfair.

If the boss of the garage and the repair men loses his head, do not lose yours but show the drivers you want to be patient and fair. If you cannot decide any one or more arguments on the spot, promise to look it up and give a decision and rectify a condition later. Be sure you go through with it later, if you want to keep the confidence and respect of the men.

Be prepared to wind up the meeting by working up the men into a voluntary contest for a period of a month, or three months, or six months.

There are a number of unique and interesting forms of contests which you can suggest to the men unless they propose some form themselves. In my own firm I have used, with quite some success, a contest between two teams in a given city or between two or more teams in more than one city, wherein the teams were chosen as follows:

Three hats containing names respectively—first, regular drivers; secondly, garage and repair men; and thirdly, executives or officers who drive pleasure type of cars. In order that an equal number of drivers, garage men and executives will be on each team, the two men drawing go through each hat in turn until all of the slips are used up. You will note at once the democracy and fairness of such a division.

The next step is to have each side choose its own captain and then the two captains choose a third party, preferably someone who is well liked and who enjoys the confidence and respect of all the men. This committee of three would have the decision as to what would constitute an accident, or in a border line case, would decide whether or not a given type of accident would be charged against a team.

It has been my custom to then get the men themselves to agree to a proposition wherein at the end of the contest period, the team having the greatest number of accidents must stand the expense of a dinner for themselves and the team with the least number of accidents. You will readily note that this puts it up to the drivers themselves and makes it a sporting proposition.

Theater Party

The company should also enter into this matter by agreeing to stand the expense of a theatre party or some good time or blow out for the entire group. In the Summer time this might result in a clam-bake or outing or Field Day, or in the Winter time, it might be a theatre party or dance. To put the last and final kick into the contest, it has been my custom to have the head of the firm, or his representative who is present, put it up to the two teams that if both teams go through the entire period without an accident, the company would stand the entire expense of both the dinner and the blow out or good time.

After one contest has been held in this manner, it can be varied in a number of ways, as the men themselves very often have unique ideas for a contest, after having been through one.

To keep interest alive among the men during the contest a striking bulletin board should be created and kept up to date in the garage or shop where the drivers congregate. This can be done in quite a few different ways such as portraying a horse race with horses' heads which can be moved along from week to week for the team having no accidents, whereas the teams having accidents are penalized by remaining still for one week, etc. Then again a bull's eye stunt or thermometer, etc., could be utilized.

In one of these contests, in our Boston district, 26 drivers wer through six months of the winter season, driving 83,000 miles, in a area of 600 square miles, including 42 cities and towns, without on single accident, which was a perfect score. I know of a number c other firms in New England who have worked out similar contests an have cut their accident rate and their insurance cost to a surprisin minimum.

You can work up these contests in new or varied form and keep ther going all the year around. To be sure you will find it harder the longe you are at it, but that will exercise your brain and ingenuity an bring you to just such conferences as this to hear what you can fror the other fellow and to give what you have learned.

My time is about up and in conclusion I want to sincerely assure yo that automobile accidents can positively be reduced to a surprisin minimum, if you will but give the problem the proper study and at tention and also that your employer will save a lot of money and suffer ing, all of which will earn for you the gratitude of the public, th employer and the driver.

DISCUSSION

W. R. RASMUSSEN (National Safety Council, Chicago, Illinois): have had the pleasure of organizing the safety department of th Yellow Cab Company in Chicago in 1921, and I agree to a considerabl extent with what Mr. Woedtke has said. We started a contest amon the drivers of that company (we had at that time three garages); w bought a silver safety trophy, mounted it on a mahogany plaque, tha cost something like fifty-eight dollars. We started a contest as to wh was to get this safety trophy. The drivers got very enthusiastic abou it, started out to work for it. We had a blackboard in every garage an every morning was chalked up the number of accidents of the garag and the name of the driver who had them.

Now, after that trophy was won by one garage, another garage coul take it away from them the following month by making a better record than the garage that won it that month.

I can remember the first one we presented that trophy to. It hap pened to be the west side garage, one of the worst we had. Mr. Gray the general manager, and I went over to present that safety trophy; when we got there the garage was one mass of flowers. The drivers had taken up a collection among themselves and decorated that garage in flowers, the office was decorated, and a large bouquet for the gen eral manager and one for the manager of the garage. Mr. Gray said. "If somebody had said 30 days ago you could make a bunch of drivers do a thing like this, I would have said they were crazy." That thing continued month after month. We did not pay them any money. We had this safety trophy going from garage to garage and it got results.

C. A. REILLY: Mr. Rasmussen was my sponsor in safety work, thanks to him, sometimes, and he put the competition board in our garage

and he put it in my mind. We run the banner system, we still have it, and we are proud of it. We change the banner from garage to garage and we find the fellows really do hustle for it.

We pay only the members of the safety council. We still work the blackboard competition, we have the banner idea, but we pay our drivers for the time we take up of those drivers of the safety council for discussing the problems as they see them on the street. There is not a day or a night that I do not go around and get to as many stands as I possibly can, stick with them, talk in the booths, talk safety, talk accidents.

I go along from stand to stand. Sometimes I fool them and start out some morning at two or three o'clock and work along the day; I may change around again and start out at nine or ten o'clock in the morning. I mean to touch everybody day and night. I get in the garages, see the operations, see the different shifts going out, and I find even in the garages you can get a few words on safety to the shift that take the cars off and on the stands.

REPORT OF NOMINATING COMMITTEE OF TAXICAB AND DELIVERY SECTION

C. H. CHRISTINE (Public Safety Engineer, St. Louis, Missouri): I beg the privilege of making the report of the nominating committee because two members feel that Mr. Kenney himself is well fitted for one of the offices and, naturally, his modesty forbids that he make such a report, and we have taken it out of his hands and ask that we make the report for him.

We nominate for chairman, C. T. Minor, Louisville Cab and Transfer Compny, Louisville, Ky., vice-chairman, representing the delivery division; Samuel L. King. Jr., general manager, Equitable Auto Company, Pittsburg, Penna.; vice-chairman, representing the taxicab division, Charles A. Reilly, safety supervisor, Yellow Cab Company, Pittsburgh, Penna.; secretary, George T. Kenney, Yellow Cab Company, Chicago, Ill.

(The report was accepted by unanimous vote.)

QUALIFICATIONS OF A SAFE DRIVER

S. L. King, Jr., General Manager Equitable Auto Company, Pittsburgh, Pa.

In order to be a safe driver, the individual must be of good moral character, possessed of all his senses, understand his responsibility, have consideration for the rights of others and be able to act promptly. He should know that the car is in such condition that no accident will result from defective equipment. He should refuse to operate a car which has defective brakes for his own and others' safety; he should know by actual application of the brakes that they function properly so that, should the occasion arise to use them, he can depend upon them to stop his car.

He should examine the car before starting to see that it is in gc operating condition, that is such items as the steering, gas and oil supp He should know that the headlights are properly focused, tires prope inflated and the spare tire ready for service. He should not neglect t battery, but should see that the proper amount of distilled water added and the battery examined weekly, also the car kept in a cle condition. He should not overlook the equipment as it results in dama to the truck and shortens the life of the truck.

He should be sure to use skid chains when it starts to rain or sn or when desirable for safety under other conditions, and should nev speed or drive in a reckless manner. He should be careful to-day tomorrow may be too late to avoid an accident, for accidents do n happen; they are caused and a well qualified driver is never in too h a hurry to be careful, for he who takes chances usually takes one t many. At blind corners where buildings or trees obstruct the view. should reduce his speed, sound the horn and keep the car under perfe control. He should drive slowly and carefully when approaching childr at play. He should never count on them to see him or to be able take care of themselves for he is responsible for their safety.

In case of accident he should secure the names and addresses of many witnesses as possible and complete information. In case of person injury, the injured party or parties should be taken to a doctor and th driver should see that they receive medical attention. It is the duty a safe driver.

He should co-operate with the traffic officers to the fullest extent f it is their intention to help. All traffic rules of the state, cities ar boroughs, through which the car is operated, should be observed ar as I said before complied with, to assist the officers in the discharg of their duties.

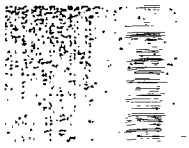
He should operate the equipment as if it were his own and, if he real desires to be a safe driver, he must keep before him SAFETY.

Accidents do not happen—they are caused.

HOW TO GET RESULTS IN ACCIDENT PREVENTION WOR

C. L. Bussing, New York City.

To get results in accident prevention you must dig and dig deep; yo must work and work with the idea of getting a careful man, a man with th fear of God in his heart. He may be just as rough as they make them but some where he has a heart; his skin may be as thick as rhinoceros, but you can get under his skin—and the place to get unde his skin is in the home. The calendar which the National Safet Council is producing is an admirable means of getting into the hom But it is my mind the particular concerns with particular trouble have to use a particular entrance to the home. We all know it i better to have a married man than an unmarried man driving an auto mobile. We all know that married men when they get home at nigh



have to talk to the wife and the child, mother or brother or the rest of the family.

To go back to my particular work, I would like to state that I am an insurance broker. I had several risks that were not doing well; I have no taxicab companies; I was asked to speak because of some of the particular information that I asked for from the Council and some of the information I had given them.

One of these particular concerns was an ice cream manufacturer. Their record had been very bad. They had had meetings, they had had bulletins posted, and it came to that place that it was necessary for me in this particular loss to act by getting on the job myself and devise means of cutting down this terrible toll of accidents that this company was having. We established meetings. Of course, you are all familiar with the fact that we should have meetings; at these meetings we had men talk with the employees, telling them the necessity of reporting accidents. We devised a special accident report which stands in the front of the driver's eyes while he is driving the car—a report such as that.

On the back is general information. which is talked over with him at the meeting, and on the inside. here, is a place for the names of the witnesses. As you know, if you have 11 witnesses and the other side has only two the chances are you win your case.

This accident report was made on heavy paper in order that the employees might be able to get the full information and not come back with the excuse they had nothing to write the names down on.

We reviewed all of the accidents in front of the men, making special efforts to have the man admit that he could have avoided the accident. We first thought we would censure the man but we found out we were in wrong; we found out it was better to have the man admit the accident could have been avoided. We posted the notices showing all of the accidents that had happened during the month, showing whether they are personal injury accidents or a property damage accident or both. We called upon the police to talk at these meetings and in addition to that, we instructed the men that the police were their best friends, and to keep on the right side of them.

We try to talk to the men in just ordinary language; say something to them that would make them sit up and take notice. We got up a bulletin "Some men of Reid have to have a kick in the guts to learn that Reid's accident frequency must come down. Beware."

At our meetings we get the boys enthusiastic and have them walk up and sign, "My Job—Your Job. Men of Reid will do their best to avoid accidents this month. Sign here." Then we post this in the particular plant.

A pasteurizer offered a set of suggestions for the safe operation of machinery. We made a poster out of it. I thought it was pretty good, and the safety engineer and everybody else thought it was fine.

Imagine my surprise at the next meeting to find that only six of the

use of this! There must be some other way out. I put up at ea plant a sign: "Men of Reid, Thou Shalt Not Kill."

The idea was to keep the bulletin board alive, and we did keep alive with posters such as the National Safety Council puts out.

We went right at them and gave them the full dope on the numb of accidents that were happening. How was this done? I find th in Reid in the first eight months, irrespective of the increase of busine some 33⅓ per cent, there were 60 accidents this year where one da or more was lost as against 108 last year. The cost of the 19 accidents for the first eight months was almost $45,000; this year the have $14,000 and some 500 dollars.

DISCUSSION

CARL H. CHRISTINE (St. Louis Safety Council, St. Louis, Missouri): The principle Mr. Bussing has used there is really direct advertisin to sell these men on his proposition. Among other varied experience I have had a little experience in the advertising field. I complimen him on that work, especially as he has not overlooked any one of th three cardinal principles for a successful campaign. First, he ha studied the men to whom he was writing, for the appeal, and that i what, if any of you men were to use a similar campaign you would hav to study to get the subjects, to get the topics and the manner in whic you are going to appeal to them. He has couched it in their ow language which strengthens the appeal, and more important than all he has not given up in two weeks or one month's time.

GEORGE T. KENNEY (Yellow Cab Company, Chicago, Ill.): In Chicago with the Yellow Cab Company, we have 5,500 yellow cab drivers. I order for a man to become a driver for our company, he must with stand the most searching investigation. He has got to come up to th ideals of the most exacting employer. For instance, he has to giv us a record dating back 10 years from the time he applies to us fo employment. We maintain a corps of trained operatives, detectives that go out and investigate that record and the mere fact that there i a misstatement of any kind in that application, is ground for rejection

ADJOURNMENT

Textile Section

September 30 and October 1, 1924

HARVEY SAUL, Chairman
Head of Labor Bureau, United States Finishing Company, Providence, R. I.

HARRY W. DONALD, Vice-Chairman
District Chief Engineer, American Mutual Liability Insurance Company, Boston, Mass.

GLENN W. COOK, Secretary
Supervising Inspector, The Travelers' Insurance Company Springfield, Mass.

TUESDAY MORNING SESSION

CHAIRMAN SAUL: Is there anything on the program, or is there anything particular in the textile industry that you gentlemen are interested in? We are going to try to make our meetings informal. We are going to discuss the subjects with those who are here.

REPORT OF COMMITTEES

MR. COOK: The executive committee, consisting of Mr. Donald, Mr. Anthony Griffith, Mr. Dearborn, Mr. Saul and myself met in December of last year and started the work for the year. The bulletin committee was given instructions, and also the statistical committee. The bulletin committee has been doing some very fine work, and I understand that we are quite a few bulletins ahead.

The statistical committee got up a form and submitted it to the different sections of the textile division. Seventeen of the plants replied to it, and this has been worked up into a tabulation, and it is published this month in the *National Safety News*, for the first six months. It is unfortunate that no more members reported, and we hope in the next six months there will be considerable more to report. At the beginning of the year there were 112 members in the textile section; seven of them dropped out, and six new firms were added, making a total of 111 plants which are represented as members of the textile section.

APPOINTMENT OF NOMINATING COMMITTEE

CHAIRMAN: I notice that the next item to take up is the item of nominating committee of officers for the next year, and I shall tak the liberty of asking Dr. Van Emburgh, Mr. Sherman, together wit Mr. Sandel of the National Safety Council to have a list of officers t present for the ensuing year.

WHAT CAUSES TEXTILE ACCIDENTS

G. W. Cook, Supervising Inspector, The Travelers' Insurance Company Springfield, Mass.

Accidents in the textile industry can, for convenience, be classifie under three heads. First, the general accidents common to all industry such as falls, hand tools; bumps, strains, hernias, etc. Second, thos accidents which occur in that part of the plant which is not strictl textile, such as machine shop, carpenter shop, power plant, or in th parts of the plant which are essential to the industry, but also found in many other industries. And third, those accidents which occur or textile machines and in the process of converting a fiber into a wover fabric.

There is a common saying that around 90 per cent of all accidents in a mill can not be prevented by mechanical safeguards. There is also a common belief that machine accidents are comparatively rare in a textile mill. These ideas are based on that erroneous measure of accidents experience, frequency. So long as a sliver in the finger is counted the same as a hand lost on a card, this belief will prevail. Many plant executives have had the unfortunate experience of witnessing a marked reduction in frequency with no appreciable reduction in accident cost. The answer is that the reduction was made in minor accidents.

Severity, and not frequency, is therfore the true measure of the accident problem, in this and in any other industry.

The engineering committee which helped devise the industrial compensation rating schedule made an exhaustive study of accident causes, using the experience of some 350,000 plants. The results are based on the cost of accidents, which is a fair measure of severity, and an excellent method of measuring the relative importance of the different accident causes.

Their figures show that 44 per cent of the cost of accidents in the cotton industry are due to mechanical causes; 54 per cent in the woolen industry, and 26 per cent in the silk industry. From this we see that approximately one-half of the accidents in the woolen and cotton mills are due to machinery.

They are divided as follows:

	Cotton	Woolen	Silk
Elevators	2.5	2.5	4.5
Power transmission	1.5	1.5	1.5
Machine drives	2	2	2
Moving parts on machines	8	8	8
Point of operation	30	40	10
Total	44	54	26

In the first six months of 1924 in the State of Pennsylvania, in the textile industry 35 per cent of all accidents, and 42 per cent of the days lost were due to machinery, by far the greatest single cause. There are many similar statistics along these lines.

You will see from these figures that the problem of machinery accidents is the outstanding safety problem in this industry. And that the point of operation on machines is by far the greatest cause of accident costs.

Point-of-Operation Accidents

Although there are many machines on which accidents occur at the point of operation, the following are the ones which this engineering committee found caused the most accidents.

Revolving flat type cards
Carpet trimmers
Roller type, body ironers
Band knives
Moire machines rolls
Pickers
Callender type ribbon finishers
Rope stranding machines
Shearers
Dry tumblers
Willowers
Carpet frayers
Centrifugal dryers or extractors
Flat work ironers
Circular knives
Openers
Pile cutters
Dying, Printing & Finishing rolls
Sewing machines
Sliver and Ribbon Lap machines
Washers

Of these the most hazardous are carpet frayer, opener, picker and willower.

It is not the purpose of this paper to describe methods of guarding points of operation. In fact, that is a subject for a paper in itself. Many of you are familiar with interlocking covers, vacuum stripping devices, automatic feeds and other point of operation guards. Beaters, licker in rolls, doffing rolls, feed rolls, callender rolls, knives, on textile machines are parts of operation to be guarded.

From what has already been said you will appreciate that the point of operation on the above and other textile machines represents the greatest single problem in the textile industry.

Our second greatest accident cause is also due to machinery. Belts, gears and other machine parts cause 11½ per cent of the accidents in in this industry. And it is probably the most difficult problem we have to solve.

There is a somewhat common belief that textile machinery is not dangerous. A belt of a given size, traveling at a certain speed is just as dangerous on a card or a loom, as it is on a lathe or a drill press. A pair of exposed gears will cause just as severe an accident on a textile machine as it will on any other machine. The textile industry has been very backward about guarding moving parts on machines and

there is a reason for this. In this industry the ratio of machines t machine workers is much greater than in the average industry. Althoug the individual machine elements are just as dangerous, the human e: posure is less. In other words if there was an operator for every m chine, there would be more accidents from this cause. And conversel the cost of preventing this type of accident is greater in a textile mil because of the large number of guards necessary per employee.

So far as I know there is no way of preventing these accidents excep by guards, and they will never be eliminated until the textile industr does go to the expense of providing these guards. Many excellen papers have been published on safeguarding textile machinery.

There is no other outstanding accident cause in a textile mill tha represents, in itself, a real percentage of accident cost. There are how ever, a number of causes peculiar to a textile mill which we may cal textile accidents, and I will try to enumerate some of them.

The practice of washing floors while the mill is in operation cause many slips and falls. The soapy condition of floors around many woo washers also caused these falls, and this is also true of wet floors i dye houses.

Picking waste from machines causes many accidents. I know o no other industry where there are so many accidents due to cleanin machinery in motion.

Injuries While Repairing Machines

Another important accident peculiar to the industry is employees bein injured while repairing or adjusting machines. They are caught i mules, looms, cards, willowers, etc. by other employees starting th machines. I believe that the reason for this is the divided responsibilit for the operation of machines in the industry. The locking of machine under adjustment and repair will eliminate most of these accidents.

The weaver is subject to the greatest variety of accidents. He is struc by flying shuttles, caught between the lay and the beam, or by th picker stick, also the weights sometimes fall on his feet. He receive infections from broken heedle wires and falls over beam shafts, and slips on spools scattered on the floor, although this last is common wherever spools are used.

The practice of slashing beams cause bad cuts on the legs.

Slivers from bobbins is a common type of textile mill accident.

In the dye house, men are scalded by hot water, particularly by tubs boiling over and some men are subject to poisoning from dyes. Steam vapor in the dye house is responsible for many trucking and other types of accidents. Exposed steam pipes cause many burns and dye house employees fall into low old fashioned tubs.

Handling bales, beams, and finished cloth cause many strains and other injuries. Bale hooks cause many accidents, and carelessness in cutting bale bands cause many more.

Mule operators get slivers in their feet, but the great hazard around mules is the carriage. Many mules have been installed. without proper clearance between the carriage and the walls or columns.

Wool sorters are subject to anthrax poisoning.

Falling spools from spinning and twisting frames is another common cause of accident.

There are probably many more accidents peculiar to a textile mill but I believe I have covered most of the common ones, and as I have mentioned them many of you have immediately thought of the method of preventing them.

Strictly textile accidents by no means represents the accident problem in the textile mill. The industry has its full share of those other types of accidents common to all industry. Infections, hernias, falls, burns, electrical shocks, trucking, elevators, struck by falling objects, cuts and bruises.

Textile Accident Problem Like That of Other Industries

In New England a large percentage of the operatives are foreign born and non-English speaking and although this makes safety work more difficult, it also makes it more necessary.

The problem of accident prevention in this industry does not differ greatly from that of any other industry. The individual accident problems peculiar to the industry have so far as I know, been all or nearly all solved by different textile safety men. Organized accident prevention work in this industry, properly conducted, will achieve all the results it will in any other industry.

Viewing the industry as one who deals with the safety problem in all industry, the outstanding reason for textile mill accidents, which appeals to me, is not our ignorance of textile mill accident causes or their remedy, but rather the accepted idea among many agents, Superintendents and overseers; that there is no real accident problem in a textile mill and that textile machinery does not need safeguarding.

Many textile mills have recognized the importance of safety work and have installed safety organizations, but have made the mistake, also made in other industries, of assigning to the safety organization only educational work.

Ignorance and carelessness cause or contribute to nearly every accident in this industry or any other industry. It is because of this fact that we conduct the educational work of the safety organization .

The engineering side of safety in the textile mill, that is the construction, installation, and maintenance of mechanical safeguards, if properly carried out means the permanent elimination of close to 50 per cent of the textile mill accidents. These two phases of the work of the safety organization are of equal importance and no organization will be successful unless this fact is recognized.

Textile mill accidents are due to a great variety of causes. No one accident cause represents a real percentage of the accidents in a textile mill, except these two, unguarded moving parts of machines, and points of operation. The point of operation is the outstanding cause of accidents in textile mills.

DISCUSSION

MR. SHERMAN: It is a very surprising thing to me, to see the percentage of mechanical and non-mechanical accidents that are brought out.

MR. COOK: That was a surprise to me when I began to investigate it, and the fault, as I mention in the paper, of all our classification of accidents is the habit we have of classing them by frequency. We have a lot of accidents in a textile mill due to slips and falls, etc., but the importance is not anywhere near as great, for example, as a man who gets his hand caught in a roller and loses it, because the cost of that accident if measured by its severity, will represent probably as much as 100 or 200 of the other type of accidents, and if we could only appreciate that preventing one cord accident, or one opener or picker accident, means more than the actual saving to the company, and saving to the man, then a great many of these sliver and other kinds of accidents could be avoided.

MR. HERRIN: How much does child labor enter into your textile accidents, where most of the work is done by women and children?

MR. COOK: Of course, I am from Massachusetts, in which child labor is handled very carefully. No one goes to work until he is 16.

What is the compensation law in your state?

MR. GRANTLAND: The compensation law is severe enough, but that does not help any after a child gets hurt. The compensation is all right; when a girl or boy gets a finger nipped off they get $11.50 a week for so many weeks; that doesn't help them very much, they make from $8.00 to $10.50 a week.

MR. COOK: This is generally the case, where the compensation law is severe enough to watch that, to keep their compensation down. How long has your compensation law been in effect?

MR. GRANTLAND: Eight years. It is only a very small State. Of course, I am the whole show, I am Secretary of the Board, and do the whole work—work out the safety problem and everything.

CHAIRMAN: What means would you recommend to overcome the condition?

MR. GRANTLAND: I want to get some sort of mild safety law passed, to make a start. We could not thing about having a real safety code introduced in our state; we have to start easy, and we don't know where to start.

MR. COOK: I don't think there is any safe-guarding law compelling them to safe-guard their machines.

DR. VAN EMBURGH: We have in New Jersey.

MR. BARLOW: The State of Pennsylvania has such a law. Pennsylvania is getting more rigid every year as to inspection, and under the present administration it is followed pretty closely. Of course, they haven't got anything near as far as those who are interested in safety would like to see them, but they are progressing along that special line.

DR. VAN EMBURGH: In New Jersey there is a very rigid ruling as regards safe-guarding of machinery; there are factory inspectors who visit the factories to see that the safeguarding devices are on, and if they are not, the owner of the company is handled severely. In our plant we have gone far beyond the actual law and have put on safe-guarding devices that are not required by the state law.

CHAIRMAN: What is the nature of the penalty?

DR. VAN EMBURGH: It is a monetary payment. I don't know what it is; it is enough to make men want to safe-guard their machines when they are told to.

MR. GRANTLAND: I hope and trust that there will be some way found to standardize all over the country

PLANNING FOR SAFETY

Raymond B. Sherman, Employment Manager, The United States Finishing Company, Norwich, Conn.

I am certain that we all have very different situations to deal with and different obstacles with which to cope. Some have managements, believing in safety but loath to back their belief by spending money for safety; not too surprising in view of the present textile situation but, nevertheless, obviously short sighted to say the least; some have overseers who have not yet learned to correlate safety with production and some have safety committees of various degrees of enthusiasm and efficiency. Our accident records are, in some cases, discouragingly high and in others, low. How, then, can we find common ground on which to stand?

It seems reasonable to start with what I believe to be an average condition, that is, a management convinced of the value of safety, realizing its relations to production and giving the necessary financial and moral support, overseers who believe that safety is a good thing and are willing to do what they can to help the work along provided it does not interfere with production, and a safety committee, interested in the meetings, ever ready to recommend guards and repairs but not particularly active in the spreading of safety propaganda or helping their fellow employees to work safely. With these conditions as a starting point, let us consider our plans for safety work.

First the manager, whose attitude and interest in safety is certain to be reflected in his overseers and assistants. Has he an active interest in the work and is he in as close touch with it as he should be? Perhaps not. Then what can be done to bring him in touch? Shall he attend the safety meetings? I believe very strongly that this should not be done for it is my experience that a dumb committee is the result of the presence of any one high in authority. I know of one plant where the safety committee was a failure due to the manager attending every meeting. After a time, however, he realized his mistake and withdrew and I believe at the present time the committee is functioning

very successfully. I do believe that to have the manager give a short talk occasionally at the committee meetings is of great value to all concerned. I have in mind the occasion of a fire in our plant which was thought to have been due to smoking. The manager considered that this was an occasion when a short talk would not only show his interest in the committee but would show the committee that he recognized them to be the most effective means of preventing such fires. In our branch of the United States Finishing Co., we have several customs which work out very well in keeping the manager in close touch. When a new member is appointed to the safety committee, the manager writes him a personal letter, outlining the duties and telling the man what is expected of him. When a member has served his three months on the committee, he is given a certificate which is signed by the manager. The manager also reads the minutes of the committee meetings and signs his name as having noted them. Every lost time accident is reported to him on a form prepared for that purpose as promptly after the accident has been investigated as possible. The safety standing of our six plants is reported to him monthly and his interest is always keen to keep our plant at the top of the list. It seems to me that keeping safety in the mind of the manager fairly constantly is extremely important for we who work at safety every day sometimes get to the point where we "can't see the forest for the trees" and his broader outlook is always very valuable.

Second, what can we plan for the overseers, the backbone of the company? They must be made to realize that lost time accidents mean loss in production and that they, being responsible for production, must take an active part in preventing accidents. They must be given to understand that no overseer worth the name will allow unsafe conditions to exist in his department. Our manager occasionally sends out letters to the overseers on the subject of safety and I quote the following from one of these letters: "Carelessness that might lead to accident is looked upon in the same light as the careless use of machinery and epuipment and the accident record for your department is taken into account in our judgment of your ability to manage your department." Overseers associations or monthly meetings are excellent opportunities to reach them and give chances for not only safety talks by the manager or head of the safety work but for discussion of safety in connection with the regular production problems. Departmental safety standing posted on the bulletin boards sometimes helps by creating a spirit of competition but my experience with this plan is that overseers, in whose departments the work is necessarily of a more hazardous nature than others, feel that they are under too great a handicap and the resentment of injustice more than offsets the value. I do not believe in having overseers attend safety committee meetings but we do have one assistant overseer or second hand present at each meeting. These men, being in particularly close touch with new employees, are impressed with the necessity of instructing them in the hazards of their work. We are, however, planning a general council in

which the management, overseers and workmen will all be represented. It is our custom to have overseers report to the manager, on a form prepared for that purpose, every lost time accident which occurs in their departments. This report is in detail and there is a space headed; "I would suggest the following to prevent the occurrence of a similar accident in the future." The value of a report of this nature is, I think, obvious. It is up to the safety man to study and know the overseers, to consult with them and seek their advice on all safety matters connected with their departments before acting and, by personal contact, to try and strengthen the weak spots for, just as surely as the manager's attitude is reflected in his oversers, so is that of the overseers adopted by the employees.

The Safety Committee

Third, the safety committee. I wonder if any of us have not had, at one time or another, the feeling that, in spite of our efforts, the interest at committee meetings was lagging and the members becoming indifferent. The safety committee has so far proven its value as to become indispensable in the safety campaign and when such conditions seem to exist, it is indeed time to get very busy and do some real planning. In the first place, give the members some definite duties and responsibilities, however small, and if they already have some, then give them some more. There is nothing that brings out what is in a person any quicker than work to do and responsibility for its being done. Then, if there is any "advance tip" or "inside dope" such as wage adjustment, plans for an outing or any new building or changes planned, let the committee have it just a little ahead of the rest of the employees for it gives them a little distinction which will mean a great deal. If the meetings have gotten into the rut of reading the minutes, safety standing, report of recommendations, accident reports and a few comments by the chairman, it is time to run in something new. Teach the prone pressure method and have everyone practice it. A large number of our accidents were caused by improper lifting and now every member of the safety committee is taught the proper way to lift and practices lifting an object that way at the meetings. Insurance companies are realizing more and more the need of spending more time and effort in safety education and your insurance company will be glad to send a special speaker to address the committee. What other plants in the company or other companies in the same line of work as your own are doing is always of interest to the committee. In our company, any peculiar or serious accident in any branch is at once reported to the other branches and talked over in the committee meetings which not only allows us to profit by the experience but also gives the members a chance to pass along some "inside dope" on safety to their fellow employees. There is one more point which, in view of the ever present argument for and against safety cartoons, I am a bit skeptical about mentioning and that is humor at the meetings. If you have in your organization an employee with a keen sense of humor, why not have him on the committee? We found such a man at one time and he was retained on the

committee for over a year because, together with his sense of humor he had real common sense and a deep interest in safety. He was a valu able member. I will admit that there is some danger in this plan bu I believe that the chairman can easily regulate it and draw the prope line between humor and ridicule. And safety is certainly firmly enough established and proven to bear some humor. We must impress upon the members that unless they are passing along the knowledge and ideas which they get and are trying to keep their fellow employees from getting hurt, they are failing in their duty as safety committee members and also that the greater part of the success of safety work is up to them.

In regard to the employees in general, there is no end to the ways and means of getting safety to them. I believe that perhaps the most effective way to impress safety upon the workmen is to keep them before the loss in wages resulting from accidents and to lay stress on what this loss will mean to them and their dependents. On the large sign board at the entrance to our plant which shows the safety standing of the several branches of the company, there is this sentence: "Because of accidents, employees of this plant have lost 183 days pay this year." The figure is changed every month when necessary and we have found it to be of great interest to the employees. W also carry this idea along on the pay envelope with a short paragraph printed on them headed: "Would you throw away this pay?" In reporting loss of time from accidents, the figure is always presented in terms of loss in wages as well as days lost. The pay envelope is perhaps the employee's most vital spot and any appeal to him by that means will not be without results.

Education of Workers

In our plant of 1200 employees, our record to date shows a 60 per cent decrease in the number of accidents over last year and a reduction from 451 days lost in 1923 to 183 days this year and it may be of interest to know some of the plans that were carried out in effecting this reduction. Our accident records were analyzed and showed 90 per cent due to non-mechanical causes so we spent the greater part of our effort in education and propaganda. Bulletins of accidents in our plant and also of our employees photographed showing such things as the proper and improper ways of lifting batches and rolls of cloth, the right and wrong ways of cleaning calendar rolls, etc., were used on the bulletin boards. A special safety pamphlet and one containing safety rules of the plant were given to all new employees. Several special safety inserts were used in pay envelopes and signs at the employment office warned persons that unless they were willing to avoid injury and work carefully, not to apply for employment. Safety stickers were placed on employees' time cards and larger ones placed on or near every machine in the plant. Box trucks used for carrying cloth from one department to another were placarded with large safety slogan signs and others of these signs were placed in conspicuous places in the plant. Calendars were posted on the bulletin boards and the safety committee

members checked off each day which passed without an accident. Many other means were used which I will not describe as I know that they are more or less familiar to all but our effects were first to educate the employees in safety and then to keep safety before them continually.

Some joker has said that the way to train a wife is to "Get them young, tell them nothing and keep them broke," and it seems to me that this may be revamped into the way to train a safe worker is to "Get them young, tell them all you can about safety and keep them interested." If this plan can be carried out systematically and consistently, we are bound to develop in our plants an organization of safe workers in whose minds and hearts is the real spirit of safety which is the ultimate goal of our safety efforts.

In closing, I quote from an article by Mr. Arthur Williams, president of the American Museum of Safety and General Manager of the New York Edison Company.

"The man who holds the most important safety job in America, and probably in the world from the standpoint of number of employees effected and money invested, has said that he would rather accept responsibility for accident prevention in a plant that did not have a single mechanical safety device, but where there was the spirit of safety among the workmen and managers, than in a plant where there was every known physical safeguard, but not this spirit of safety."

WEDNESDAY MORNING SESSION

CHAIRMAN COOK: Mr Saul, chairman of the section, is ill this morning, so he turned the job of presiding over to me.
he turned the job of presiding over to me.

REPORT OF NOMINATING COMMITTEE

MR. SHERMAN: We submit the following report for nominations for the offices during the coming year:

Chairman—Harry W. Donald, chief engineer, American Mutual Liability insurance Company, Boston, Mass.

Vice-Chairman—Glenn W. Cook, supervising inspector, Travelers Insurance Company, Springfield, Mass.

Secretary—B. F. Griffith, J. P. Coates, Inc., Pawtucket, R. I.

(The report of the committee was accepted by unanimous vote.)

THE TEXTILE WORKER—HEALTH—REHABILITATION OF THE INJURED

Dr. George H. Van Emburgh, The Clark Thread Company, Newark, N. J.

The wearing-out, breaking-down or crippling of the human machine in industry will continue to occur as long as work exists. Despite the

wonderfully successful efforts of safety engineers to protect these machines from external violence, by safe-guards, and by better organization and education from the dire sequel of carelessness and neglect, they continue to become maimed and crippled.

Although the employment manager and the medical department have striven together to pick the right type of human machine for the job at hand, and although they have greatly lessened the number of misfits, some of the machines still continue to give out or are broken under the strain of unsuitable work.

In spite of the efforts of the industrial physician who strives constantly to protect his machines by providing them with hygienic and sanitary places in which to work, and even though their health is guarded by well conducted cafeterias and by periods of rest and recreation, some of them become disabled; others develop internal disturbances which predispose to early and ready injury.

The importance of this restoration to usefulness of the industrially injured is soon apparent when we inquire into some of the factors which underlie it. According to an admittedly conservative estimate by Commissioner Charles H. Verrill, of the United States Employees' Compensation Commission, there are at least 2,500,000 industrial accidents resulting in temporary disability each year. Our records in New Jersey show an increase of reportable accidents. There were 42,990 in 1921, 46,603 in 1922, and 66,641 in 1923.

Perhaps some of this may be due to a better system of reporting accidents of late, but the importance of the great number of injured is only accentuated. Thousands of these have suffered grievous and irreparable injuries. It is estimated that 75,000 have amputations, 5,000 have lost the sight of an eye—and over 500,000 have stiff or weakened hands, arms, or legs as the result of fractures, severe burns, or extensive damage of the soft parts.

Unless these disabled workers are rehabilitated, or, as Mock aptly terms it, "reclaimed," many of them will become "cripples," a term we would do well to strike out of our working vocabulary.

When Mental Troubles Begin

During the long days of inactivity and suffering following a severe accident, the patient's mind is constantly troubled. He is disabled, and almost invariably he holds his work and employer directly responsible, forgetting his own carelessness or disobedience. He worries about the pains of the days to come; he is uneasy about his family, for he knows the temporary compensation is not enough to keep things going smoothly. Perhaps they can manage for a little while, but when will he be able to work again? Here one of the most insidious of evil factors enters. "What if he should be unable to work?" The thought terrifies him. He broods about it. He recalls some friend who has been "crippled," and his anxiety and morbidness greatly retarded his recovery.

In this depressed and doubting frame of mind there is an unwillingness to suffer the further pain which is often necessary to strengthen a

weakened limb or loosen a useless stiff joint; and so the man becomes more or less disabled.

How Industry Deals With the Injured

Unfortunately, some employers still consider the human machine as something to use to the utmost for gain. When it has become disabled, they are no longer interested in it. They pay the injured what compensation the law demands, and then fire him, feeling that they have entirely discharged their responsibility, for to re-employ such a handicapped worker would add a compensation hazard which they do not feel morally obligated to assume.

The doom of these handicapped workers is almost certain, for if the concern responsible for their injury will not put them back at useful work, their chances of finding a suitable job in another factory are small indeed. Other employers are not interested in them, for there is no doubt but that the worker who has lost part, or all, of the use of an arm, eye, or leg is a greater hazard, in most industries, than one not so handicapped.

They drift from one job to another, constantly dropping to a lower scale because of their unfitness and lack of training in the newer work, until finally they relinquish all effort to work. These make up the loafer and beggar of the street corner, the shoe-string merchant, and the physically handicapped and mentally debased for whom their families and communities must provide.[1]

A step toward the solution of this problem has been suggested by Hazlett.[2] If the state carried the insurance of these handicapped workers, the employer would no longer need to diicharge them to protect himself from an increased hazard and compensation claim. The state, too, would benefit through the increased earning power of the insured, and through the lessening number of those dependent upon state aid.

The New Jersey State Department of Labor has established a fund from which one-eyed workers who are blinded by an accident to their sole remaining eye, receive the difference in compensation between blindness of one eye (100 weeks) and total blindness (400 weeks).

Prior to the establishing of this fund it was almost impossible for one-eyed workers to obtain employment in our state.

2. Some concerns, through a mistaken idea of kindness, give their seriously handicapped workers easy jobs, such as gateman, watchman, or messenger, but the very softness of these jobs robs them of all incentive and the bitterness of the realization of their lost ambitions adds to their incompetency, and many of them drift on to the scrap heap.

3. The third group of employers have a more enlightened viewpoint. They try to return all of their disabled to suitable and useful work. This often necessitates teaching them an entire new trade, or breaking them in in a new department; but it keeps the handicapped at gainful work and it keeps up the morale and confidence of the employees in their company.

Industry has been concerned with the problem of industrial hygien and the conservation of human productiveness[3] for the past fifteen years and some industries have had elaborately organized departments fo reclaiming their sick and injured for many years, according to Mock But it took the Great War, with its thousands of dramatically wounded to awaken us to the necessity of rehabilitating or refitting all of ou handicapped, so that they might be able to compete with the mor fortunate.

Mental Factors in Rehabilitation

If a man is gainfully employed, and believes that by his own effort he may occupy an independent and self-supporting place in his com munity, he will soon forget his limitations and devote all his energy t making good.

Man's chief limitation is within himself. The loss of an arm or le does not of necessity make a cripple. We are all of us familiar with someone so handicapped, who has made good, and as our work of recon struction continues, this number will be greatly increased.

Industry's only interest in reclaiming the disabled is not by any means philanthropic. Since the advent of compensation laws, the manu facturer has been penalized for all serious injuries to his employees and temporary compensation must be paid until the injured is able t return to work, or the case is closed in court. It is only natural, there fore, that we should make use of every means to secure the speediest possible return of our injured. Permanent compensation must be paid not only for the actual loss of some bodily member, but also for every case of resulting weakness, stiffness, contraction, or disabling deformity, no matter how slight. It is not sufficient that a wound be healed, or a broken bone united. The injured part must be restored to perfect use fulness or the employer must pay for the loss.

The length of temporary disability can be greatly cut down by re constructive measures; and these same measures will, in many cases, make it possible finally to discharge a worker from treatment with a perfect functional result, where there would otherwise have been a costly permanent loss.

The most frequent causes of long continued disability are (1) pain, (2) weakness, (3) stiffness, or (4) loss of some part of the body, (5) exaggeration, (6) malingering, and (7) the neuroses may also pay a part.

To avoid or minimize these factors, we should begin our reconstructive efforts at the earliest possible moment. It is of the utmost import ance that the patient be kept in a hopeful and contented frame of mind, and he must have complete confidence in those who are caring for him. One of the surest ways to antagonize an injured worker, and start him on the road to discontent and fault-finding, is to attempt to learn all of the intimate details of his accident, or fix the responsibility, by a grilling or tactless third degree. Remember, he is sick and in pain; this makes him apprehensive. He should be treated with every considera tion. His care should be in charge of a competent industrial surgeon.

If this surgeon is a member of a general hospital staff, and assumes sole charge of the injured, it will engender confidence in the worker, minimize confusion in treatment, and assure him, in many cases, better care and attention than he would otherwise get.

Consultations with specialists may be held as required, but there must be no indecision or wavering in the conduct of the case, or the patient will be quick to detect it and doubts will be implanted in his mind.

Don't lie to him. He will learn the truth and then your influence with him is at an end. Assure him that he will get the best of care and that nothing will be left undone. Remove his fears of the future by convincing him that he will be able to work and be self-supporting; and see that his family does not come to want. A little money and kindness here will be amply repaid later.

Keep the Mind Occupied During Convalescence

As he recovers from the pain and shock of the injury, he must not be permitted to lie in bed for hours, unoccupied save with thoughts of his troubles. Give him something to do and he will get well sooner. I try to find out what my patient has been interested in before the accident. Many times it has been a course of study at night, drawing, designing or needlework. If it is possible, urge them to continue it. Take an interest in their efforts and encourage them. Point out to them that this is an opportunity to carry on their studies or enjoy their hobbies. Many of our patients have produced beautiful and useful articles of wearing apparel while hospitalized.

In many cases I request the nurses to furnish them with a supply of gauze to be folded and made into dressings. All of this is occupational therapy. It should be started with most patients while in the hospital, and may be carried on during convalescence.

Vocational re-education may be merely the carrying on to completion of their studies, so as to prepare an employee, so injured as to be unfit to return to his former work, for some other occupation. Or, it may be necessary, during convalescence, to teach them some new way of doing their work, or perhaps they may have to learn an entirely new trade or operation; but, in any case, they should not just be cured of their anatomical ills and then be discharged from treatment, and left to shift for themselves. If they are, they will quickly sink into a state of depression. They will compare themselves with unhandicapped individuals, and perhaps, after an effort or two to make good, will cry out, "What's the use? I can't hold up my end with the other fellows." Thus we have placed another burden upon the family and community, have lessened the confidence of our workers in their employers, and have undoubtedly added greatly to the amount of compensation our company must pay.

Physiotherapy Aids in Recovery

As the wounds or broken bones begin to heal, other helpful reconstructive measures may be employed. Various fields of science have supplied us with indispensable adjuncts in our efforts to secure the speediest

We use (1) heat, (thermotherapy); (2) electricity, (electrotherapy) (3) hot or cold baths or douches, (hydrotherapy); (4) light, usually artifically generated for its high ultra-violet content, (heliotherapy); (5) mechanical apparatus; (6) massage; and (7) active and passive movement. These are all grouped under the one term—physiotherapy.

Almost every case of injury, whether civil or industrial, that is dismissed from our general hospitals. with the perfunctory "cured" on their chart. shows some evidence of disability. If this is permitted to remain the patient suffers and industry pays. However, by means of physiotherapy we are usually able to relieve the pain, build up and strengthen the tissues, and loosen stiff joints. This sounds as though physiotherapy were a panacea or cure-all, suitable for the exploitation of quacks. Unfortunately, many physicians have looked upon it as such, and have therefore deprived their patients of its benefits. But chiropractors and osteopaths, who were quick to see its possibilities, have adopted it wholesale. However, because of their inability to diagnose properly, and because of their lack of knowledge of the indications and limitations of physiotherapy, the results have not always been satisfactory.

Physiotherapy is one of the most important factors in cutting down compensation awards, which are becoming ever larger, due to a broadening of the law. It removes. or minimizes. the factors which prolong temporary disability. and by increasing the restoration to function, it obviates. or lessens a permanent award.

Examples of Recovery Through Physiotherapy

A few of our examples in The Clark Thread Company are typical of what may be accomplished generally by concentrated effort to reclaim the injured:

M. L. had a comminuted fracture of her right shoulder. When discharged from the hospital as "cured" the disability was 85 per cent of her arm. By means of physiotherapy it was lowered to 33⅓ per cent, a saving of 51⅔ per cent of the use of the arm, and $1.085.04 Compensation.

J. F. suffered a severe injury of his left hand. When discharged from the hospital with his wounds all healed, the hand was practically useless. By means of physiotherapy we restored his hand to 80 per cent of its former usefulness and saved the company $1,440 permanent compensation.

J. H. had a badly comminuted fracture of the thigh. Before the beginning of physiotherapy his disability was 60 per cent of the leg. After a prolonged course of treatment the leg was restored to perfect use—no permanent disability and $1.785 saved by the Company.

C. S. had a severe burn of her left arm extending from the shoulder to the wrist. After the wounds were healed there was 25 per cent loss of usefulness to the arm. Under treatment this disability was removed. The arm is now as strong and free in movement as before the accident, and a permanent compensation award of $850 was saved.

It is more difficult to show the actual savings in temporary disability because a comparison with like types of cases untreated with reconstructive measures would be unfair, on account of many extraneous factors. Nevertheless, we feel certain that the return to usefulness and function, of our injured, is much more speedy than anything we witnessed before the use of physiotherapy.

Perhaps the severity rates would be of interest. The following figures show severity rates for a period of years in the same plant under approximately the same conditions before and after the advent of efforts at rehabilitation:

1920	.532
1921	.401

After the introduction of reconstructive measures the rate has fallen to:

1922	.285
1923	.107

This means that employees are returned to work much more quickly now than was possible before.

This phase of our work is of such importance that we have recently established completely equipped branches of our medical departments in two of our smaller outlying plants, one six miles and the other twelve miles distant from our main hospital. However, these branches are intimately associated with our main organization, and a uniform type of treatment is employed.

Many states have established clinics where this work is carried on for those concerns which have no provisions for such treatment in their plant hospitals.

There are many cases of permanent loss of body substance which we must attempt to replace with artificial limbs. These workers will then, of necessity, need to be re-educated and perhaps vocationally trained before their rehabilitation is complete and they are again ready to work for a living. Still, others are injured in such a way that it is impossible to supply them with artificial limbs. In these cases it may be necessary to vocationally re-educate the injured and thus, by teaching him some useful occupation, we make him an independent and self-supporting citizen instead of a cripple.

J. R. was an ordinary department sweeper when his right had became caught in a tube-ticketing machine and three fingers and part of a fourth were amputated. Because of his loss he was unable to return to his regular work. He had been interested in figures and we ecouraged him. He studied bookkeeping and now fills a position in our office. A short time ago he said to me, "It was hard to lose my fingers, but I guess it was the best thing after all, for I never would have got very far up in the department."

Let me repeat, a man is never a cripple unless he believes that he is. It is our duty to convince him that he is not, and to back this up by restoring his body to the greatest possible usefulness, and by then finding him gainful and suitable employment.

Our Company has been one of the first in the State of New Jersey t appreciate and adopt methods of caring for its sick and injured; an its president, Mr. J. William Clark, was one of the members of th original Board of Commissioners through whose efforts the New Jerse Compensation Law was drafted. We believe, wholeheartedly, that all c our efforts have been amply rewarded.

As the movement for human conservation and reclamation spreads, it benefits will be multiplied in untold degree among the workers, thei families, communities, and perhaps most of all, the industry itself.

References

1. H. Mock, "Industrial Medicine and Surgery."
2. T. L. Hazlett, "Rehabilitation of the Industrially Handicapped."
3. Kober and Hayhurst, "Industrial Health."

DISCUSSION

CHAIRMAN: Doctor, in your statement about the vocational re-edu cation, is it your idea that the employer should pay for that—stand th expense of re-education?

DR. VAN EMBURGH: We have done that, and have found the expens of vocational re-education is small, because of the increase in moral where the employees know that that is done; we think the mone spent for that purpose is very well spent.

MR. COTCHER: Do you find men bumming on the job?

DR. VAN EMBURGH: That is my job. I think you will find that every. where. The place we get that particularly is where we return an em ployee to do light work; we put them back at light work and pay them their salary, and then they do not want to go back to their own work, as long as they get their pay they want to stay on the easy jobs. We use our judgment, and as soon as we think a man is strong enough to return to his occupation, we return him. We pay a 10 day wait- ing period in Jersey; the 10 days must be paid if the employee is absent from his work more than seven weeks; but our company, if the injury occurred to any on account of any defect in the machinery, pays the 10 days waiting period promptly.

MR. COTCHER: Do you have a physical examination?

DR. VAN EMBURGH: Yes, sir: that is one of the most important parts of our work, the physical examination, to fit them for the work they are to do. It is the easiest thing in the world to go into a factory and have a task assigned you when you start, and two weeks after- wards go down-stairs and skip a step and say "ouch", and the company is out three or four hundred dollars for hospital charges, and other charges: many people realize that and try to put it over. They always look around to be sure they have two or three witnesses before they let out the yell.

CHAIRMAN: Is a witness necessary in Jersey?

DR. VAN EMBURGH: An accident must occur by some stress or strain: it must be accompanied by severe pain; there must be prostration following it; and it must be reported to the company in 24 hours; and it must be followed with inability to work the following day. It is easy for one to carry out all five of them.

CHAIRMAN: In New Jersey, all of that is required of you. In Massachusetts a man may work for a couple of weeks and go home and report that he got a hernia in a certain way, and at a certain time, and that is all that is required.

DR. VAN EMBURGH: That is unfair to the employer and the employee. A physical examination remedies all that; a man comes into the hospital and when we examine them we find that they have bad feet, or bad ankle diseases—we cut them out right there before they get in the plant; or they might have an acute contagious disease, and they are cut out before they get in the plant where they might spread that.

Re-examination

MISS SOUTHALL: Do you have a re-examination of your old employees?

DR. VAN EMBURGH: Not at stated times, but we do encourage them to come down. There are very few of our foremen who will go beyond the year period without coming in. Almost all of our executives come for examination, and a great many of our workers do, although it is not compulsory. It ought to be done, and it is the sort of thing we are working toward.

CHAIRMAN: When you put the medical examination into effect, did you examine all your old employees?

DR. VAN EMBURGH: No; if they leave work and come back and are re-employed, and there are disabilities, they may be able to get their old jobs, but if they are old employees the company says they are willing to accept them. There are a number of old employees who have other positions. We make a job for them, and we look after them and advise them all we can, and we do not attempt to eliminate them if they have been in the service a very long period of time.

MISS SOUTHALL: May I ask the Doctor what your success has been in grading employees for other jobs, according to their limitations?

DR. VAN EMBURGH: We have four classifications; employees fit for any work, employees who are fit for small detail work, employees fit for more and greater detail work, and employees not fit for any work at all.

ADJOURNMENT

Woodworking Section

September 30, October 1 and 2, 1924

G. E. SANFORD, Chairman
General Electric Company, Schenectady, N. Y.

E. ROSS FARRA, Vice-Chairman
United States Gypsum Company, New Brighton, N. Y.

H. G. WIBERG, Secretary
Lumber Mutual Casualty Insurance Company of New York, New York City

TUESDAY AFTERNOON SESSION

CHAIRMAN SANFORD: I appoint as a nominating committee to select the officers for next year: E. Ross Farra, manager of the Reading-Berks County Safety Council; M. C. Goodspeed, General Electric Company, Erie, Penn., and J. I. Fisher, of the Willard Storage Battery Company.

DISCUSSION OF SAFEGUARDS

MR. ROLAND JONES (Surty Manufacturing Company: Our method of guarding rip saws has been primarily a guard comprising a splitter back of the saw and an automatic hood raising and lowering over the saw.

The best method we have found and which has worked out the most successfully is by having the splitter setting on a 45 degree angle back of the saw and the front turned up on the opposite 45 so you are working on two 45 degree angles. The guard comes in contact with the lumber no matter what the thickness may be, closes automatically keeping the saw cutter at this degree and allowing the work to pass through, also having a kick-back dog on the back to prevent a board from bending and kicking back for the rip saw work.

The same type of guard works out equally as well on the cross-cut table where the table does not tilt. This same type of guard we have begun to realize will probably have to be multiplied to meet the codes which are being strengthened a whole lot in a great many places, but the same type of guard will cover tilting table work. I understand that the new code of Pennsylvania is calling for a splitter even on a tilting table and a guard passing through the splitter.

MR. FARRA: What about the operator seeing the saw?

MR. JONES: We leave every guard open in front to give the operator clear vision. We made a survey some years ago and found the majority could not see the saw. We figured leaving them open in the front would overcome the objectionable point, and have found it successful.

MR. J. I. FISHER (Willard Storage Battery Company): You all know what a double wedge saw is. It is fed with a chain on one side and a hold down roll ahead of the saw and a hold down roll on the rear of the saw on the other saw.

We have taken the roll and, instead of having it unfurled as it is now, we have made a new roll and milled a tongue on to it one-half an inch long set behind the saw. Now, when your material is fed in it acts as a spreader and prevents the kick-back or fly-back. You know, in double edging, your kick-backs don't come from the material split off after passing through. It is the material on the long pieces that get on the edge and fly back. This will prevent it.

We have had a bad puncture wound from a kick-back from the tunnel, so we edvised a little kick-back guard attached to the bed of the machine on one side made of sheet metal. It is attached to a spring. so when the material is fed in to the machine and passes that and touches the cutter it automatically closes up against the chain feed, so if your wood splits in there it can't kick back.

MR. R. McA. KEOWN (Wisconsin Industrial Commission): The Simmons Bed Company, of Kenosha, uses an underslung slitter saw for a certain operation cutting material of the same width. As you step on the foot treadle the guard automatically comes down. This is supposed to be fastened to the table leaving an opening only large enough for the material that is being processed. As you take your foot off the treadle, the guard goes back as the saw recedes into the housing. They are using that in their plant very successfully. It is rather a simple operation, and I think that if any of you desire to get blueprints of that, they will be glad to send them to you.

Finger Type

The so-called finger type of guard on the take-away side of the clipper is as good as any I have seen, but the trouble with it is that it is not always used, and on some jobs they claim that they can not use it: for instance, in measuring up fruit boxes, where they take a great many thicknesses of thin veneer, and they wish to take it away in a pile. The finger guard will disarrange the pile so they say it is more of a nuisance than a help, but we have quite a number of serious accidents from the take-away side of the machine.

MR. FARRA: There is just one way of handling the old-timer. That is by continually attempting to educate that man to the place where he will use a guard. There is no other way, in my opinion, to do it. If you were an employer of men, you would not fire him. If you did, you would be one out of a million. I am both the employment manager

and the safety engineer. and I know where that type of woodworking machine hands are as scarce as they are now nine-tenths of the industry would not fire him. Therefore, the only thing you can do is to educate him, and I think eight times out of ten he can be educated if you keep at it long enough.

I was for nearly seven years in a plant where four-fifths of the operators were men of 50, many of them operating saws and shapers for nearly 30 years or more. In the end, I got most of them to use guards.

MR. JONES: I believe, gentlemen, in a case of that kind a whole lot of the blame can be laid to the supervision of the higher-ups! in other words the management. If that same man, that old man who won't use a guard should sit down at 10 o'clock in the morning and light his pipe to have a smoke on a pile of shavings what would the foreman say to him? He doesn't do that. He knows there is a rule against it. I claim in the adequate use of safety guards if the management has spent its money and provided an efficient guard that will prevent accidents and protect the operator he should also co-operate in enforcing the safety rules in that plant. I don't believe there would be any employee who would not finally use the guard. He might become unruly and quit his job, but I believe that same man in two weeks time would be back looking for a job again if he knew that was a rule they had to live up to.

MR. ROOF (Willard Storage Battery Company): In our carpenter shop we had quite a bit of trouble about seven years ago, and our manager called the foreman of the department up and told him that the men had to use the guards or the foreman would be responsible and lose his job.

MR. FISHER (Willard Storage Battery Company): In that same carpenter shop we have had a man for fifteen years. He didn't use a guard when he got there. I finally went over and talked to him, talked about other machines to him, and I got his ideas on guards and other machines. He gave his ideas on another machine and then we finally put him to work on that machine with his own guard. We got him to use his own guard on his own machine where he had been working for years. If you antagonize him you are going to lose out, but if you nurse him along and try to educate him your way, show him the use of the guard he will use it.

WEDNESDAY MORNING SESSION

CHAIRMAN SANFORD: Since the last Safety Congress in Buffalo, N. Y., 1923, 68 new members have been added to the section, cancellations during that time being 31, giving us a net gain of 37, and a present section membership of 403.

The section held one meeting during the year, that being in con-

which meeting was very well attended. The membership of this section is, to a large extent, composed of companies, the major portion or all of whose business is that of woodworking.

The section officers, as well as the National Safety Council headquarters would be glad to receive from any or all members of the section suggestions as to bulletins of timely information, and we sincerely hope that our members in the lumber and logging plants, saw mills, etc., will assist in submitting subjects for bulletins. These do not ncessarily need to be photographs, as a description of a picture could be used by the artist in making up sketch where photographs were not readily available.

SAFETY IN THE LOGGING AND LUMBERING INDUSTRY

John A. Dickinson, Mechanical Engineer, U. S. Bureau of Standards

Whatever shortcomings the logging and sawmill safety code may possess, no one can logically bring the charge against it that the industry was not hazardous enough to warant its preparation.

The employment of statistics in a paper of this kind is not generally advisable but there are two tables which show the hazards of this particular industry in a very striking manner.

The following table, prepared by the Prudential Insurance Company, gives an estimate for the year 1916:

Industries	Employees	Fatalities	Rate per 1000 Employees
Metal Mining	205,000	700	3.41
Coal Mining	750,000	2,273	3.03
Fisheries and Navigation	158,000	474	3.00
Electricians (Light and Power)	71,000	160	2.25
Army, Navy and Marine Corps	176,600	353	2.00
Quarrying	91,000	173	1.90
Lumber Industry	558,000	837	1.50
Railways, Steam (Interstate)	1,673,000	2,370	1.42
Coke Ovens	32,000	45	1.41
Ore Dressing	24,000	33	1.38
Building and Construction	1,575,000	1,969	1.25
Draymen, Teamsters, etc.	720,000	720	1.00
Street-Railway Employees	336,000	336	1.00
Ore Smelting	44,000	36	0.82
Watchmen, Policemen, Firemen	210,000	158	0.75
Railways, Electric (Interstate)	75,000	45	0.60
Telephone and Telegraph (Including Linemen)	257,000	129	0.50
Agricultural Pursuits	12,600,000	4,410	0.35
Manufacturing (General)	7,641,000	1,910	0.25
All Other Occupied Males	5,125,000	3,792	0.74

As may be seen by an examination of this chart, the lumber industry not only shows a high rate per thousand men employed (1.50) but also ranks high in the list of total fatalities.

The second table, prepared from a report of the Bureau of Labor Statistics, of later date, separates the woods operations from the actual manufacture of lumber and shows how hazardous the logging phase of this work is.

Industries	Employees	Fatalities	Rate per 1000 Employees
Electric Light and Power	31,366	160	5.73
Lumbermen, Woodchoppers, etc.	205,315	903	5.00
Policemen, Sheriffs, etc.	116,621	431	4.10
Coal Mining	780,837	2,370	4.08
Water Transportation	96,067	384	4.00
Metal Mining	151,792	524	3.66
Warehouses, etc.	131,442	333	2.84
Steam Railroads	1,280,137	2,591	2.25
Road and Street (Chauffeurs, deliverymen, etc.)	878,669	1,625	2.05
Oil and Gas Production	91,022	177	2.05
Quarrying	77,960	135	2.04

According to this summary, logging is more hazardous than coal mining and ranks high in *total number* of fatalities; this without taking into consideration the fatal accidents occurring in and about sawmills. Obviously, the lumber industry is one of our most hazardous industries.

In most of the ordinary manufacturing processes, it is possible to fix and control the conditions under which the material is processed and consequently to provide, by means of mechanical structures or carefully worked-out methods of procedure or both, a reasonable degree of safety for the operator. In logging, this is not true; the timber must be felled where it grows, be it on a level plain, or on the 30-degree slope of a mile-high mountain. The angle at which the tree grows and the arrangement of branches—factors which determine to a large extent the direction in which the fall must be made—were determined years, perhaps hundreds of years, ago.

Employment of Skilled Men

Much valuable timber grows on rugged, almost inaccessible, ground. It has been stated in one of the Forest Service publications that at least twenty per cent of the Douglas fir cut on the Pacific slope is lost through breakage in felling due largely to the steep, rocky slopes on which it grows. If this is true, and there is no reason to doubt the accuracy of the statement, it is obvious that the sections broken from these huge trees as they crash down on the rocky hill-sides, form of themselves a serious hazard.

These dangers can be minimized only by the employment of skilled men under the most experienced supervision; even under these conditions, unusual physical conditions may result in accidents which it is almost imposible to anticipate.

River driving, perhaps the most spectacular phase of logging, is beset with hazards, few of which can be mitigated save by the employment of highly skilled crews. Even with the most experienced men, serious and fatal accidents are all too common.

It is unfortunate that in the past little attempt has been made to improve river conditions preparatory to the drive. The removal of stumps, bowlders and ledges during the low water stages of the river will, to a large extent curtail the number of jams, consequently reducing the number of men needed for the ever-hazardous work of breaking up such jams.

Another serious hazard to men working in the woods is fire. A considerable number of lives are lost every year in forest fires. While care on the part of logging crews may prevent fires starting on their logging area, they are still exposed to the hazard through the carelessness of hunters, campers, through sparks from locomotives and even by lightning.

Logging operators should, of course, take every precaution to prevent fires originating on their property, by providing spark arresters on locomotives, donkey engines, powerhouse smoke stacks, and waste burners.

Bridges and trestles should be provided with water buckets and combustible material should be removed from around trestle footings. In many cases, trestles and bridges are the best means of escape from burning areas, and it is important that they be available in case of emergency.

While it is true that in felling, there are certain hazards due to the nature of the terrain or the peculiarities of growth of the trees themselves, it is not in this phase of logging that the greatest number of serious accidents occur. The loading, transportation, and unloading of logs is the most hazardous work in the entire industry—or, at least, produces the largest number of serious and fatal accidents. Many of the hazards are mechanical and could be eliminated, or minimized, by use of properly chosen equipment, maintained in good condition through frequent inspection.

Material Handling

One reason for the severity of the typical accident in the handling of logs is the weight of the average "stick" handled. A saw log containing 400 board-feet is only an average-sized log in most operations, yet it will weigh in the neighborhood of a ton, while logs of a dozen times this weight are common on the Pacific slope. A "pinch" between logs of this size is usually a very serious matter.

To a person familiar with ordinary manufacturing processes, the question would naturally arise "Why not handle such material entirely with machinery and keep the men out of the way of the logs?" Unfortunately, it is necessary to have loaders which are portable and can be easily and rapidly moved from place to place. Handling machinery of the type used in a steel mill or a factory would not be practical for work in the woods. Then, too, the logs vary in size and shape so it becomes necessary to have a crew of men available to assist in loading so that even, stable piles may be built up on the log cars.

In unloading, an operation responsible for many bad accidents, there seems to be room for considerable improvement. In most mills in the East this is done by a crew who first chop out the holding stakes and then roll the logs off the car with peevies.

In the West, mechanical unloaders have been used extensively, because the large size of logs handled make hand unloading impractical. Many of these unloaders need no power other than that furnished by

the movement of the train. One of the simplest of these consists of a long timber pivoted at one end and arranged to extend over the tracks. When a car is to be unloaded, it is brought up to the unloading skids, the stakes, chopped part way through, and the free end of the timber, which is generally provided with a steel point, is brought to bear against the load. The "poke", as the unloader is called, now makes an acute angle with the track and points to the rear of the train. As the engine is started, the "poke" swings toward a position at right angles to the track, at the same time pushing the load off the opposite side of the car. If long logs are to be unloaded, a pair of hinged pokes may be used, in which case they are generally tied together with a third timber parallel with the track. The method of utilization is the same.

For some reason there is little or no use of such devices in other timber districts, although their use would undoubtedly remove one of the most serious hazards in the industry. Recently I visited a modern hardwood mill in which the machinery had been very thoroughly guarded, the layout was as near ideal as will be found anywhere, the natural and artificial illumination were all that could be desired, yet the unloading of the log cars was handled by a crew of eight men armed with pike poles and peevies. A mechanical unloader which would require not over two men, would have paid for itself in a few years in the saving of labor alone, and would surely have made the operation a much safer one.

The transportation of logs to the mill has always been one of the most hazardous phases of the lumber industry. The compensation insurance rate on "Logging railroads" is, or was a few years ago, triple that of the actual logging or sawmill operations.

Derailment of Trains

One of the chief sources of accident in the operation of logging railroads is the derailment of trains. Because most logging roads are temporary, the right of way is not prepared with anything like the care that would be exercised if it was to be used for passenger service. Ties and rails are small and light and in many cases ties are spaced so far apart that the rails will spring under the weight of loaded cars. The California Logging Code, which was brought out seven or eight years ago, specified the weight of rail and spacing of ties to be used on logging railroads. Compliance with such minimum requirements should do much to secure safe logging railroads although the condition of the road bed itself is of great importance if accidents are to be prevented.

Many logging railroads are laid out with insufficient clearance, particularly through rock cuts. I recently rode on a narrow-gauge line where the clearances were so small that a log projecting six inches beyond the side of the logging car would be caught on the sides of some of the rock cuts. Several tie-ups which had occurred on this line were due to this cause. The hazard to a switchman or brakeman riding on the side step of a logging car when passing through such cuts is

less than the compensation for one member of the crew. The use of snow plows which will clear a path wide enough for the train and a switchman standing along side of it is very desirable, but unfortunately such width of plow is not common.

The manufacture of lumber is in quite a different category from logging—natural hazards are replaced by man-made hazards. A large percentage, in fact a majority, of the reported sawmill accidents, are machine accidents. When the fact that practically all sawmill machines run at very high speeds and require relatively large amounts of power is taken into consideration, this percentage is not surprising.

The use of band saws has, to a certain extent, decreased the hazard of cutting the log into slabs. With the old-style circular saw running at a speed of approximately 10,000 feet per minute, a slab or even a smaller log, which jammed on the saw, could be thrown with tremendous force down the mill, whereas the band saw, having no component of motion in the direction of travel of the log, offers no such hazards. The band saw itself is not, however, entirely without its hazards. A broken saw flying at the ordinary cutting speed, which is from 8,000 to 11,000 feet per minute, is very dangerous. Fortunately, however, such accidents are comparatively rare. The band wheels themselves, which are generally made of cast iron, are run at speeds considerably in excess of that used with cast-iron wheels in other industries. While it is true that most of these wheels are carefully designed and balanced, it is necesary to inspect them at frequent intervals to make sure that they are sound and running true, and to test the spokes and rim with the hammer in order to detect any fine cracks which may have developed. No wheel with cracked rim or spokes should be allowed to run.

Guarding the log carriage is a fine example of the employment of so-called substandard guards. A 42-inch rail along the carriage runway may be a protection to passers-by but is a menace to the men on the carriage, should a log be thrown over onto the carriage when being loaded from the log deck for a high rail in the rear of the carriage may prevent the escape of the carriage crew. Similarly, a failure of the driving shackle or any one of a number of accidents which might occur, may require that the setters be in a position to step off the carriage quickly. A guard rail not higher than the height of the carriage is therefore indicated.

Edgers

Edgers are probably responsible for as many serious accidents as any other machine in the sawmill. They are virtually power-fed rip saws which trim the rough edges of the slab to be normal to its face and thus provide a board or plank which has been cut on all four sides. If the saws become dull or if the stock pinches on the saw for any reason, there is a probability that either the plank or the edging, or both, will be shot back at the operator at very high speed, unless

the edger is provided with either the safety dogs or jam rolls to catch and hold such material.

Trimmers and slashers should be provided with barricades both in front and in the rear as in case of a jam of material between two saws, it is possible that the wood so jammed will be picked up and thrown with approximately the velocity of the saw. Very frequently such jams result in broken saws, and saw fragments flying with the velocity of two miles a minute are only slightly less deadly than shrapnel. That such accidents are relatively common may be proved by the examination of the roofs of many old sawmills; almost invariably one finds patches in the roof where fragments of saws or other missiles have been thrown as a result of jams. In view of the large amount of power required to drive slashers and trimmers and the heavy material handled, it is necesary to install exceptionally heavy barricades. In the Logging and Sawmill Safety Code, there is a photograph of a barricade made of 2-inch planks which has been completely pierced by a missile from the slasher saws.

Shingle and lath mills offer a decided hazard to the fingers of the operators, unless they are equipped with automatic feeding devices, as in the more modern mills. Every possible protection should be provided over the saws of such equipment.

Lumber stackers are frequently subject to injury either through collapse of pile or falling of lumber when stacking or unstacking. Many collapses of piles can be directly traced to improper foundations. The Forest Service has recently been carrying a campaign of education on the need of proper pile foundations. This was based largely on a better seasoning and protection of lumber from dry rot, but such foundations mean better and safer piles and consequently, fewer yard accidents.

There are accidents on record of men being blown from the top of a lumber pile when stacking lumber in a high wind. Men should be instructed to handle lumber with the edge toward the wind where its velocity is high enough to seriously interfere with their work.

Roofs

Dry-kiln tops and the covers in the past have been largely built of wood. The escape of steam from the green wood contained in them will, in a comparatively short time, rot out wood in overhead structures, and where it is necessary for men to go on the roof to adjust vents or dampers, such accidents are almost inevitable. On a recent trip through the Great Lakes lumber district, I received reports of three such accidents, one of which was fatal. An all-concrete, tile, or metal kiln is very desirable not only from the standpoint of safety, but from the standpoint of upkeep as well. Kiln doors should preferably be of the horizontal sliding type. Swinging doors are likely to blow shut when being loaded or unloaded, and vertical doors are subject to the criticism that unless the counterweights are secured with a non-cor-

rodible metal cable, it is only a matter of time when one of the counter weights drops through failure of the rope, and allows the door to descend. Another objection to this type of door is that frequently it is not raised the full distance and in either pushing in or taking out a loaded car, lumber on the top of the pile may catch on the bottom of the door and be thrown off on the loading crew below.

These are a few of the common hazards which the committee has endeavored to cover in the American Logging and Sawmill Safety Code. This Code is now available in print and has been distributed to State officials and lumber organizations and manufacturers of equipment. Copies of this publication known as Handbook No. 5 of the Bureau of Standards, may be obtained through the Superintendent of Documents, Government Printing Office, Washington, D. C. at sixty cents per copy.

REPORT OF NOMINATING COMMITTEE

MR. G. A. ORTH: I have been requested to read the report. The following selections were made by the committee:

Chairman, G. E. Sanford, General Electric Company, Schenectady, N. Y.

Vice-chairman in charge of program, H. G. Wiberg, Lumber Mutual Insurance Company, New York City.

Vice-chairman in charge of statistics, E. R. Farra, New Brighton, N. Y.

Vice-chairman in charge of membership, logging and lumber, C. J. Pettibone, Edward Hines, Yellow Pine Trustees, Lumberton, Miss.

Secretary, J. B. Grier, American Car and Foundry Company, Wilmington, Del.

(The report was accepted by unanimous vote.)

FIRE PREVENTION IN WOODWORKING PLANTS

Charles E. Springer, Kentucky Actuarial Bureau, Louisville, Ky.

Where any question may be raised as to proper method of procedure, whether in installation of hazards or in making changes or improvements in your risk, I would suggest you consult with the fire underwriters having jurisdiction; they will be represented in your locality and are always ready and able to advise you.

Conditions in a risk are reflected in the fire insurance rate, and it is human nature to expect that a consideration be shown in rate for improvements made. I trust, however, you would be willing to make improvements where it would tend to better conditions and prevent a possible fire, even though no rate consideration be shown. Keep in mind that property destroyed by fire is gone forever. Insurance may reimburse you to some extent, but it does not bring back the property destroyed, nor does it prevent fires. Keep before you the *prevention* idea, as it is difficult to disassociate the two terms, *prevention* and *protection*, the fire prevention engineer today being a very important factor in our economic life.

In order to discuss the question before of fire protection in woodworking plants, it will be necessary first for us to consider what is in the class that requires protection. What is likely to produce a fire? From a fire point of view there are many excellent risks, but no perfect one. There are risks where every hazard has seemingly been given the best of attention, but even in these you are likely to find some condition that may bring disaster to that plant. There are other risks in which it might be predicted with a certain degree of assurance that a fire would occur, and it does, but in most cases it occurs when least expected. Misfortune has resulted in many cases because business was so good the assured felt he could not take the time to clean up his risk, but continued on the producing end only until too late.

Let us divide woodworking risks into three general classes: first, *saw mills*, producing the rough lumber from the logs; second, *planing mills*, preparing lumber for building purposes, etc., and third, *those risks involving varnishing or other like processes*, such as furniture factories. There are, of course, many different classes of woodworkers, other than those specifically mentioned. Here in Louisville we have wagon works, farm implements factories, cooperage plants, veneer factories, box and crate factories, piano and pipe-organ factories, dump car plants, handle factories; flooring plants, novelty factories. We also have factories making base ball bats and golf sticks, and—last, but not least—coffin factories.

Saw Mills

Let us first consider the saw mill class, which might be divided into dry and wet log mills, and further into the portable class and the more permanent class. The portable class does not operate longer in one locality than to cut out the timber near at hand. Buildings are of more or less light frame shed construction; boiler is of the portable type, under same shed with saw; stack through roof, without any clearance—in fact, in many cases partly supported by wooden roof timbers; slabs and sawdust accumulations are left in close proximity to boiler, the operator no doubt feeling, if he gives the matter any though at all, that he will get away from that locality before any accident happens to his plant. Even such risks, no matter how temporary their character, should be properly guarded, by providing ample boiler and stack clearances and maintaining good housekeeping conditions. Otherwise, it is possible that the entire plant and its product may be destroyed. It sometimes happens that the general character of employees at such plants is not of the highest and it would make little difference to them if the plant did burn. The more permanent type of mill is of more substantial construction and, as a rule, better conditions prevail in such risks.

There are three classes of hazards common to nearly all woodworking risks, viz: power, heat and light.

Power is usually from steam, although other forms are used. Boiler arrangement has been found to be the same in some instances as in portable type mills; this, however, is the exception, and not the rule. Building should be of good, substantial construction, with boiler in fire-

proof building or cut off from mill section by a good fire wall, wi openings protected by standard fire doors so that, if a fire should occ in either section, the possibility of its spreading into the other sectic would be remote. When we speak of any standard device, we mean o approved by the Underwriters' Laboratories. Where boilerroom is n fireproof, ample clearance should be provided for both boiler and stac and ventilation should be given boiler overhead. Boiler stacks shou extend a sufficient distance above the roof of any building and be pr vided with spark arresters.

Refuse is ordinarily used for fuel and, whether hand or machine fe should not be stored in such position as to be subject to spark hazar when furnace is fired, and should never be placed on a direct line wit the furnace door. Too much danger is involved in the careless handlin and storage of refuse.

Many plants use the Dutch Oven feature in feeding refuse to boiler This hazard is not so serious as might appear, provided boiler house i fireproof or incombustible and conveyors, down spouts, etc., are meta It might be posible to buckle unprotected steel roof trusses over boiler if an excessive amount of refuse should be allowed to accumulate o oven. This I hardly think liable to happen.

Shot-gun Type of Log Carriage

The shot-gun type of log carriage is another possible source of dange in a saw mill, as these cylinders many times rest on combustible base and have been found covered with sawdust and refuse. Steam cylinder should be supported on incombustible bases and provision made to pre vent, if possible, any accumulation of refuse on them. If impossible t prevent same ordinarily, a portable type of cover might be provide which could be easily removed to permit the removal of refuse. It ha been suggested that an opening be cut in floor under cylinders to permi refuse to drop through. This, however, is unsatisfactory from the floo opening point of view, as floor openings should always be reduced t the minimum, both as to size and number. Again, such an arrangement might permit of the accumulation of rubbish at a point seldom visited, producing a condition which would either create a fire in itself or tend to rapid spread of fire should one occur.

Where refuse accumulations are too heavy to be taken care of under boilers, the open slab burner pit is often employed. This should be of a standard type and located not nearer than 200 feet from mill or other building or lumber yard. If less than that distance is maintained, then a sufficient (20-foot) guard or embankment on mill side should be provided to prevent sparks being conveyed to other sections of plant. Conveyor and its supports to be incombustible the required distance (10 feet) from the pit.

The tower, or chimney, refuse burner is also used, which is less hazardous than the open pit arrangement. Conveyor and supports connected with burner must be incombustible.

All bearings should be metal and readily accessible. Oil should not be permitted to drip on floor. Combustible timbers supporting large bearings should be protected by metal and have an oil-tight metal drip pan beneath each bearing.

Where heat is necessary, it should be steam, with pipes free from contact with combustible material.

Lighting, when necessary, should be by electricity; equipment installed in accordance with the requirements of the National Electrical Code.

In addition to the proper arrangement of hazards to prevent a fire loss, provision should be made to fight a fire, should one occur. Where plant is large enough to warrant, a private water works system with yard hydrants and hose, also a fire organization among employees, should be provided. Inside standpipe and hose service, large chemicals on wheels. hand chemicals of approved type or casks and pails, all properly protected against possible freezing are necessary.

Some plants are protected by automatic sprinkler equipments.

Watchman with approved clock service should be provided, and advantage taken of Central A. D. T. service where available. Where in a city having a fire alarm service, the watchman's stations should be of the combination watchman and fire alarm type. Some plants assign the night watchman the duty of supervising housekeeping conditions after regular working hours. The watchman's regular duties, however, should never be interfered with.

Lumber Yards

Lumber yards should be given proper consideration. Heights of piles should not be excessive; proper streets or alleys should be maintained; yard hydrants properly housed and provided with necessary equipment, supplied by own pump or tank or from city service, should be installed. Care should be exercised to see that hose and hydrant connections are such that the city department can make use of them. Casks and pails should be distributed and maintained. Signs forbidding smoking should be posted and enforced; this order is too often violated. Yard should be maintained free from rubbish; it is not often that a fire occurs in a well maintained and fenced yard. Where engines enter premises they should be provided with spark arresters, and ash pans should never be emptied in the lumber yard.

You may perhaps feel that I am suggesting conditions which it would be impossible to bring about; but there are many, many plants having one or more of these conditions existing in them. The carrying out of these suggestions would tend to bring about ideal conditions; ideal conditions would reduce the loss ratio, and a reduced loss ratio would mean not only a conservation of our lumber supply, but also a lower fire insurance rate on this class of risk. (The same general suggestions will apply to other classes.)

Let us now consider for a few moments the planing mill class. The hazards of heat, light and power in risks of this and its allied classes are similar to those of the saw mill, and the same general suggestions as to their arrangement and protection apply. Buildings of this class are

usually larger, have greater floor space, are more fully enclosed a built for greater permanence than those of the saw mill class. Refu is more finely divided, is dryer and more susceptible to fire, and shou be better guarded by installation of blowers to all machines whe practicable and floor sweeps where blowers do not take care of refus There are many more types of machines in this class, operated by ind vidual motors, necessitating closer attention to installation and maint nance. Motors should be properly enclosed and, where necessary, vente to outside of building.

Heating Systems

The hot air blower heating system is frequently found, with lon runs of large diameter heating pipes, piercing brick division walls. I such cases, proper automatic cut-off should be installed in pipes a division walls. The same protection should be provided in piping i connection with blower systems where passing through fire division wall

Where necessary to use stoves, they should be of a substantial cha acter, firmly set on an incombustible base or in a sand box enclosur to catch falling ashes or sparks. Stove pipe should vent into a goo brick chimney; both stove and pipe to have sufficient clearance from an combustible surroundings.

Electric light bulbs, where subject to breakage, should be protecte by guards. Gas should not be used for lights unless absolutely necessary but where used should be from stationary brackets with jets properl protected and every reasonable precaution taken to guard against an possible danger.

One of the most common and important hazards of this class is th redrying feature. Kilns should be of fireproof construction, with stand ard fire doors at openings. Steam pipes therein are better arranged when located at sides or overhead. Interior of kiln should be protected by sprinklers, having one or more sources of supply, also by steam jet with control valve conveniently located outside. Where there is a ventilator, a damper should be installed and arranged to operate by hand. Ventilator control should be located near steam jet valve.

In many cases drying machines are used for conditioning thin lumber. Where practicable, dryers should be protected by automatic sprinklers. Steam is probably the best extinguishing agent for fires in dry rooms or drying machines.

Shavings vaults should be of fireproof construction; walls to be of brick or concrete and extend through roof; opening to boiler room to be protected by standard fire door. Vault should have screened ventilator opening in roof and be equipped with sprinklers if available, or with steam jet with quick-opening valve conveniently located.

In some risks of this class there is the additional hazard of glazing, priming and painting. Where combustible volatiles are used in such processes, they should be properly guarded. Where waste or rags are used to rub oily machinery, they should not be thrown into some corner, but standard cans should be provided in which to deposit them.

In the third class (varnishing risks, etc.) we have practically the same features of heat, light, power and dry rooms as in those already considered. The added hazard of varnishing and dipping is a very serious one unless the necessary safeguards are provided. The use of highly inflammable compounds subject to flashing at ordinary temperatures and giving off inflammable vapors presents a serious fire hazard. Dipping should be carried on in separate fireproof buildings or rooms. Walls should be of brick or concrete, ceiling fireproof or incombustible; floors should be fireproof or, if combustible, covered with sheet metal and, where possible, waterproofed and scuppered; door openings should be protected by standard fire doors and window openings by standard wire glass windows in metal frames.

Inflammable Liquids

Inflammable liquids used in dipping should be stored in outside buried tanks properly vented, and conveyed to dip tank only through an approved pumping system or standard portable containers. Tanks should be of substantial construction and firmly supported to prevent a possible displacement. Drip boards and other appurtenances should be incombustible. Tanks, other than small ones, should be provided with overflow pipe discharging to outside drain tank. Tanks of 500 or more gallons capacity should have automatically and manually operated drains. Drain should preferrably terminate in outside buried tank, properly vented. Valve should be of an approved type, preferably of a sliding disk and lever pattern. Pipe should be trapped. Ventilation should be, if possible, by natural means, vents to be placed at both ceiling and floor levels, in outside walls. Care should be taken to prevent pockets of gas in outside enclosures or in corners of room. Tanks should have incombustible covers, arranged to close by hand and automatically. Cover should be kept closed when tank is not in use. If impracticable to use approved cover, tank should be equipped with an approved foam extinguishing system (this, of course, for large systems). Hand extinguishers of the foam or tetrachloride type should be installed, as this type is especially adapted for fires in this class. Standard waste cans should be provided and [illegible] smoking. Hose streams should not be used in case of a fire in a dip tank, as they are more likely to cause a spread of the fire rather than its extinguishment.

Where spraying is carried on, it should not be in the open, but in spray booths, well ventilated to avoid an atmosphere which, if not explosive, will permit a rapid spread of fire. Fires in spray booths result from fans or motors used in exhausting the booth, from broken lights or from cleaning the booth with highly inflammable solvents.

Glue pots are a possible source of danger, depending upon fuel used. The safest arrangement would be from steam, with all pipes free from contact with combustible material. The idea of fires occurring from steam pipes has many times been ridiculed, but such fires have occurred. But even if such a thing were impossible, if you should produce a charred or thoroughly dried out condition in woodwork, you realize fully

how much more rapidly it would burn if an accident should happen. For the same reason, proper clearances should be provided for all combustible materials from contact with or close proximity to heated surfaces, whether furnaces, boilers, stacks, etc.

The hazard involved in finishing where rubbing is carried on should be considered, and provision made to properly take care of oily rags, etc., by means of standard waste cans.

The storage of quantities of upholstering materials, moss, tow, excelsior, cotton, etc., should be in separate rooms or in bins, metal lined and covered.

Even though you may have considered favorably every item of hazard in your own risk, you may have a near neighbor who has not, and it will be necessary to consider the hazard of exposure from his risk. The nature and extent of recommendations in such case will depend upon the construction and conditions in each risk.

In conclusion, permit me to say that in its last analysis the entire subject is quite elementary. In woodworking risks you are dealing with combustible materials, and combustible materials are subject to destruction by fire. The more finely divided these materials are, the quicker they burn; hence, a very important factor is the proper care of refuse and dust and of maintaining best possible housekeeping conditions. Fire is more likely to occur in a dirty risk than where good housekeeping conditions are maintained.

Guard all hazards as fully as possible by standard installations, and maintain these conditions. Provide as full a complement of extinguishing agents as may be necessary to fully cope with any fire which may occur. Install a standard automatic sprinkler system, if possible; then you will have an excellent aid on the premises while you are away. If unable to erect fireproof buildings, erect such as contain the minimum of combustible materials.

With the annual fire loss in this country now exceeding the enormous sum of $500,000,000, 75 per cent of which is preventable, it behooves each of us to take every reasonable precaution to reard this drain on our national resources.

DISCUSSION

MR. FISHER: We have in our plant five hose houses. Each house is manned by seven men, and we have universal fire department connections. We have the A. D. T. system and it shows exactly where the location is. One company goes to the back end of the plant, another to the front end, another sets up at a hydrant in front of the plant, and our plant fire department is working on the fire while the fire department is arriving. They will set up at our hydrant inside, disconnect our line, and attach to the pumper.

I believe there are certain conditions in woodworking plants where you can extinguish fire with 50 pounds pressure better than you can

with 125 pounds. In box factories, for instance, you get a fire in the piles of boxes and you have got to get that fire on the floor and knock it out. You have got to use 125 pounds pressure; then, after you get it knocked out, you can use enough pressure to soak it with water. Underwriters' rules say they shall be piled 18 inches from the sprinkler heads, and you can't get your two and a half line in there unless you have the proper clearance.

CHAIRMAN SANFORD: In some of our plants at the General Electric we use a mixture of soda and sawdust for dip tanks, particularly the smaller ones, or those where you can get action around the tanks. You can't use that on a tank that is confined in a closed place very well. That sawdust is stored in boxes with the top of the box not over three and a half feet in height, and slanted. The entire surface after the box is filled is covered with brown paper, and around all these tanks we keep a stock of these ordinary long-handled iron snow shovels, which works very nicely on small fires.

There is another scheme that we have to a very limited extent on dip tanks, and that is an installation of the foamite extinguishers in brackets immediately over the tank. The extinguisher is tipped over at about 30 degrees and the bottom of it held off from the framework by a connection with a fusible link, so that as soon as the links melt through that tank swings down on the pivot and lands business side down and gets to work.

MR. LUND: In the Grand Rapids factories, over the naptha dipping tanks, which are used yet, although most of the stains are water stains now, we arrange a hinged lid over each tank, supported with a fusible link. If anything happens in that tank there is a flash, the fusible link goes and the lid closes.

MR. FISHER: The rubber industries in Akron think so much of sawdust in their local fire department they have a truck load of sawdust that responds to every fire, and they have a great many of those fires. I think if you will look back about six or seven months ago in the *National Safety News* there is a table grading the different materials for extinguishing fires. It will show you what is best for each fire.

THURSDAY MORNING SESSION

RESULTS OBTAINED IN SAFEGUARDING OF WOODWORKING MACHINERY DURING THE PAST TEN YEARS

R. A. Prouty, Safety Engineer, Ætna Life Insurance Company, New York City

It is the duty of the historian to prepare a systematic record of past events—a record so arranged that the relationship of the individual events one to another and to the sum of them all can be readily

ascertained and studied. Such a record should show important ou standing facts in logical order and in such a manner that prope emphasis is given to those that have contributed to progress or hav had a retarding effect.

There is but little satisfaction, however, to be derived from a mer recitation of what has been done in the past. Rather, our purpos should be to determine if our energies have been directed in the prope channels, if our efforts have produced results that are satisfactor and how we should chart our course for the future. As children most of us were required in our study of history to memorize a seemingly endless list of dates on which different events occurred Today, educators are placing less stress on the memorizing of masse of data and are encouraging their pupils to look behind and beyon the facts to underlying causes of historical events and the effec of those events upon the human race. As students of accident pre vention we can, with advantage, avoid the academic and cultivate the practical point of view.

We may, with benefit, consider a few specific machines, but before doing so, let us turn aside for a minute and review some of the causes of the ever-increasing interest in safeguarding which seems to have started on a large scale approximately ten years ago. One of them was the formation of the National Safety Council through which valuable information gathered from many sources was put into the hands of users of machinery. The organization of the Woodworking Section of the Council early in its history has provided another medium for the exchange of ideas and comparisons of results obtained from the use of various types of guards. Another factor of prime importance was the enactment of workmen's compensation laws in state after state in rapid succession. The unfairness of charging all plants in the same industry the same rate regardless of physical conditions was quickly recognized and a system of schedule rating was soon devised by means of which credits could be obtained by installing safeguards. I would not care to give you the impression that a financial incentive was necessary to get manufacturers to safeguard their machinery for such was not the case. Hundreds and thousands of plant owners were installing guards because of a humanitarian desire to prevent unnecessary suffering and loss of life and limb. Nevertheless the possibility of reducing insurance costs strengthened that desire in many instances and provided a stimulus for others who are not disregardful of safety but who had never had the ways and means of promoting it brought forcefully to their attention.

A survey of conditions in the woodworking industry ten years ago shows that the essentially dangerous nature of the machinery employed was recognized and that earnest efforts were being made at that time to provide effective safeguards. In the light of our present knowledge, some of the guards then used seem rather crude but anyone who will take the time and trouble to examine photographs and drawings of

guards of that period will perceive at once that their makers had a good understanding of the fundamental principles involved. Such improvements as have been made since are more of the nature of refinements, than radical changes in design.

Development of Circular Saw Guards

For the first example, let us consider the circular saw as it is at once the most common woodworking machine and in an unguarded condition, one of the most dangerous. The need for protection over the saw blade has been recognized ten years ago and the use of the riving knife or splitter was common. Splitters of one form or another have been used almost as long as power driven saws themselves. But the protection provided was inadequate. Many saws were provided with a simple band of iron or steel curved to conform to the contour of the saw blade. Others consisted of similar metallic bands with side flanges extending beyond the roots of the teeth. At the best these guards offered but partial protection and were not held in very high esteem by the operators.

The desire to limit the operator's vision as little as possible probably was responsible for the designs just mentioned as well as other incomplete enclosures. From the curved flange to the full hood was not such a very long step, yet some of the first hood guards interfered so much with the operator that their use was soon discontinued after a trial. Those who tried solid hoods complained that the sawyers could not see their work and other hoods made by placing wire mesh over flange guards provided to be but a little better because of the blurring effect produced when the saw was constantly watched through the mesh. All early hoods had the common fault of requiring manual adjustment when changing from one thickness of stock to another.

At the present time it is possible to secure a guard for almost any circular saw job which will adjust itself automatically to the thickness of the work, will cover the saw blade entirely and will permit a reasonably complete view of the saw without eye strain or blurring.

Band saw guard design has not changed much in the last ten years. It is true that there used to be a good many band saws guarded on the operator's side of the machine only but the best guarded plants ten years ago had guards which entirely enclosed both the upper and lower band wheels. There has been one improvement worthy of mention, namely a guard for the portion of the blade between the upper band wheel and the sliding guide. On the whole, band saw guards are better constructed today than formerly in that fewer and fewer of slat guards with wide open spaces are found in use. Solid guards and ones made of small wire mesh are more in evidence.

Jointer guards, like band saw guards have undergone no radical change in the past ten years. Cylindrical heads were in use for a number of years before 1914, but the square head was altogether too common. There has been quite a change in the attitude of jointer owners toward guarding in the period under consideration. With the introduction of cylindrical heads, many who had been using point of

operation guards discontinued them believing that the new type head in itself was all the safety device necessary. The degree of danger, of course, is materially reduced when safety heads are used but the practice of the best equipped plants today is to use both cylindrical heads and guards that adjust themselves automatically to the stock.

Proper Guards Do Not Hinder Operation

It would be possible to continue our study and trace the changes made in guarding other woodworking machines. It has been proved beyond any doubt that boring machines, planers, mortisers, sanders and other forms of woodworking equipment can be made comparatively safe without great interference with the work.

It would be gratifying if it were possible to make a scientific study of the accident records of a large number of woodworking plants in which mechanical safeguards have been used constantly and conscientiously during the past ten years. An analysis of this nature, coupled with a study of the safeguarding methods employed, would undoubtedly show us whether our present practices are fully effective and if not, in what particulars they are failing to produce the desired results. Moreover, we could reasonably expect to obtain, as a by-product, information which would be invaluable in preventing accidents in this basic industry.

When one attempts to assemble and analyze data for this purpose he soon encounters difficulties. In his search for large groupings of woodworking plants to study, he turns naturally to reports of state labor boards, industrial accident commissions and other bodies charged with the duty of compiling accident statistics. A review of a file of such reports shows an insufficiency of essential information on one hand and a lack of uniformity in the methods of preparing it on the other. It is time that several states put out reports that are quite complete insofar as they relate to the number of accidens caused by various machines and the lost time occasioned by such accidents.

Even such reports, in a given state, are not comparable one with another over a period of years to determine if the general accident situation is improving because the exposure element is missing. It dos not mean much to learn that there were fewer accidents and less lost time unless we know if the reduction was due to a corresponding decrease in employment or to effective accident prevention measures. Again, state reports are an unreliable index to the results obtained from safeguarding because it is impossible to tell if the plants responsible for the bulk of accidents have been fully safeguarded or not.

It is commonly believed that insurance companies have statistics from which accident frequency and severity of any industry can be computed quickly. Such is not the case. The number of accidents reported from each cause is available—the lost time accasioned by them could be figured—but like the state reports, insurance figures do not contain satisfactory exposure data. Workmen's compensation insurance premiums are based on the payroll exposure and as a consequence, insurance statistics would show the number of accidents and the amount

of lost time per unit of payroll expenditures instead of per unit of man hour exposure.

Statistical Tabulations Valuable

The voluntary furnishing of individual plant records to the Nationa Safety Council for publication and study is certainly to be encouraged The figures published in the July issue of the *National Safety New* are prepared in a form which renders easy a comparison of one plant's record with that of another or with the average for the industry.

The caption used at the beginning of the article in the *Nationa Safety News* is rather startling, "Woodworking Accidents Fewer bu More Severe." It would lead us to believe that the average wood working plant while able to reduce the number of accidents has failed in its efforts to eliminate conditions likely to cause injuries of considerable seriousness. Statistically, this would appear to be true but I should like to direct your attention to a few facts regarding the figures that constitute the woodworking section accident statistics

During 1923, the records of 82 plants were submitted and upon these figures the 1923 accident frequency and accident severity rates were based. Of the 82 companies that sent in their records for 192 only 47 had sent similar records in 1922. In all fairness the records of those who reported for 1922 should be compared with their own records for 1923 before making definite conclusions. Of course, it is desirable to figure accident frequency and accident severity rates on the greatest possible number of plants. Such rates reflect average conditions better than would others computed on the experience of a smaller number of units. Nevertheless, in comparing yearly averages for 1922 and 1923, we should keep in mind the fact that 35 more plants are reported for 1923 than reported for 1922 and the introduction of their records, favorable or unfavorable, may swing the genera average one way or the other and not show whether those who sub mitted records for 1922 have made any progress.

Taking the ten groups in the order in which they appear in the tabulation and considering only the plants that reported in both 192 and 1923 we get the following results:

	No. of Companies reported for both years	No. of Companies with lower frequency rate for 1923	No. of Companies with lower severity rate for 1923
Sash, Doors, Blinds and Interior Trim Mills ...	13	9	5
Saw and Shingle Works	9	3	3
Veneer Mills	2	1	0
Furniture Manufacturing	8	5	6
Piano Manufacturing	2	0	1
Agricultural Implement Mfg.	3	0	0
Other Companies (Misc. Mfg.) having large woodworking depts.	5	3	1
Box and Package Manufacturing	0	..	..
Coopers and Cooperage Stock Mfg.	2	1	1
Miscellaneous Woodworking Companies	3	2	2

Total No. reported for both 1922 and 1923—47.

Percentage of plants having better frequency rates for 1923—51.

Statistics Indicate Value of Safeguards

With this direct comparison of the same plants for 1922 and 1923 before us and the knowledge that approximately one half of them have bettered both their frequency and severity rates, there is every reason for optimism and the belief that safeguards have indeed prevented accidents in the woodworking industry. Differing local conditions, the effect upon the industry of sectional booms and depressions and various other factors make it difficult to compare with justice the records of different concerns. The best use any concern can make of its accident records is to compare them with its own previous records and utilize the result as a guide for its accident prevention activities.

Negative evidence of the value of safeguards is found in a recent investigation of fifty circular saw accidents involving the loss of 76 fingers, by the N. Y. State Department of Labor. Only six of the machines on which the accidents occurred were properly guarded. Six others were provided with inadequate guards and the other 38 had no point of operation guards at all. It cannot be argued that the provision of guards would have prevented all of the accidents but it is reasonable to assume that their installation on the machines in question would have saved a large number of fingers Proof that woodworking safeguards do prevent accidents is best found in a study of individual plants where they have been employed. Through the courtesy of officials of plants I shall mention, I am permitted to quote their accident experiences: The Willard Storage Battery Company, of Cleveland, Ohio, started to keep accident records for its woodworking department in 1920 and its practice is to establish a ratio between the days worked and the days lost on account of accidents. Beginning with 1920 it was as follows:

1920	.....	15 per cent
1921	.....	39 per cent
1922	.....	42 per cent
1923	.....	18 per cent

Woodworking safeguards are provided for all machines and it is interesting to learn that only eight of the 76 accidents occuring in the four-year period were due to machinery in motion; moreover, three of these accidents are directly attributable to violations of safety rules. Two others occurred when saw guards were improperly raised and three were due to the slipping of operators' hands from material being worked on sanders.

Experience of Prominent Concerns

The letter to the Timber Products Manufacturers, Spokane, Washington, was referred to the Inland Empire Safety Council which, while unable to give definite figures, stated that the plants belonging to the Associated Industries of the Inland Empire located in Washington and Idaho had reduced their accident frequency and severity from 50 to 75 per cent by a combination of mechanical safeguards and education. Director Floyd L. Daggett expresses the belief that the best results

can be obtained by pushing the educational work after mechanical safeguards have been installed.

With all of its woodworking machines guarded at the point of operation. the Montgomery Furniture Company of New York City is able to show a clean sheet so far as machine accidents are concerned.

Himmelberger-Harrison Lumber Company very kindly reviewed their accident records and reported that 85 per cent of all of the accidents in their plant were minor injuries principally small bruises and cuts and dust in employees' eyes. This concern manufactures lumber, operates band saw mills, planing mills, a table top factory and a heading plant where slack barrel cooperage stock is manufactured. Since all of the machinery has been safeguarded only one serious accident has occurred and this was held due to defective mechanical equipment.

The Globe Wernicke Company, Cincinnati, Ohio. was unable to supply any figures covering its accident experience over a period of years but stated that the concern had gone the limit in providing safeguards. The most interesting information given by this company is its statement that the installation of guards has in no way retarded production. Such are the records of a few representative plants that have taken an active interest in safety and have provided guards for their woodworking machinery.

DISCUSSION

MR. SMITH (T. H. Mastin Company): Out of about 700 sawmills that we carry, we have shown a great increase in the last seven years in accidents, about a 100 per cent increase in accidents, and an increase in severity of about 125 per cent, but that is figured as a money cost, not as time lost, so it really is not indicative of anything, because in Misisssippi where we used to pay $25 for a smashed finger now we pay $1,500, so that doesn't mean anything. But accidents have actually increased just around 100 per cent in the last seven years in sawmills.

MR. JENNINGS (Graceland Lumber Company): I have had success with education, especially in severe accidents. We have about 1,500 men, and in the month of August we had two severe accidents. I remember three years ago, when I began on this work we had as high as 15 severe accidents a month. When I left home this month we had three severe accidents.

MR. MCGINLEY (Cloverdale, La.): We have been in the safety game about a year and after we organized a council and started an educational campaign we cut down our accidents 40 per cent. It is altogether an educational proposition, we find.

MR. SMITH: The trouble in the South with the lumber industry, more or less, is that it is mostly a temporary proposition. A man puts up a mill for $18,000 or $20,000, his labor is more or less floating, and there are several mills within five or six miles. If the fellow

doesn't like the job he will float over to the next one, and then he will float back. We can fix the mills up and guard them and still they will get hurt.

If you want good suggestions on lumber mills, write to the J. J. Newman Lumber Company, at Hattiesburg.

SAFETY IN SAW MILLS AND PLANING MILLS

B. E. Kenney, W. P. Brown & Sons Company, Inc., Fayette, Ala.

This business is one of the most dangerous occupations in which men engage, as it envolves labor of the heaviest kind throughout the entire operation. This necessitates a very sturdy and hardy workman, and it is very difficult to train these men to take care of themselves. Saw mill men are a different breed from workmen in most any other industry, and are hard to make or take the time and trouble to safeguard themselves from injury, but I am sure that we are rapidly becoming more civilized, and that in the last few years we have seen the "light", and know that the rules and regulations laid down by the Safety Council, and other organizations, are helping us in more ways than one.

Hazards first start when the logs are unloaded from the log car by the derrick and placed in trough of log chain that conveys logs to the mill on log deck. The tong hooker is the employee in danger here. He must be very careful in hooking his logs, and should not be allowed to wear gloves as he is in danger of getting them caught between points of the tongs and the logs. Most accidents are due to this and are generally finger wounds. The log trough must have a sufficient depth so as not to permit the log to fall out on its trip into the mill.

Upon its arrival on log deck in mill it is kicked by steam kicker out of trough on to the log deck skids. This log deck should be of ample length so the operator will not be in danger of rolling logs. The pitch of the deck should be sufficient to permit logs rolling down to kicker, or loader, without the operator assisting. The end of the log deck near sawyer should be walled up at least five feet high with planking six inches thick so as to protect sawyer from danger at this point.

The log is loaded on the carriage by log loader and placed in position by steam nigger. The dogger should be protected by an extension of an iron bar bolted on the carriage knees to protect him from log that might be thrown over top of knee. The sawyer is one man on the job who pretty well takes care of himself. He generally arranges his own safeguards, and his greatest danger is when a saw is pulled off. but not in our experience have we had a sawyer injured in this manner, but never should a sawyer permit the log to pass the end of the saw before reversing his carriage, and he must watch his offbearer. or tripper, very carefully in order to se that this man pulls the board away from the log when the saw drops it off. If the tripper does not

do his work properly there is great danger of the carriage catching the board, jerking it back toward the sawyer, pulling the saw off and possibly doing other damage.

The sawyer's lever should be substantially guarded and locked in neutral position when not in use, also his lever rig should at all times be kept oiled, examined daily and kept working easily, and shot gun valves kept set and of the type where nothing can get into the valves, and in some cases a valve controller should be installed. The carriage crew is at all times at the mercy of the sawyer, and the sawyer should at all times keep this on his mind as he must protect them.

All live roll gears and drives should be completely enclosed, leaving only top of rolls exposed.

Re-sawing Operations

Where a re-saw is used the greatest hazard is exposed gears and rolls. They should all be guarded as well as sprockets and chains and the carefulness of the operator in placing board in re-saw is necessary, and a man here should never wear loose or baggy clothing, or gloves, sleeves of jumpers should be cut off at the elbows. Where a horizontal re-saw is used, this is one of the most dangerous positions in the mill, and we should be very careful in our selection of men to work on receiving ends.

After the board passes through re-saw and is tripped to the edger, the edgerman places his saws for passage of the board through the edger. Now, I am sure that all edgers of recent manufacture have suitable press rolls, both front and rear, to prevent the kicking back of boards, also a guard of sheet metal should be installed just over the rolls to prevent sawdust and splinters being thrown back in the edgerman's eyes.

The board travels through the edger and over the edger tailer rolls, and usually falls on chain that conveys it to the trimmer. Here the trimmer operator is in no danger if a guard is provided between him and the saw. Otherwise, there is a chance for some part of his clothing to be caught on trimmer chain and drawn toward the saw.

The board passes over the trimmer on to the green slip chain where it is placed on lumber buggies or stacked on kiln trucks as the case may be.

The proper arrangement of machines and drives is important in every saw mill. Machines should be located so that each workman will have sufficient space in which to handle his material with the least possible interference from other workmen or machines. This is of particular importance.

All machines should have their belts and other moving parts guarded.

All gears and frictions should be completely enclosed.

Runways should be provided with guard rails and toe boards where it is necessary for workmen to pass over moving equipment and for oiler to oil machinery.

Slasher saws should all be guarded to prevent workmen from walking into them.

All stairways should be railed.

All shafting, pulleys and belts within six feet of floor should be guarded and all dead ends of shafting completely enclosed.

No pretruding set screws should be allowed anywhere on any equipment.

Screens should be provided to keep dust from sawyers eyes. His job is very important and he needs clear vision always.

The walls around feeding end of hog should be high enough to prevent workmen from falling in, and screen provided for top to keep chips from flying about.

The operator should never use anything but a wooden strip to dislodge an obstruction. An iron rod is very dangerous.

Stopping and starting devices within easy reach of the operator are essential to safe operation.

Machinery should never be started without whistle signal blown and answered.

It is very important that instructions be issued to all employees with reference to nails in boards. These should be put out of reach or turned over.

There are many different methods of transporting lumber to the yard, and it is not necessary for me to go into detail, for I believe that you will agree that there is very little hazard in this department with the exception of the overloading or careless loading of trucks. Overloading may cause a break-down, thereby causing injury by falling of load on the driver. In loading trucks the lumber should be evenly placed to avoid shifting or slipping. Frequent inspection of truck equipment should be made and defects remedied.

Where lumber is stacked the stackers should be very careful not to permit the pile to slip over and cause injury. Very often it is a serious one. When the dry lumber is being removed from stacks for final shipment the same degree of carefulness should be exercised in the proper loading and placing of the lumber on the truck. When workmen are moving or pushing a loaded truck they should never be permitted to put their hands on the wheels or spokes. There is danger of fingers being caught between spokes and the lumber. When the lumber is stacked on kiln trucks and put through kilns and unloaded at dry end, there is very little safe-guarding to be done there. We must educate every workman to be careful and not careless in this work.

Proper Arrangement of Machines and Drives

Most all planing mills are arranged differently, but the proper arrangement there of machines and drives, and the proper space for workmen to handle material, is equally important as the saw mill. All moving parts, saws, etc., should be guarded and runways protected the same as in the saw mill.

On account of the high speed of machines, they should be kept in proper condition by experienced men. All knives, saws and cutting tools should be kept sharp, properly adjusted and well secured in place. All waste material and rubbish should at all times be kept cleaned up. Waste suction pipes are necessary to keep floors and shavings cleaned up. Sawdust and shavings cause slippery floors and it is also hazardous to workmens eyes.

It is very important that the finished material be piled properly in the slick shed and on the yard so piles won't topple over and workmen may operate in safety in removing the lumber.

General meetings of all employees are held twice or more each year and safety practices and past accidents are discussed thoroughly with great stress laid on careful handling of tools and material. It is evident that these meetings are very helpful in convincing the workmen that we are vitally interested in their safety, and that their cooperation is absolutely necessary to the accident prevention work we are carrying on.

We have a safety committee which is composed of five members, the assistant manager, superintendent of manufacturing and shipping, mill superintendent, head millwright and foreman of construction. They meet every month. One member of this committee is appointed as an inspector, and it is his duty to make a weekly inspection of the whole plant and personally inspect everything, and to make a note of everything that might be the cause of an accident. If he finds anything that he considers very dangerous he immediately has it guarded. Everything that this inspector finds is discussed at the next meeting of the Committee and suitable guard is planned and is erected at once. It is the duty of every member of this committee to watch for anything that might cause an accident and to discuss this at the next meeting, and a guard is planned to protect the workmen. The guard is erected immediately.

The following report is a summary, or classification, of 26 accidents showing the different causes. This covers a period of six months. It is from one of our mills and is about the average of our accidents at all of our operations:

Falls	5
Falling Objects	2
Mechanical Causes	1
Nail and Splinter Punctures	1
Careles Handling—Tools and Material	17

First we have five falls, not one of which was caused by negligence on the part of the company by not having the proper safeguard, but by carelessness on the part of the injured party in not using more caution in watching their step.

Second, two accidents were caused by falling objects, neither of which were caused by any negligence on the part of the company.

Third, one accident was caused by mechanical causes. This was a minor accident and was caused by the breaking of a dog lever.

Fourth, one accident was caused by a puncture. This was the sharp broken end of a board which was lying on the ground, and had injured party used a moment's time in picking up this broken board this accident would have been prevented.

Fifth, 17 accidents were caused by the careless handling of tools and material, thus we have over one-half the number and cost of the accidents at this operation attributed to this division.

This report goes on to say that it is not a matter of insufficient time for these men to remove the causes for this class of accident, but a matter of training their minds to recognize a cause of an accident before it happens, and either avoid it as a fox would a naked steel trap, or remove the cause.

Education of Employees

From the classification shown above it demonstrates that the mechanical end has been safeguarded and kept in pretty fair condition, and it is plainly evident that the education of employees in the different lines of work in which he is engaged, is the greatest work before us at this time. Now, this is a mighty problem, especially with the class of labor that we now have, and is something that we should all spend a lot of time and patience in trying to interest our employees to cooperate in overcoming. The accidents that still occur in our plants from day to day are witnesses to the fact that we have room for improvement. Accidents are undoubtedly the largest single item of avoidable waste of manufacturing costs.

Accident work pays a threefold return. There is a return to the employer, also a return to the employee in a physical and monetary saving, and the return to the community to a lessening of the care for the maimed and disabled. Any of these surely justifies the furtherance of the work, but taken in the aggregate they constitute one of the most important planks in the platform of good business.

I believe that throughout the world, the United States has the reputation of holding life very cheaply, and our lumber industry seems to have been leading all other industries in holding up this reputation, but right now no other country in the world is spending as much money as American business concerns of all kinds now spend to prevent accidents and to take scientific care of the injured.

From my experience, I am sure that a printed set of rules and orders for safety work will not apply to all saw mills. We all have different conditions with our different saw mill operations. I know that the same rules will not apply to all of our operations. We just have to search and observe each hazardous condition and plan a preventive. Every month we find out how to guard some place that we have always thought it impossible to guard. Also you cannot always depend on men that you have assigned to the job of planning and in-

stalling guards to take care of them. You will have to help them plan, and it is surprising just how many hazardous places you will guard when you get down to real work and decide that these places must be guarded.

I think that the prevention of accidents depends more upon the education of employees than upon the safeguarding of machinery, although the machinery must be guarded as this is the first lesson that we have been taught. Now, we must try to educate, and this education depends a great deal upon the keeping of this subject uppermost in the minds of the employees; by having general meetings, explaining and illustrating the result of carelessness and posting of warning, "be careful" signs, danger signals and safety posters. Now it may be said that the accident prevention problem involves two essential elements—safeguarding and education—in each of which there is more or less detail work. Experience has conclusively proven that safeguarding and educational work in any plant is not a one man job, and satisfactory results can be secured only through the highest measure of co-operation between the employer and his employee. The employer himself must be vitally interested in the work if he expects to educate his men to share the responsibility with him. The men must be given a part to perform in it if their interest is to be aroused and maintained. The problem must touch them somewhere, and they must be convinced that their interest is really being looked after.

Now—let us all support the National Safety Council, follow their instructions, and we will find that our number of accidents will be lessened. We will have a safer and more pleasant business and a better satisfied employee.

DISCUSSION

MR. SMITH: There is one hazard on the deck that I think has been passed over, and it is very important. We have paid for a great many deaths on that. It is where the deck is empty and the scaler will roll a log down when the carriage is down to the other end, and the sawyer does not see it; it goes over the loaders on the track, he reverses his carriage or dumps them all off, or the log breaks in two and the end flies up and breaks the sawyer's neck. The only way to prevent that is for the log scaler or man in charge of the deck to keep all logs off of it when it is empty until the carriage is back and standing opposite the deck.

MR. JENNINGS: Roll over the roller arm?

MR. SMITH: Yes.

MR. KENNEY: Leave one log against the log roller.

MR. SMITH: We have had several accidents of another nature on the deck. They'd have the short side full and the long side would be

empty. The scaler would kick a log over on the short side, and it would swing around and catch the sawyer on the kick-back, when they are going through, especially on the last cut, the sawyer turns around to watch the next log. He reverses the dogs, and doesn't kick the log off, it reverses, and we have had dozens of sawyers killed that way. There is a protection on that. You can put a 6x6 there to skid that dog back down.

MR. A. L. MARTIN (Employers' Mutual Life Insurance Company): During the year 1923, we all realized that the accident losses were something terrible. In fact, our records in Wisconsin show that the worst previous record to 1923 was 1918.

We instituted a stunt which worked out very nicely. Wisconsin is a state in which the lumber industry is very great, especially the sawmills, planing mills, etc., and we devoted considerable of our efforts to that.

We incorporated a stunt which we called the six cylinder safety drive, and the principal object was to reach the foremen. We realized that the foreman was the top sergeant on the job, the key man in the industry, and as he leads the others follow. That is a necessary part of plant discipline.

We were very successful in this campaign. We obtained first the consent of the management in the plant to institute this campaign, and then we got the names of all the foremen, and held our meetings at the plant with the foremen, calling them safety smokers, and instituted a campaign of education. We also held meetings of the employees. We visited the lumber camps; we visited the sawmills, and all those industries, by personal visits, getting into contact with the men themselves, holding the smokers and the meetings. These had a fine effect.

(ADJOURNMENT)

13

INDEX

A. B. C. Session: Minutes, 83-114.
Accident Records:
"Accident records and how to keep them" (Auel) 83-88.
Discussion on Mr. Auel's paper, 88-89.
Accident Reports: (See Report Forms.)
Accidents—Costs: In "Review of the petroleum accident records in Oklahoma" (Fowler) 727-737.
"Reducing accident costs in waterfront work—the conflict between compensation and admiralty laws" (Fouhy), 530-536.
Accidents—Reduction: In annual report of the president (DeBlois) 18-21.
Accidents—Statistics:
"Accident records and how to keep them" (Auel) 83-88.
Atlanta, Ga. automobile accident reduction, 80.
Automobile accidents. In "Suggestions for model tables on automobile accidents (Stellwagen and Kopf), 854-873.
Automobile accidents investigated in Grand Rapids, 882.
Automobile fatalities in Louisville, 889.
Chicago and Cook Co., 654.
Coal mines. In "Organizing the mining industry for safety" (Feehan) 605-609.
Discussion, 1080-1082.
Discussion on Mr. Clarke's paper, 173-174.
Discussion on value of comparative accident statistics (Woedtke) 311-314.
Electric railways, 376-377.
Elevator accidents, 441-442.
England and Wales, 841.
In "Further comments on traffic accident prevention" (Kelcey) 849-854.
In "Safeguarding the lives and limbs of lake seamen" (Marr) 528.
In "Safety engineer—his privileges and opportunities (Forster) 131-132.
In "Safety in the logging and lumbering industry" (Dickinson) 1180-1181.
In "Why we are interested in Safety" (Williams) 372.
Kimberly-Clark Co., 686.
Lehigh Portland Cement Co. reduction, 197.
"Maritime casualties" (Edwards) 511-517.
Marquette Cement Mfg. Co. reduction, 196.
Metal mines. In "Organizing the mining industry for Safety" (Feehan) 605-609.
"Mine accident statistics' (Adams) 589-597.
Plant fire reductions, 706.
"Progress in standardizing accident statistics" (Chaney) 655-659.
"Public accidents in U. S.", 840-873
Reductions for various cities 1023-1024.
Report of committee on statistic of Steam Railroad Section (Carrow) 1079-1080.
Report of standardization an statistics committee (Partridge 1049-1052.
"Review of the petroleum accident records in Oklahoma (Fowler) 727-737.
"Standard statistics" (Clarke) 170-173.
Total accidental death rate i U. S. compared with automobil deaths, 812-813.
"Why accurate statistics ar essential to successful acciden prevention" (Beard) 1137-113
Acetylene welding: (See Welding.
Acids:
"Dangers due to mal-practice i the handling of acid tank cars (Crass) 234-238.
Adams, H.: Report of film committee, 1082-1083.
Adams, W. W.: "Mine accident statistics," 589-597.
Affleck, B. F.: "Safety from th executive's point-of-view," 183-188.
Alexander, M. W.: "Review o safety movement," 954-961.
Allen, T. H.: "How a communit safety council can aid the polic department," 911-914.
Allison, W. L.: "Acquiring a safet conscience," 1120-1126.
American Society of Safety Engineering: (See Engineering Section.)
Ames, W. F.: Chairman, Construction Section, 305-326.
Annealing Chains:
Discussion, 554-555.
"Safe operation and use of cran chains" (DeForest) 552-554.
Annual Meeting of Members: (Se Business Session.)
Archer, T. P.: "Supervising in re lation to safety," 164-169.
Arrowsmith, M. N.: "Teachin safety to the next generation 918-926.
Ashe, S. W.: "Personal experience with the prone pressure metho of resuscitation," 108-113.
Chairman, Plant Publication Section, 753-803.

Ashworth, W. G.: "Safety from the viewpoint of the track department," 1097-1100.
Auel, C. B.: "Accident records and how to keep them," 83-88.
Address of acceptance, 117-118.
Discussion on codes, 449-450.
"New specifications for guards in the power press code," 145-141.
Austin, W. F.: "How can I establish safety?" 315-318.
Automobile Driving:
"Automobile age" (Pride) 69-73.
Cranking a car, 752.
Discussion (Jack) 903-904.
Drivers "Safety Council. In "How we get discipline through supervision" (Reilly) 1134-1135.
"Drivers' licenses, including examination and revocation" (Stoeckel) 895-903.
Estreated bail. In "Accident facts as a basis for preventive measures" (Haven) 885-886.
Establishing a motor vehicle bureau for the state of New York," (Graves) 873-876.
Examination of drivers. In "Some headlights on the highway traffic problem" (Mason) 1026-1028.
"How to get results in accident prevention work" (Bussing) 1154-1156.
"How we get discipline through supervision" (Reilly) 1131-1135.
"Keeping safety before the eyes of drivers" (Woedtke) 1149-1152.
"Mechanical control systems" (Kelker) 905-909.
"Mental tests for commercial drivers" (Snow) 909-911.
"Motorists and pedestrians" (Smith) 74-79.
"Qualifications of a safe driver" (King) 1153-1154.
Record of suspensions in Connecticut, 902.
"Safety in motor truck operation" (Elkin) 647-655.
"Safety: Our foremost problem" (Kenney) 1139-1147.
"Securing the co-operation of taxicab drivers for safety" (Miles) 1136-1137.
State method used to license motor vehicle operators, 902-903.
"Suggestions for model tables on automobile accidents" (Stellwagen and Koph) 854-873.
Tests of drivers. In "Safety: Our foremost problem" (Kenney) 1139-1147.
"Who is responsible for public accidents?" (Bryan) 79-82.
"Why accurate statistics are essential to successful accident prevention' (Beard) 1137-1139.
Automobile Registration: In "Planning and rebuilding our cities for the motor age" (Knowles) 810.
Automobile Statistics: (See Accidents; Statistics.)
Automotive Section:
Announcement of nominating committee, 142.
Exhibit and demonstration, 154-155.
Minutes, 141-180.
Report of nominating committee, 164.
Averill, L. E.: Address of chairman, 142-143.
Chairman, Automotive ,Section 141-174.
Awards: (See Bonus Systems.)
Banquet, 115-139.
Barber, A. B.: "Conference on street and highway safety," 119-122.
Barnes, J. P.: Chairman, Electric Railway Section, 357-396.
General session, Education and public safety, 65-82.
Joint meeting of Public Utilities and Electric Railway Sections, 1005-1029.
Bartholomew, H.: "City planning as an aid to public safety," 831-833.
Bayrer, O. D.: Discussion on power presses, 155.
Beard, W. G.: "Why accurate statistics are essential to successful accident prevention,". 1137-1139.
Benefit Associations: (See Employees' Benefit Associations.)
Benzol Poisoning Sub-Committee:
Discussion on second progress report, 279-283.
Second progress report, 265-279.
Back Sprain: In "Chronic insidious bone and joint disease as a cause of prolonged industrial compensation" (Conn) 1043-1044.
Blasting: In "Stray electrical currents" (Jones) 576-577; 579-580.
Bonus System:
Discussion, 385-388.
In "How we get discipline through supervision" (Reilly) 1132-1133.
In "Safeguarding the lives and limbs of lake seamen" (Marr) 527.
List of companies, 385.
Report of committee on award systems (Hadsell) 380-385.
Bond, W. R. Jr.: "Responsibility of the petroleum industry for safety," 707-711.
Braden, F.: "Records and spot maps in Louisville," 887-893.
Brake-Testing Campaigns: In "Accident facts as a basis for preventive measures" (Haven) 883-884.
Bridges, M. W.: Report of secretary of Electric Railway Section, 357-358.
Brigades: (See Fire Prevention.)
Brock, H. T.: "Plant hazards in the ice and refrigeration industry." 494-501.
Bruere, H.: "Better management through co-operation—the safety method," 1063-1068.
Brundage, D. K.: "Statistical analysis of sick benefit association records," 418-428.

Bryan, S.: "Who is responsible for public accidents?" 79-82.

Buckley, D. J.: "Safety from the viewpoint of the locomotive engineer," 1100-1101.

"Building Men for Safety" (Heron) 55-61.

Bulletin Boards:
"How to advertise the safety idea." (Solensten) 96-101.
In "Safety kinks" (Colburn) 583-584.

Bulletins:
Discussion at Petroleum Section, 718-719.
Discussion on comic bulletins, 101.
Discussion on negative bulletins, 102.
Discussion on photographs vs. drawings, 103.
Discussion on short vs. long text, 102-103.
"How to advertise the safety idea." (Solensten) 96-101.
Report of bulletin committee of Rubber Section, 1052.
Report of Electric Railway Section bulletin committee (Hodson) 358.

Burns—Chemical:
"Reducing accidents caused by machinery and chemical burns" (Schwarze) 636-640.

Bus Operation:
Age and qualifications of drivers, 359-360.
Brakes. In "Overcoming the hazards of motor bus operations" (Graham) 363-364.
Cost of accidents, 369-370.
Discussion on bus operation (Powell) 367-370.
Discussion on hazards of two men busses and one man bus, 371.
Discussion on Mr. Graham's paper (Radley) 364-367.
Discussion on speed, 367.
Discussion on speed average, 370-371.
Inspection. In "Overcoming the hazards of motor bus operation" (Graham) 363.
Motion to appoint a committee to study standardization, 371.
"Overcoming the hazards of motor bus operation" (Graham) 359-364.
Placing responsibility on the operator, 368-369.
Training the driver, 366.

Bush, S. L.: "Should the benefits vary according to a man's salary or be based on the length of service?" 432-435.

Business Session:
Minutes, 7-37.

Bussing, C. L.: "How to get results in accident prevention work," 1154-1156.

Butler, H. E.: "Safety from the viewpoint of conductor," 1105-1106.

Cam, W. G. H.: "Intangible assets of the cement manufacturer," 206-215.

Cameron, W. H.: Annual report of managing director, 31-35.

Campaigns—Industrial: (See also contests.)
Discussion on best month to hold campaign, 204.
Discussion on Mr. Halpin's paper, 195-206.
"No-accident month campaigns" (Halpin) 190-195.

Capdeville, M. P.: "Safety from the viewpoint of the shopman," 1101-1104.

Carbon Monoxide: Discussion, 751.

Cartoons: Discussion, 779-780.

Carter, C. F.: "Development of safety on the railroads," 1068-1073.

Cathartics: Discussion, 297.

Causes of Lost Time Accidents: In "Mine accident statistics" (Adams) 591-595.

Cement Industry:
Discussion on Mr. Affleck's paper, 188-190.
Discussion on Mr. Cam's paper, 215-221.
Discussion on Mr. Halpin's paper, 195-206.
Discussion on welfare activities in cement plants, 217-221.
"Human element in safety work" (Mallon) 221-227.
"Intangible assets of the cement manufacturer," (Cam) 206-215.
"No-accident month campaigns" (Halpin) 190-195.
"Safety from the executive's point-of-view" (Affleck) 183-188.

Cement Section:
Minutes, 181-232.
Report of Nominating Committee, 182.

Chains: (See also Annealing Chains.)
"Safe operation and use of crane chains" (DeForest) 550-554.

Chairs:
"Better posture when seated" (Tuttle), 1038-1039.

Chaney, L. W.: "Progress in standardizing accident statistics," 655-659.

Chemical Burns: (See Burns: Chemical.)

Chemical Industry:
"Corrosion and its relation to safety in chemical plants" (Shapleigh) 248-255.
"Dangers due to mal-practice in the handling of acid tank cars" (Crass) 234-238.
"How a medical department may contribute to safety in the chemical industry" (Slater) 255-261.
"Summary of present practice in industrial poisoning prevention," 238-246.

Chemical Section:
Appointment of nominating committee, 233-234.
Joint meeting with Rubber Section, 865-884.

Minutes, 233-263.
Report of membership committee, 233.
Report of nominating committee, 248.
Children, Safety Work With:
"Interesting school children in Safety on the streets" (Gordon) 388-391.
"Relationship between safety and recreation and how each can help the other" (Lies) 941-946.
"Organization of the Junior Safety Councils" (Woerner) 935-938.
"Teaching safety to the next generation" (Arrowsmith) 918-926.
Ching, C. S.: "Future of the A. S. S. E. Engineering Section," 452-454.
City Planning: (See also Traffic.)
"City planning as an aid to public safety" (Bartholomew) 831-833.
"Planning and rebuilding our cities for the motor age" (Knowles) 809-828.
Clancy, J. A.: "Interesting the individual in safety work," 1128-1129.
Clark, W. A.: "Safety from the viewpoint of the car department," 1090-1097.
Clarke, E. J.: Standard Statistics, 170-173.
Classification of causes of accidents:
"Review of the petroleum accident records in Oklahoma" (Fowler) 727-737.
Close, G. F.: "Content of personnel publications," 769-774.
Clothing:
Discussion on leather coat, 1019.
"Protective devices and clothing for foundry workmen" (Watters) 555-562.
Codes:
Discussion (Auel) 449-450.
"Standardization of safety codes" (Whitney) 62-64.
Coffin, Lorenzo A.: In "Development of safety on the railroads" (Carter) 1070-1073.
Colburn, C. L.: "The Joseph A. Holmes Safety Association plan," 625-629.
"Safety kinks," 582-586.
Colcord, A. W.: "Halth education of our foreign families," 471-480.
Committees—Safety:
Discussion, 1118.
Discussion on Mr. Morris' paper, 94-95.
Discussion on organization (Timm) 722-724.
Discussion on the rotating committee, 725-726.
"Effective methods of safety organization — Manufacturing Division" (Winslow) 719-722.
In "Effective safety methods in the marketing division of the petroleum industry" (Singleton) 740-742.
In "Planning for safety" (Sherman) 1165-1166.
In "Safeguarding the lives and limbs of lake seamen" (Marr) 525-527.
In "Securing co-operation of employees in safety work" (North) 644-645.
"Organizing and maintaining interest among committeemen" (Corbin) 1115-1117.
"Safety committees" (Shaw) 716-718.
"Safety committees will starve unless fed" (Morris) 89-94.
Community Safety Councils:
"How a community safety council can aid the police department" (Allen) 911-914.
In annual report of president (DeBlois) 14-15.
Presentation of attendance cup, 115.
Community Safety: (See Public Safety.)
Company magazines: (See Plant Publications.)
Compensation: (See Workmen's Compensation.)
Competition: (See Contests.)
"Conference on street and highway safety" (Barber) 119-122.
Conn, H. R.: "Chronic insidious bone and joint disease as a cause of prolonged industrial compensation," 1039-1049.
Conover, R. G.: "How to reach readers with safety material," 760-768.
"Conscience, Acquiring a Safety" (Allison) 1120-1126.
Construction:
Discussion on gangs, 218-219.
Discussion on sub-contractor, 322-324.
Discussion on the value of comparative accident statistics, 314-315.
"How can I establish safety?" (Austin) 312-318.
"Must we be forced to adopt safe practices?" (Hieatt) 208-211.
Report on safety code, 325-326.
"Safety no longer a matter of choice" (Tubesing) 206-208.
Construction Section:
Appointment of nominating committee, 311.
Minutes, 305-326.
Report of nominating committee, 324-325.
Contests: (See also Campaigns, Industrial.)
Discussion, 387.
Discussion on chauffeur's contests, 1152-1153.
In "Accident prevention work in the Bell Telephone System" (Elstrum) 967.
In discussion (Helbin) 974-975.
In discussion on best safety stunt in our mills, 682-684; 686.
In "Human element in safety work" (Mallon) 222.
In "Keeping safety before the eyes of drivers" (Woedtke) 1151-1152.

In "Why we are interested in safety" (Williams) 373-374.

Cook, G. W.: "What causes textile accidents?" 1158-1161.

Co-operation:
"Better management through co-operation—the safety method" (Bruere) 1063-1068.
"Getting the co-operation of local safety committeemen, local officers and labor representatives in correcting unsafe practices" (Satterfield) 1127-1128.
In "Accident prevention work in the Bell Telephone System" (Elstrum) 962-964.
"Securing co-operation of employees in safety work" (North) 641-647.

"Co-operation in safety among trade and other associations (Grant) 21-25.

"Co-operation of the medical department and the safety department" (Cromwell) 633-635.

Copeland, E. J.: "Development of domestic ice machines and relative hazard of refrigerant gases used," 501-505.

Corbin, H. S.: "Organizing and maintaining interest among committeemen," 1115-1117.

"Corrosion and its relation to safety in chemical plants" (Shapleigh) 248-255.

Cost of accidents: (See Accidents—Cost.)

Courts, Safety:
In "Effective safety methods in the marketing division of the petroleum industry" (Singleton) 742.

Cranes:
"Construction, operation and maintenance of overhead electric travelling cranes" (Hall) 540-549.
"Safe operation and use of crane chains" (DeForest) 550-554.

Crass, M. F.: "Dangers due to malpractice in the handling of acid tank cars." 234-238.

Cromwell, O. F. W.: "Co-operation of the medical department and the safety department," 633-635.

Crooks, A. W.: "Proper ventilation of mixing mills," 1053-1055.

Culliney, J. E.: "Should the management have anything to say in the running of a mutual benefit association?" 409-411.

Cuspidors:
In "How to make a sanitary survey of an industrial plant" (Ferguson) 484.

Cylinders: (See Oxygen Cylinders.)

Davis, J. J.: "Fundamentals of our industrial safety problem," 39-42.

Dawson, C. D.: "Correlation of Safety with grade school subjects," 336-340.

DeBlois, L. A.:
Annual report of president, 11-21.
Chairman, Annual meeting of members, 7-37.
Response to welcome, 10.

DeForest, A. V.: "Safe operation and use of crane chains," 550-554.

Delivery Section: (See Taxicab and Delivery Section.)

Demonstration Centers: (See Schools—Safety Work in.)

Dental Work: In "Health service work in paper and pulp mills" (Frechtling) 676-677.

Dickinson, J. A.: "Safety in the logging and lumbering industry," 1180-1186.

Dies: "Punch presses and dies" (Thompson) 143-145.

Diseases—Occupational: "Chronic insidious bone and joint disease as a cause of prolonged industrial Compensation" (Conn) 1039-1049.

Doeller, G. A.: Discussion on positive and negative side of life. 774-775.

Domestic Ice Machines: "Development of domestic ice machines and relative hazard of refrigerant gases used" (Copeland) 501-505.

Downey, J. N.: "How we interest foreign women," 926-928.

Drinking Water: In "How to make a sanitary survey of an industrial plant" (Ferguson) 482.

"Drivers Licenses, Including Examinations and Revocation" (Stoeckel) 895-903.

Dublin, L. I., Chairman: "Report on Public accidents in the U. S.", 340-373.

Dust Elimination: Discussion, 1055-1056.

Dust Explosions: "Dust explosions in the rubber industry" (Hextis) 1036-1039.

Edges: In "Safety in the logging and lumbering industry" (Dickinson) 1184-1185.

Education: "Safety education and its relation to training for citizenship" (Hall-Quest) 65-69.

Education—Engineering:
Report of the committee for the promotion of safety education in engineering colleges. (Keown) 433-441.
Safety committee of the Society for the Promotion of Engineering Education, 439-441.

Education of Workmen: "Educating the worker" (Houze) 104-108.

Education Section:
Affiliations with other organizations, 331-332.
Appointment of nominating committee, 332.
In Annual report of president (DeBlois) 15.

In Report (Van Schaack) 806.
Joint meeting of Public Safety and Education Section, 931-950.
Minutes, 65-82; 327-356.
Report of nominating committee, 356.

Edwards, F. T.: "Safety and fire prevention," 1073-1079.
Edwards, R. F.: Maritime casualties, 511-517.

Election of Executive Committee: (See Executive Committee of N. S. C.)

Electric Flat Irons: In "Selection and safe installation of electric appliances" (Greenwood) 992.

Electric Railway Section:
Appointment of nominating committee, 358.
Minutes, 357-396.
Minutes of joint session with Electric Railway Section, 1005-1029.
Report of bulletin committee (Hodson) 358.
Report of committee on award systems (Hadsell) 380-385.
Report of nominating committee, 380.
Report of secretary (Bridges) 357-358.

Electric Railways:
Discussion on conduct of meetings (Harman) 375-376.
Discussion on education of the public, 377-378.
"Electric railway in community safety extension" (Palmer) 1005-1010.
"Why we are interested in Safety" (Williams) 371-374.

Electric Range: In "Selection and safe installation of electric appliances" (Greenwood) 997-998.

Electrical Sub-stations: (See Sub-stations.)

Electricity:
"Instructions in and observance of safety rules in sub-station operation" (Niesz) 1012-1019.
"Selection and safe installation of electric appliances" (Greenwood) 990-1003.

Electricity—Mines:
"Electric starting devices and fuses with reference to safety" (MacWilliams) 617-624.
"Safety in underground use of electricity" (Johnson) 612-617.
"Stray electrical currents" (Jones) 575-580.

Electricity—Static:
Fire in Pittsburgh garage, 737-738.
In "Fire prevention in oil property" (Epps) 699-700.

Elevators: Report of research committee on elevator hazards (Heinrich) 441-444.

Elkin, Z. C.: "Safety in motor truck operation," 647-655.

Elstrum, U. P.: "Accident prevention work in the Bell Telephone System," 961-968.

Employees' Benefit Associations:
"Benefit associations—their need, scope and possibilities (Ryan) 398-409.
Discussion, 414-417; 428.
Discussion on married and single employees, 436.
"Should medical service of a mutual benefit society extend beyond the work done in the plant?" (Wright) 411-414.
"Should physical examinations be compulsory to members of a mutual benefit association? (Tenney) 429-432.
"Should the benefits vary according to a man's salary or be based on the length of service?" (Bush) 432-435.
"Should the management have anything to say in the running of a mutual benefit association?" (Culliney) 409-411.
"Statistical analysis of sick benefit associations record" (Brundage) 418-428.

Employees' Benefit Associations Section:
Appointment of nominating committee, 416.
Committee on statistics, in "Statistical analysis of sick benefit association records" (Brundage) 418-428.
Minutes, 397-436.
Report of nominating committee, 418.

Employees' Magazines: (See Plant Publications.)

Employment:
In "Educating the worker" (Houze) 107-108.
In "Plant hazards in the ice and refrigeration industry" (Brock) 496.

Engineering Education: (See Education—Engineering.)

Engineering Section:
"Future of the A. S. S. E. Engineering Section" (Ching) 452-454.
In Annual report of the president (DeBlois) 15-16.
Luncheon, 452-454.
Minutes, 437-454.
Report of the committee for the promotion of safety education in engineering colleges (Keown) 438-441.
Report of fly-wheel research committee (Tolsted) 438.
Report of membership committee, 448-449.
Report of nominating committee, 450.
Report of research committee on elevator hazards (Heinrich) 441-444.
Report of research committee on theatre hazards (Jensen) 444-448.

Engineers—Safety:
In "Effective safety methods in the marketing division of the petroleum industry" (Singleton) 739-740.
In "Securing cooperation of employes in safety work" (North) 644-645.

"Safety engineer—his privileges and opportunities" (Forster) 128-132.
Epps, F. A.: "Fire prevention in oil properties," 695-707.
Examination of Automobile Drivers; (see Automobile Driving).
Executive Committee of N. S. C.: Election, 116-117.
"Executive's Point-of-View" (Affleck) 183-188.
Executive's Place in Safety: In "Securing cooperation of employes in safety work" (North) 642-643.
Explosives: "Safety in the use of explosives" (Greenfelder) 598-605.
Eye Protection: (see also Goggles). Discussion, 1019.
Discussion on eye protection in metal working plants, 174-180.
In "Protective devices and clothing for foundry workmen" (Watters) 560-561.
Fatigue: (see also Posture).
"Fatigue problem in industry" (Gilbreth) 466-471.
In "Safety in motor truck operation" (Elkin) 652.
Feehan, F.: "Organizing the mining industry for safety," 605-609.
Feet—Injuries: In "Protective devices and clothing for foundry workmen" (Watters) 559.
Ferguson, C. L.: "How to make a sanitary survey of an industrial plant," 480-485.
Films:
In Annual report of the president (DeBlois) 18.
Report of Film Committee (Adams) 1082-1083.
Fire Extinguisher: Use of tetrichloride, 1020.
Fire Prevention:
"Fire prevention in oil properties" (Epps) 695-707.
"Fire prevention in woodworking plants" (Springer) 1186-1192.
In "Effective safety methods in the marketing division of the petroleum industry" (Singleton) 744-745.
In "Safety in the use of explosives," (Greensfelder) 601-602.
"Safety and fire prevention" (Edwards) 1073-1079.
First Aid:
In "Accident prevention work in the Bell Telephone System" (Elstrum) 965-966.
In "Accident records and how to keep them" (Auel) 84.
In "Cooperation of the medical department and the safety department" (Cromwell) 633-634.
In discussion (Helvin) 972-973.
Floors: In "Reducing accidents caused by machinery and chem-
Flowers, Ida: "Correlation of safety with English," 343-351.
Flywheels: Report of fly-wheel research committee (Tolsted) 438.
Foreign Women: "How we interest foreign women" (Downey) 926-928.
Foreign Workmen: "Health education of our foreign families" (Colcord) 471-480.
Foremen:
"Educating the worker" (Houbé) 104-108.
In discussion (Helvin) 973-974.
In "Securing cooperation of employes in safety work" (North) 645-646.
Forster, H. W.: "Safety engineer—his privileges and opportunities," 128-132.
Fouhy, J. F.: "Reducing accidents costs in waterfront work—the conflict between compensation and admiralty laws," 530-536.
Foundries: Protective devices and clothing for foundry workmen" (Walters) 555-562.
Fowler, H. C.: "Review of the petroleum accident records in Oklahoma during 1922," 727-737.
Frechtling, L.: "Health service work in paper and pulp mills," 673-680.
"Fundamentals of our industrial safety problem" (Davis) 39-42.
Guards: Discussion, 1177-1179.
Hadsell, R. R.: Report of committee on award systems, 380-385.
Hall, R. D., Chairman: Mining Section, 573-631.
Hall, W. S.: "Construction, operation and maintenance of overhead electric traveling cranes," 540-549.
Hall-Quest, A. F.: "Safety education and its relation to training for citizenship," 65-69.
Halpin, T. F.: "No-accident month campaigns," 190-195.
Hand, R. F.: "Practical safety supervision in the merchant marine," 518-522.
Harmon, James: Discussion on Mr. William's paper, 374-376.
Haven, R. C.: "Accident facts as a basis for preventive measures," 881-887.
Health: Health education of our foreign families" (Colcord) 471-480.
Health Service Section:
Appointment of nominating committee, 455.
Minutes, 455-492.
Report of nominating committee, 492.
Health Supervision of Employees:
Discussion (Geier) 490-492.
"Health service work in paper and

"How a medical department may contribute to safety in the chemical industry" (Slater) 255-261.
"Industrial health as a purchasable commodity (Schram) 455-466.
"Textile worker - health - rehabilitation of the injured" (Van Emburgh) 1167-1174.
Heinrich, H. W.: Report of research committee on elevator hazards, 441-444.
Helvin, E. L.: Discussion on work of Southern Bell Telephone and Telegraph Co., 972-976.
Hernia:
Discussion, 228-232.
Resolution, 229-230.
Heron, "Jamie": "Building men for safety," 55-61.
Herrold, G. H.: Discussion on street intersections. 828-829.
Hieatt, C. C.: "Must we be forced to adopt safe practices?", 308-311.
Highways: (see Public Safety and Traffic).
Hitchcock, C. I.: Chairman, General Sessions, 39-64.
Hodson, P.: Report of bulletin committee. Electric Railway Section, 358.
Garages:
Fire at Pittsburgh garage, 737-738.
Poster, 751.
Gas Industry:
Baltimore ordinance, 978.
Discussion on gas appliances. 982-990.
New York bill pending. 979.
"Selection and safe installation of gas appliances" (Mitchell) 977-982.
Gas Masks: (see Respirators).
Gases: "Safe handling and use of cutting and welding gases" (Smith) 563-571.
Gases—Refrigeration: "Development of domestic ice machines and relative hazard of refrigerant gases used" (Copeland) 501-505.
Geier, O. P.: Discussion, 490-492.
General Federation of Women's Clubs: Suggested safety program, 928-929.
General Session: Minutes, 39-82.
Gilbreth, Mrs. F. B.: "Fatigue problems in industry," 466-471.
Gillillan, Strickland: "Spice of life," 133-139.
Gloves: In "Electric starting devices and fuses with reference to safety" (MacWilliams) 623.
Goggles: (see also Eye Protection).
Discussion of use in railroad shops. 1114.
Discussion on eye protection in metal working plants. 174-180.
Sterilization, 179-180.
Gordon, Isaiah: "Interesting school children in safety on the streets," 388-391.
Gosling, Thomas: "Interesting the teacher in safety education, 332-336.
Grade Crossings: (see also railroads).
"Development of safety on the railroads" (Carter) 1068-1073.
In "Acquiring a safety conscience" (Allison) 1124-1125.
Graham, R. N.: "Overcoming the hazards of motor bus operation," 359-364.
Grant, R. F.: "Cooperation in safety among trade and other associations," 21-25.
Graves, Mark: "Establishing a motor vehicle bureau for the state of New York," 873-876.
Green, N. E.: Address of welcome, 8.
Greensfolder, N. S.: "Safety in the use of explosives," 598-605.
Greenwood, C. E.: "Selection and safe installation of electric appliances," 990-1003.
Gruver, H.: "Organization and function of the demonstration center," 931-935.
Hoener, E. H.: Report of engineering committee, 1031-1034.
Hoists: In "Safety in underground use of electricity" (Johnson) 615-617.
Holmes, Joseph A., Association: (see Joseph A. Holmes Safety Association).
Home Safety:
"Development of domestic ice machines and relative hazards of refrigerant gases used" (Copeland) 501-505.
Discussion on domestice ice machines, 508.
Discussion on gas appliances (Wintersteen) 982-990.
"Selection and safe installation of electric appliances" (Greenwood) 990-1003.
Hoover: Pledge to support, 27-28: 118.
Horan, C. F.: Chairman, Rubber Section, 265-304; 1031-1060.
Hose, Defective: (see Gas Industry).
Hours of Labor: Discussion on 12-hour day, 215-216.
House Organs: (see Plant Publications).
Housekeeping: (see also Cuspidors: Drinking Water; Toilets; Sanitation; Wash Rooms).
Discussion on Mr. Stunzi's paper. 162-164.
"Plant housekeeping" (Stunzi) 156-162.
Howard, C. H.: Discussion on positive side of safety, 768-769.
Houze, J. O.: "Educating the worker," 105-108.
Hoxie, F. S.: "Dust explosions in the rubber industry," 1036-1038.
"Human Element in Safety Work" (Mallon) 221-227.

Ice and Refrigeration Industry:
"Development of domestic ice machines and relative hazard of refrigerant gases used" (Copeland) 501-505.
Discussion on broken saws, 507.
"Hazards of the ice scoring machines" (Stuck) 505-507.
In "Selection and safe installation of electric appliances" (Greenwood) 998-999.
Joint meeting with Taxicab and Delivery Section, 1149-1156.
"Plant hazards in the ice and refrigerating industry" (Brook) 494-501.
Ice and Refrigeration Section:
Appointment of nominating committee, 493.
Minutes, 493-509.
Report of nominating committee, 509.
Illumination: (see Lighting).
Industrial Poisons Committee: Tentative report, 238-246.
Inflammable Liquids: In "Fire prevention in woodworking plants" (Springer) 1191-1192.
Insurance: Discussion on compensation insurance (Horan) 1035-1036.
Insurance—Life: "Rubber industry from a life insurance standpoint" (Vance) 1056-1060.
"Intangible Assets of the Cement Manufacturer" (Cam) 206-215.
Interest in Safety Work, How to Maintain:
Discussion on "best safety stunt in our mill," 682-690.
"Safety kinks" (Colburn) 582-586.
"Interesting the Individual in Safety Work" (Clancy) 1128-1129.
Ironers: In "Selection and safe installation of electric appliances" (Greenwood) 999-1000.
Jack, F. E.: Discussion on automobile driving, 903-904.
Jacoby, A. L.: "Mental causes of accidents," 42-48.
Jensen, H.: Report of research committee on theater hazards, 444-448.
Johnson, J. B.: "Safety in underground use of electricity," 612-617.
Jones, E. E.: "Stray electrical currents," 575-580.
Joseph A. Holmes Safety Association (Colburn), 625-629.
Junior Safety Councils: (see Schools-Safety Work in).
"Organization of the junior safety coucils" (Woerner) 935-938.
Kaems, A. L.: Discussion on power presses, 154.
Kelcey, G. G.: "Further comments on traffic accident prevention," 849-854.
Kelker, R. F.: "Mechanical control systems," 905-909.
Kelly, R. W.: "Recent progress in safety in the California petroleum industry," 746-749.
Kenney, B. E.: "Safety in saw mills and planing mills," 1200-1205.
Kenney, G. T.: "Safety: our foremost problem," 1139-1147.
Keown, R. McA.: Report of the committee for the promotion of safety education in engineering colleges, 438-441.
Kettering, C. F.: Public safety problem, 48-55.
Kileen, F. G.: "Safety from the viewpoint of the trainmen," 1106-1109.
King, S. L., Jr.: "Qualifications of a safe driver," 1153-1154.
"Kinks, Safety" (Colburn) 582-586.
Knowles, M.: "Planning and rebuilding our cities for the motor age," 809-828.
Kopf, E. W.: "Suggestions for model tables on automobile accidents," 854-873.
Labels for Solvents: Discussion, 283.
Labor Turnover: In "Intangible assets of the cement manufacturer" (Cam) 213-214.
La Fountaine, C. L.: Report of committee on cooperation with other agencies, 1084.
Lake Carriers Association: "Safeguarding the lives and limbs of lake seamen," 523-529.
Lead Poisoning:
Cathartics, 297.
Discussion (Paine) 287-295.
Discussion (Whiting) 284-287.
Discussion on prevention of (Roof) 295-298.
Discussion on prevention of (Wright) 299-304.
Instructions to employees, 291-295.
Legislation: In "Fundamentals of our industrial safety problem" (Davis) 41-42.
Ley, H. E.: Chairman, Employees Benefit Associations Section, 397-436.
Licenses for Automobile Drivers: (see Automobile Driving).
Lies, E. T.: "Relationship between safety and recreation and how each can help the other," 941-946.
Lighting:
In "Health service in paper and pulp mills" (Frechtling) 679-680.
In "How to make a sanitary survey of an industrial plant" (Ferguson) 483.
Littell, F. J.: Discussion on trimming a die casting, 154.
Line Protectors: In "Electric starting devices and fuses with reference to safety" (MacWilliams) 622-623.
Local Councils: (see Community Safety Councils).
Lockers: Discussion, 320-321.

Locomotives—Mines: Control devices. 587-588.

Logan, E. L.: "What the women of Washington are doing for safety," 917-918.

Logging and Lumbering:
In "Fire prevention in woodworking plants" (Springer) 1186-1192.
"Safety in the logging and lumbering industry" (Dickinson) 1180-1186.

Lost Time Accidents: (see Causes of Lost Time Accidents).

Lumbering: (see Logging and Lumbering).

MacBrayne, L. E.: Chairman, Joint Meeting of Public Safety and Education Sections, 931-950.

McClellan, U. F.: Chairman, Packers and Tanners Section, 633-660.

McKenney, T. H.: Chairman, Metals Section, 539-572.

McNally, J. A.: "Presentation of safety inspector's problems," 1111-1113.

MacWilliams, G. F.: "Electric starting devices and fuses with reference to safety," 617-624.

Maintaining Interest in Safety:
Discussion on Mr. Mallon's paper, 227-232.
"Human element in safety work" (Mallon) 221-227.
"Organizing and maintaining interest among committeemen" (Corbin) 1115-1117.

Mallon, J. H.: "Human element in safety work," 221-227.

Management: "Better management through cooperation—the safety method" (Bruere) 1063-1068.

Managing Director's Annual Report, 31-35.

Marine Hazards:
Discussion on federal compensation act, 536.
"Maritime casualties" (Edwards) 511-517.
"Practical safety supervision in the merchant marine" (Hand) 518-522.
"Reducing accident costs in waterfront work—the conflict between compensation and admiralty laws" (Fouhy) 530-536.
"Safeguarding the lives and limbs of lake seamen" (Marr) 523-529.

Marine Section:
Minutes, 511-537.
Report of nominating committee, 518.
Resolution on enactment of federal compensation bill, 537.

Marr, G. A.: "Safeguarding the lives and limbs of lake seamen," 523-529.

Masks: (see Respirators).

Mason, R. O.: "Some highlights on the highway traffic problem," 1021-1028.

Matches: (see Smoking).

Medical Supervision: (see also Health Supervision of Employees; Physical Examination of Employees).
"Cooperation of the medical department and the safety department" (Cromwell) 633-635.
Discussion, 726.
Discussion on Dr. Slater's paper, 261-263.
"Health service work in paper and pulp mills" (Frechtling) 673-68
"How a medical department may contribute to safety in the chemical industry" (Slater) 25
261.
In "Securing the cooperation of employees in safety work" (North) 643.
In "Should medical service of a mutual benefit society extend beyond the work done in the plant?" (Wright). 411-414.
"Industrial health as a purchasable commodity" (Schram) 455-466.

Meetings of Employees: Discussion on conduct of meetings (Hammon) 375-376.

"Mental Causes of Accidents" (Jacoby) 42-48.

"Mental Tests for Commercial Drivers" (Snow) 909-911.

Merit System: (see Bonus Systems).

Metals Section:
Appointment of nominating committee, 540.
Minutes, 539-572.
Proposed change of name, 563.
Report of nominating committee, 562-563.

Metcalfe, F. M.: Chairman, Steam Railroad Section, 1061-1130.

Methyl Chloride: In "Development of domestic ice machines and relative hazard of refrigerant gases" (Copland) 504.

Miles, L. L.: "Securing the cooperation of taxicab drivers for safety," 1136-1137.

Mines and Mining:
"Electric starting devices and fuses with reference to safety" (MacWilliams) 617-624.
"The Joseph A. Holmes Safety Association plan" (Colburn) 625-629.
"Mine accident statistics" (Adams) 589-597.
Mine locomotive control device, 587-588.
"Organizing the mining industry for safety" (Feehan) 605-609.
"Safety in underground use of electricity" (Johnson) 612-617.
"Safety kinks" (Colburn) 582-58
"Stray electrical currents" (Jones) 575-580.
"Safety in the use of explosives" (Greensfelder) 598-605.

Mining Section:
Appointment of nominating committee, 589.
Minutes, 573-631.
Report of nominating committee, 629-631.

Mitchell, A. O.: "Selection and safe installation of gas appliances." 977-982.

Mixing Mills: "Proper ventilation of mixing mills" (Crooks) 1053-1055.

Morey, A. T.: Chairman, General A B C Session, 83-114.

Morris, F. E.: "Safety committees will starve unless fed," 89-94.

Moses, H. W.: Chairman, Public Utilities Section, 951-1003.

Motion Pictures: (see Films).

Motor Age: "Planning and rebuilding our cities for the motor age" (Knowles) 809-828.

Motor Bus Operation: (See Bus Operation).

"Motor Truck Operation, Safety in" (Elkin) 647-655.

Moving Pictures in Safety Work: (see also Films).
In "Safety kinks" (Colburn) 585-587.

Mullins, E. Y.: Prayer, 7-8.

Mutual Benefit Associations: (see Employees' Benefit Associations).

National Bureau of Casualty and Surety Underwriters: 120.

National Safety Council: President's annual report (DeBlois) 11-21.

Negative Side of Safety: (see Positive Side of Safety).

Neumann, E. G.: "Safety from the viewpoint of the transportation department," 1087-1090.

New Employees:
In "Protective devices and clothing for foundry workmen" (Watters) 561-562.
In "Safety kinks" (Colburn) 582-583.

Niesz, H. E.:
"Instructions in and observance of safety rules in substation operation," 1012-1019.
Treasurer's annual report, 35-37.

No-accident Campaigns: (see Campaigns).

Nominating Committee: Report, 26.

North, H.: "Securing cooperation of employees in safety work," 641-647.

Nurse:
In "Health education of our foreign families" (Colcord) 476-478.
In "Health service in paper and pulp mills" (Frechtling) 677-678.

Obier, J. L.: Address of welcome, 306.

Oil Company Safety:
"Effective methods of safety organization" (Wallace) 714-715.
"Effective methods of safety organization-manufacturing division" (Winslow) 719-722.
"Effective safety methods in the marketing division of the petroleum industry" (Singleton) 738-746.
"Fire prevention in oil properties" (Epps) 695-707.
"Recent progress in safety in the California petroleum industry" (Kelley) 746-749.
"Responsibility of the petroleum industry for safety" (Boyd) 707-711.
"Review of the petroleum accident records in Oklahoma" (Fowler) 727-737.
"Standard Oil Company" (Waddington) 715-716.

Oklahoma Workmen's Compensation Law: In "A review of the petroleum accident records in Oklahoma during 1923" (Fowler) 727-737.

Oliver, J. W.: Discussion on school safety work, 391-394.

Olschewsky, W. H., Jr.: Discussion on work of Western Union, 968-972.

"One Hundred Year Old Safety Man," 687-688.

Opp, George: Report of secretary, 951-953.

Organization:
Discussion, 722-724.
"Effective methods of safety organization-manufacturing division" (Winslow) 719-722.
"Effective safety methods in the marketing division of the petroleum industry" (Singleton) 738-746.
"Effective methods of safety organization-producing division" (Wallace) 714-715.
"Human element in safety work" (Mallon) 221-227.
In "Instruction in and observance of safety rules in substation operation" (Niesz) 1018-1019.
"Organizing the mining industry for safety" (Feehan) 605-609.
"Planning for safety" (Sherman) 1165-1166.
"Safety kinks" (Colburn) 582-586.

Oxygen Cylinders: In "Safe handling and use of cutting and welding gases" (Smith) 563-571.

Pacini, A. J.: "Physiotherapy and physiotherapeutic reconstruction," 485-490.

Packers and Tanners Industry:
"Reducing accidents caused by machinery and chemical burns" (Schwarze) 636-640.
"Securing cooperation of employees in safety work" (North) 641-647.

Packers and Tanners Section:
Appointment of nominating committee, 633.
Minutes, 633-660.
Report of nominating committee, 641.

Paine, W. S.:
Discussion on prevention of lead poisoning, 287-295.
Chairman, Engineering Section, 437-454

Palmer, L. H.: "Electric railway in community safety extension," 1005-1010.

Paper and Pulp Industry:
"Digest of annual congress proceedings of Paper and Pulp Section" (Rosebush) 663-671.
Discussion on paper and pulp mill code (Sandel) 671-673.
Discussion on best safety stunt in our mill, 682-690.
"Health service work in paper and pulp mills" (Frechtling) 673-680.

Paper and Pulp Section:
Appointment of nominating committee, 663.
Members registered, 661-662.
Minutes, 661-691.
Report of nominating committee, 691.

"Parent-Teachers' Association and what it can do for safety" (Watkins) 939-941.

Parking:
Discussion, 829-830; 836-839.
In "Plannning and rebuilding our cities for the motor age" (Knowles) 818; 820.

Partridge, A. M.: Report of standardization and statistics committee, 1049-1052.

Pedestrians: "Motorists and pedestrians" (Smith) 74-79.

Pedestrian Tunnels: Discussion, 833; 835-836.

Petroleum: (see Oil Company Safety).

Petroleum Section:
Appointment of nominating committee, 695.
Minutes, 693-752.
Petroleum safety handbook committee, 748.
Register of members present, 712-713.
Report of manufacturing division (Timm) 693-694.
Report of nominating committee, 713-714.
Report of secretary (Senne) 694-695.
Report on change of name, 714.

Pfeiffer, T. P.: "Make-up and art in house organs and plant publications," 776-778.

Phillips, G. W.: Chairman, Paper and Pulp Section, 661-691.

Physical Examination of Employees: (see also Health Supervision of Employees; Medical Supervision).
Discussion, 435-436; 680-682.
Discussion on Dr. Slater's paper, 261-263.
"Health service work in paper and pulp mills" (Frechtling) 673-680.
"How a medical department may contribute to safety in the chemical industry" (Slater) 255-261.
In "Benefit associations-their need, scope and possibilities" (Ryan) 401-405.
Discussion (Olschewsky) 970.
"Should physical examination be compulsory to members of a mutual benefit association?" (Tenney) 429-432.

Physicians, Industrial:
Discussion on pay, 681.
"Industrial health as a purchasable commodity" (Schram) 455-466.

"Physiotherapy and Physiotherapeutic Reconstruction" (Pacini) 485-490.

Pipe Lines for Oxygen Supply: In "Safe handling and use of cutting and welding gases" (Smith) 568-571.

Planing Mills: "Safety in sawmills and planing mills" (Kenney) 1200-1205.

"Planning for Safety" (Sherman) 1163-1167.

Plant Publications:
Committee Appointments, 803.
"Content of personnel publications" (Close) 769-774.
"Cost of employees' magazines" (Wilkins) 793-800.
Discussion, 791-793.
Discussion (Ashe) 785-786.
Discussion on cartoons, 779-780.
Discussion on costs, 800-802.
Discussion on distribution, 759-760.
Discussion on poetry, 780.
"How to reach readers with safety material."
"Makeup and art in house organs and plant publications" (Pfeiffer) 776-778.
"Plant publication policies" (Stevens) 754-759.
"Spirit of a house organ" (Price) 787-791.

Plant Publication Section:
By-laws, 784-785.
Minutes, 753-803.
Report of nominating committee, 785.

Playgrounds:
Discussion, 946-950.
"Relationship between safety and recreation and how each can help the other" (Lies) 941-946.

Pledge to Support Hoover, 27-28; 118.

Poems: "Building men for safety" (Heron) 55-61.

Poisoning: (see Benzol Poisoning; Lead Poisoning; Turpentine Poisoning).

Poisons Committee, Industrial:
Discussion on report, 246-247.
Tentative report, 238-246.

Poisons, Committee on Industrial: (see Benzol Poisoning Subcommittee).

Police Department:
"How a community safety council can aid the police department" (Allen) 911-914.
In "Accident facts as a basis for preventive measures" (Haven) 886-887.

Popularizing Safety: In "Safety kinks" (Colburn) 584-585.
Positive Side of Safety:
Discussion (Howard) 768-769.
Discussion on positive and negative side of life (Doeller) 774-775.
Posture: (see also Fatigue)
"Better posture when seated" (Tuttle) 1038-1039.
Potassium Citrate: Discussion on treatment of plumism, 298.
Powell, G. B.: Discussion on his operation, 367-370.
Power Presses:
Discussion on Mr. Auel's paper, 151-154.
Discussion on power presses (Bayrer) 155.
Discussion on power presses (Littell) 154-155.
Discussion on power presses (Kaems) 154.
"New specifications for guards in the power press code" (Auel) 145-151.
"Punch presses and dies" (Thompson) 143-145.
Prayer (Mullins) 7-8.
President's Annual Report (DeBlois) 11-21.
Price, W. D.: "Spirit of a house organ," 787-791.
Pride, G. H.: "The automobile age," 69-73.
Prizes: In discussion on "Best safety stunt in our mill," 683.
Prone Pressure Method: (see Resuscitation).
Prouty, R. A.: "Results obtained in safeguarding woodworking machinery during the past ten years," 1193-1199.
Psychology: "Mental causes of accidents" (Jacoby) 42-48.
Public Relations-N. S. C.: In annual report of the president (DeBlois) 16-17.
Public Safety: (see also Automobile Driving; Parking, Pedestrians; Traffic).
"Accident facts as a basis for preventive measures" (Haven) 881-887.
"City planning as an aid to public safety" (Bartholomew) 831-833.
"Collection and use of accident reports by the police department" (Sinke) 876-881.
"Electric railway in community safety extension" (Palmer) 1005-1010.
"Establishing a motor vehicle bureau for the state of New York" (Graves) 873-876.
"Further comments on traffic accident prevention" (Kelcey) 849-854.
"Mechanical control systems" (Kelker) 905-909.
Motorists and pedestrians" (Smith) 74-79.
"Planning and rebuilding ou cities for the motor age (Knowles) 809-828.
"Public accidents in the U. S., 840-873.
"Public safety problem" (Ketter ing) 48-55.
"Records and spot maps in Louis ville" (Braden) 887-893.
Resolution, 28-29.
"Who is responsible for public ac cidents?" (Bryan) 79-82.
Public Safety Section:
Appointment of nominating com mittee, 809.
In annual report of presiden (DeBlois) 13-14.
Minutes, 65-82; 805-914.
Minutes of joint meeting o Public Safety and Educatio Sections, 931-950.
"Public Accidents in the U. S.," 840-873.
Report (Van Schaack) 805-809.
Report of nominating committee 831.
Public Safety Section-Women's Divi sion:
Appointment of nominating com mittee, 917.
Minutes, 915-929.
Report of nominating committee 926.
Public Utility Section:
Appointment of nominating com mittee, 954.
Minutes, 951-1003.
Minutes of joint session wit Electric Railway Section, 1005 1029.
Report of nominating committee 982.
Report of secretary (Opp) 951 953.
Public Utilities (see Electric Rail way; Railroads; Telephone In dustry).
Publicity: Report of publicity com mittee of Steam Railroad Sec tion (Braden) 1084-1085.
Pulp Industry: (see Paper and Pulp Industry).
Punch Presses: (see Power Presses)
Questionnaires: In discussion or "Best safety stunt in our mill," 689-690.
Quinn, H.: Address of welcome, 8-10
Radley, G. R.: Discussion on Mr Graham's paper, 364-367.
Railroads: (see also Steam Railroad Section).
Railroads:
"Acquiring a safety conscience" (Allison) 1120-1126.
"Better management through co-operation—the safety method" (Bruere) 1063-1068.
Brake development. In "Development of safety on the railroads" (Carter) 1071-1073.
"Development of safety on the railroads" (Carter) 1068-1073.
Gas generator buildings—rules,

"Presentation of safety inspectors' problem" (McNally) 1111-1113.
"Safety and fire prevention" (Edwards) 1073-1079.
"Safety from the viewpoint of the car department" (Clark) 1090-1097.
"Safety from the viewpoint of conductor" (Butler) 1105-1106.
"Safety from the viewpoint of the locomotive engineer" (Buckley) 1100-1101.
"Safety from the viewpoint of the shopman" (Capdeville) 1101-1104.
"Safety from the viewpoint of the track department" (Ashworth) 1097-1100.
"Safety from the viewpoint of the trainmen" (Kileen) 1106-1109.
"Safety from the viewpoint of the transportation department" (Neumann) 1087-1090.
See also Grade Crossings.

Recreation:
Discussion, 947-950.
"Relationship between safety and recreation and how each can help the other" (Lies) 941-946.

Refineries. (see Oil Company Safety).

Refrigeration: (see also Gases—Refrigeration).

Refrigeration Section: (see Ice and Refrigeration Section).

Registration: (see Automobile Registration).

Rehabilitation: "Textile worker—health—rehabitation of the injured" (VanEmburgh) 1167-1174.

Reilly, C. A.: "How we get discipline through supervision," 1131-1135.

Reninger, H. A., Chairman: Cement Section, 181-232.

Report forms—Industrial:
Accident forms developed by Walworth Mfg. Co., 93-94.
General Motors Corporation form, 171-172.

Report forms—Public:
In "Collection and use of accident reports by the police department" (Sinke) 876-881.
In "Suggestions for model tables on automobile accidents" (Stellwagen and Kopf) 855-873.
"Records and spot maps in Louisville" (Braden) 887-893.

Reporting of Accidents: In "Effective safety methods in the marketing division of the petroleum industry" (Singleton) 741-742.

Resolutions:
Coffin resolution, 1129-1130.
Report of Resolutions Committee of Steam Railroad Section, 1086-1087.

Resolution Committee: Report, 26-31.

Respirators:
Discussion, 1020-1021.
In "Protective devices and clothing for foundry workmen" (Walters) 558.

"Responsibility of the petroleum industry for safety," (Boyd) 707-711.

Resuscitation: "Personal experiences with the prone pressure method of resuscitation" (Ashe) 108-113.

Reszke, F. E.: Discussion on work of Cincinnati schools, 340-342.

Rewards:
Automobile insignia. In "Accident prevention work in the Bell Telephone System" (Elstrum) 967-968.
See also Bonus Systems.

Roof, K. E.: Discussion on prevention of lead poisoning, 295-298.

Rosebush, F. H.: Digest of annual Congress proceedings of Pulp and Paper Section, 663-671.

Rubber Industry:
Code. In "Report of Engineering Committee" (Hoener) 1031-1034.
"Dust explosions in the rubber industry" (Hoxie) 1036-1038.
"Proper ventilation of mixing mills" (Crooks) 1053-1055.

Rubber Section:
Joint meeting with Chemical Section, 265-304.
Minutes, 1031-1060.
Report of Bulletin Committee, 1052.
Report of Engineering Committee (Hoener) 1031-1034.
Report of Membership Committee, 1053.
Report of Nominating Committee, 1039.
Report of Safe Practices Committee, 1052-1053.
Report of Standardization and Statistics Committee (Partridge) 1049-1052.
"Rubber industry from a life insurance standpoint" (Vane) 1056-1060.

Rules: "Instructions in and observance of safety rules in substation operation" (Niesz) 1012-1019.

Ryan, A. H.: "Benefit associations—their need, scope and possibilities, 398-409.

Safeguards: (see Guards).

Safety Department: "Cooperation of the medical department and the safety department" (Cromwell) 633-634.

Safety engineers: (see Engineers, Safety).

Safety Movement—Progress:
"Fundamentals of our industrial safety problem" (Davis) 39-42.
In annual report of the president (DeBlois) 18-21.
"A review of the safety movement" (Alexander) 954-961.

Sand Blasting: In "Protective devices and clothing for foundry workmen" (Walters) 557-558.

Sandel, J. M.: Discussion of paper and pulp mill code, 671-673.

Sanford, G. E., Chairman: Woodworking Section, 1177-1206.

Sanitation:
"How to make a sanitary survey of an industrial plant" (Ferguson) 480-485.
In "Health service in paper and pulp mills" (Frechtling) 678-679.
Drinking water; toilets; wash rooms.

Satterfield, D. E.: "Getting the cooperation of local safety committeemen, local officers and labor representatives in correcting unsafe practices," 1127-1128.

Saul, H., Chairman: Textile Section, 1157-1175.

Saw Mills:
In "Fire prevention in woodworking plants" (Springer) 1186-1192.
"Safety in saw mills and planing mills" (Kenney) 1200-1205.

Saws:
Discussion on guards, 1177-1178.
In "Results obtained in safeguarding of woodworking machinery during the past ten years" (Prouty) 1195-1198.

Schools, Safety Work in:
"Correlataion of safety and physical education" (Schrader) 351-356.
"Correlation of safety with English" (Flowers) 343-351.
"Correlation of safety with grade school subjects" (Dawson) 336-340.
Discussion (Oliver) 391-394.
Discussion on "Safety guard" (Reszke) 340-342.
Discussion on work of Cincinnati schools (Reszke) 340-342.
"Interesting school children in safety on the streets" (Gordon) 388-391.
"Interesting the teacher in safety education" (Gosling) 332-336.
Junior Safety Councils in "Correlation of safety with English" (Flowers) 349-351.
"Organization and function of the demonstration center" (Gruver) 931-935.
"Organization of the Junior Safety Councils" (Woerner) 935-938.
Outline of school safety committee duties, 391.
"Parent-Teachers' Asociation and what it can do for Safety" (Watkins) 939-941.
"Report on work of the Education Section" (Whitney) 327-332.
See also Children, Safety Work with.

Schrader, C. L.: "Correlation safety and physical education 351-356.

Schram, C. F. N., Chairman: Heal Service Section, 455-492.
"Industrial health as a purcha able commodity," 455-466.

Schwarze, F.: "Reducing acciden caused by machinery and chem cal burns," 636-640.

Scientific Selection of Automobi drivers: (see Automobile Dri ing).

Schools, Safety Work in: (see al Children, Safety Work with).

Scoring Machine: (see Ice and R frigeration).

Scott, R., Chairman: Report of mer bership committee, 1079.

Seating: (see Chains).

Senne, E. J.: Report of secretary Petroleum Section, 694-695.

Shapleigh, J. H.: "Corrosion and relation to safety in chemic plants," 248-255.

Shaw, T. N.: "Safety committee: 716-718.

Sherman, R. B.: "Planning f safety," 1163-1167.

Shoes: Discussion on shoes for i workers, 509.

Signals—Traffic:
Discussion, 914.
"Mechanical control system (Kelker) 905-909.

Singleton, F. C.: "Effective safe methods in the marketing di sion of the petroleum industr 738-746.

Sinke, J.: "Collection and use accident reports by the poli department," 876-881.

Slater, B. J.: "How a medical partment may contribute safety in the chemical industr 255-261.

Slipping and falling hazard: "Plant hazards in the ice a refrigeration industry" (Broc 495.

Smith, E. N.: "Motorists and ped trians," 74-79.

Smith, H. S.: "Safe handling a use of cutting and weldi gases, 563-571.

Smoking: Discussion, 749.

Snow, A. J.: "Mental tests for co mercial drivers," 909-911.

Solensten, R. T.: "How to advert the safety idea," 96-101.
"Spice of life" (Gillillan) 133-1

Spillman, H. C.: "Tribute to ind try," 124-128.

Spot Maps: "Records and spot m in Louisville" (Braden) 887-8

Springer, C. E.: "Fire Prevention woodworking plants," 1186-11

Stairways: In report of Resea Committee on Theatre Haza (Jensen) 445-446.

"Standard statistics" (Clarke) 170-173.
Standardization: (see Codes).
Static Electricity: (see Electricity, Static).
Statistics: (see Accidents-Statistics).
Steam Railroad Section:
Coffin resolution, 1129-1130.
Minutes, 1061-1130.
Report of chairman, 1061-1063.
Report of committee on cooperation with other agencies (La Fountaine) 1084.
Report of committee on statistics (Carrow) 1079-1080.
Report of film committee (Adams) 1082-1083.
Report of membership committee, 1079.
Report of nominating committee, 1085-1086.
Report of publicity committee, (Braden) 1084-1085.
Report of resolutions committee, 1086-1087.
Stellwagen, H. P.: "Suggestions for model tables on automobile accidents," 854-873.
Stevens, M. T.: "Plant publication policies," 754-759.
Stoeckel, R. B.: "Drivers' licenses, including examination and revocation," 895-903.
Street traffic: (see Automobile Driving; Street Traffic).
Stuck, W. J.: "Hazards of the scoring machine," 505-507.
Stunzi, J. J.: Plant housekeeping, 156-163.
Stunts, Best Safety, 682-690.
Sub-Stations: "Instructions in and observance of safety rules in substation operation" (Niesz) 1012-1019.
Suggestions: Discussion on best safety stunts in our mills, 690.
Sulphur Dioxide: In "Development of domestic ice machines and relative hazards of refrigerant gases used" (Copeland) 503-504.
"Supervising in relation to safety" (Archer) 164-169.
Surgeons, Industrial:
In "Health education of our foreign families" (Colcord) 475-476.
See also Physicians, Industrial.
Switches:
In "Electric starting devices and fuses with reference to safety (MacWilliams) 619-620.
Tank Cars: "Dangers due to malpractice in the handling of acid tank cars" (Crass) 234-238.
Tank Wagons: Fire in Pittsburgh garage, 737-738.
Tanks: (see Oil Company Safety).
Tanners: (see Packers and Tanners Section).
Taxicab and Delivery Section:
Appointment of nominating committee, 1136.
Joint meeting with Refrigeration Section, 1149-1156.
Minutes, 1131-1147.
Report of nominating committee.
Taxicabs: (see Automobile Driving; Taxicab and Delivery Section).
Telephone and Telegraph Industry:
"Accident prevention work in the Bell Telephone System" (Elstrum) 961-968.
Discussion (Helvin) 972-976.
Discussion (Olschewsky) 968-972.
Tellers, Appointment of, 10.
Tenney, A. B.: "Should physical examination be compulsory to members of a mutual benefit association?" 429-432.
Textile Indusrty:
"Textile worker-health—rehabilitation of the injured" (Van Emburgh) 1167-1174.
"What causes textile accidents?" (Cook) 1158-1161.
Textile Section:
Appointment of Nominating Committee, 1158.
Minutes, 1157-1175.
Report of nominating committee. 1167.
Thalner, R. F.: Chairman, Automotive Section, 174-180.
Theatres: Report of research committee on theatre hazards (Jensen) 444-448.
Thompson, G. S.: Discussion on eye protection in metal working plants, 174-176.
"Punch presses and dies," 143-145.
Thomy, J. P.: Chairman, Public Safety Section—Women's Division, 915-929.
Timm, E. A.: Dicusssion on organization, 722-724.
Report of Manufacturing Division, 693-694.
Toastmaster's address (Woodcock) 122-123.
Toilets: In "How to make a sanitary survey of our industrial plant" (Ferguson) 483-484.
Trade Associations: "Cooperation in safety among trade and other associations" (Grant) 21-23.
Traffic:
"Accident facts as a basis for preventive measures" (Haven) 881-887.
Arcades, elevated sidewalks and multiple streets. In "Planning and rebuilding our cities for the motor age" (Knowles) 823.

By-pass loops. In "Planning and rebuilding our cities for the motor age" (Knowles) 825-826.

"City planning as an aid to public safety" (Bartholomew) 831-833.

"Conference on street and highway safety" (Barber) 119-122.

Discussion on multiple level streets, 833-834.

Discussion on street intersections (Herrold) 828-829.

Discussion on traffic commissions, 834-835.

Economics of traffic. In "Further comments on traffic accident preevntion" (Kelcey) 853.

"Further comments on traffic accident prevention" (Kelcey) 849-854.

In "Public accidents in the U. S.," 847-848.

"Mechanical control systems" (Kelker) 905-909.

"Motorists and pedestrians" (Smith) 74-79.

"Planning and rebuilding our cities for the motor age" (Knowles) 809-828.

"Records and spot maps in Louisville" (Braden) 887-893.

Regulation. In "Planning and rebuilding our cities for the motor age" (Knowles) 816-818.

"Some highlights on the highway traffic problem" (Mason) 1021-1028.

Traffic Counts: In "Planning and rebuilding our cities for the motor age" (Knowles) 811-812; 815.

Traffic signals: (see Signals, Traffic).

Traveling Cranes: (see Cranes).

Treasurer's Annual report (Niesz) 35-37.

"Tribute to industry" (Spillman) 124-128.

Truck operation: (see Automobile Driving).

Tubesing, W. F.: "Safety no longer a matter of choice," 306-308.

Tubing: (see Gas Industry).

Tunnels for Use of Employees: In "Protective devices and clothing for foundry workmen" (Walters) 561-562.

Turpentine poisoning: Discussion, 285.

Tuttle, G. R.: "Better posture when seated," 1038-1039.

Vacuum Cleaners: In "Selection and safe installation of electric appliances" (Greenwood) 996-997.

VanEmburgh, G. H.: "Textile worker—health-rehabilitation of the injured," 1167-1174.

VanSchaack, D., Chairman: Public Safety Section, 805-914.

Report, 805-809.

Vane, R. J., Jr.: "Rubber industry from a life insurance -standpoint," 1056-1060.

Ventilation:

Discussion on second progress report of benzol poisoning sub committee, 281.

In benzol poisoning sub-committee, report, 273-277.

In "How to make a sanitary survey of an industrial plant" (Ferguson) 482-483.

"Proper ventilation of mixing mills" (Crooks) 1053-1055.

Waddington, T. W.: Standard Oil Company, 715-716.

Walker, F. P., Chairman: Ice and Refrigeration Section, 493-509.

Chairman, Joint meeting of Taxicab and Delivery and Ice and Refrigeration Sections, 1149-1156.

Chairman, Taxicab and Delivery Section, 1131-1147.

Wallace, D. J., Chairman: Petroleum Section, 693-752.

"Effective method of safety organization," 714-715.

Wash Rooms: In "How to make a sanitary survey of an industrial plant" (Ferguson) 484-485.

Washing Machines: In "Selection and safe installation of electric appliances" (Greenwood) 995.

Water: (see Drinking Water).

Waterfront operations: (see Marine Hazard).

Water Heaters: In discussion on gas appliances, 989-990.

Watkins, Arthur: "Parent-Teacher Association and what it can do for safety," 939-941.

Watson, A. L., Chairman: Chemical Section, 233-263; 265-304.

Watters, W. E.: Protectice devices and clothing for foundry workmen," 555-562.

Welch, W. E., Chairman: Marine Section, 511-537.

Welcome, Addresses of (Green and Quinn) 8-10.

Welcome, Response to (DeBlois) 10

Welding: "Safety handling and use of cutting and welding gases (Smith) 563-571.

Welfare Work: Discussion on welfare activities in cement plants 217-221.

Whiting, S. E.: Discussion on prevention of lead poisoning, 284-287.

Whitney, A. W.: "Stardardization of safety codes," 62-64.
Chairman, Education Section, 327-356.
Report on work of the Education Section, 327-332.
Wilkins, E. T.: "Costs of employees' magazines," 793-800.
Williams, R. J.: "Why we are interested in Safety," 371-374.
Winslow, W. V.: "Effective methods of safety organization—Manufacturing Division," 719-722.
Winterstreen, C. C.: Discussion on gas appliances, 982-990.
Woedtke, L. D.:
Discussion on the value of comparative accident statistics, 311-314.
"Keeping safety before the eyes of drivers," 1149-1152.
Woerner, E.: "Organization of the Junior Safety Councils," 935-938.
Women's Activities:
"How we interest foreign women" (Downey) 926-928.
Minutes of Public Safety Section, 915-929.
"Parent-Teachers' Association and what it can do for safety" (Watkins) 939-941.
"Suggested safety programs for the General Federation of Woman's Clubs," 928-929.
"What the women c are doing for sa 917-918.
Women's activities 915-917.
Woodcock, C. E.: Ad Toastmaster, Banqu
Woodworking Industri
"Fire prevention in plants" (Springer
"Results obtained in of woodworking m ing the past ten ye 1193-1199.
Woodworking Section:
Minutes, 1177-1206.
Report of nominatin 1186.
Workmen's Compensat
"Chronic insidious joint disease as a longed industrial c (Conn) 1039-1049.
"Reducing accident waterfront work—between compensa miralty laws" (Fo
Resolution on enact eral compensation
Wright, W.: Discussio tion of lead poiso
"Should medical se mutual benefit so beyond the work plant?" 411-414.