INDUSTRIAL HYGIENE FOUNDATION

FOUNDATION FACTS

Foundation Facts is a monthly news-letter issued to industrial concerns holding membership in Industrial Hygiene Foundation. The Foundation is a combined research and service institution to protect the health of workers in industry.

Vol. 3. November, 1941 No. 11.

The Sixth Annual Meeting of members of the Foundation is now history. The program was built around the theme: Defend the Defense Worker, and each of the papers presented during the two days carried a message of particular value in the present emergency.

3[illegible]6 individuals, representing [illegible]06 companies or organizations, attended the sessions, a 40% increase over the previous "high."

In order that those on the Foundation's mailing list who were not able to attend the meeting may have an idea of the scope of the program and of its highlights, this issue of the Digest consists of abstracts of all papers which were prepared beforehand, instead of the usual abstract of literature.

It is expected that the Proceedings of the meeting, with all papers and discussions in full, will be ready for distribution about the middle of December.

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Pennsylvania

Abstract of an address on "Protection of Men and Machines" by Edward A. Tamm, Assistant Director, Federal Bureau of Investigation, at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 12, 1941.

The war in Europe is entering its third year. While the scream of dive bombers and the destruction of Panzer divisions may not constitute an immediate menace to our safety here in America, vicious, subversive forces are at work which threaten our national strength.

The FBI is proud to take part in the internal defense of America. I might say the work is not entirely new to us. We have dealt with the enemies of American peace and freedom before.

I hope the theme of the annual meeting of the Industrial Hygiene Foundation is "Defend the Defense Worker." All too many of us in America fail to appreciate how vital to our national preparedness is the welfare of our factory employees. In this regard it is appropriate to explain one phase of the national defense work the FBI is doing.

At the request of the War and Navy Departments, the FBI is engaged in surveying many large industrial plants manufacturing essential defense products. Through this program we hope not only to make it difficult for the saboteur to gain entrance into the plants to carry on his destructive work but also to safeguard against accidents which might cause shutdowns or personal injury to employees. Our sole interest is in safeguarding American industry; we are not concerned with legitimate labor activities. Under no circumstances does the FBI interfere with the employer-employee relationships.

America's strength in the future will depend on the uninterrupted flow of goods from our production lines today. Her defense industries must operate smoothly and efficiently. In these all-out efforts the defense laborer is a key figure. If a laborer loses a week's work because of illness or industrial accidents, production may be slowed down that much. With enough such accidents the saboteur doesn't have to turn a hand - his "work" is being done for him.

Of the more than 2,500 important industrial plants which are on the priorities list to be surveyed by the FBI, surveys of 2,022 plants have already been completed. These physical surveys include detailed inspections by our trained Special Agents of the entire plant properties and comprehensive suggestions are made to the plant managements by the FBI. We suggest how a particular plant can be better protected against the malicious efforts of the spy or saboteur as well as from the more common industrial accidents.

Deficiencies most frequently found pertain to the matter of selecting and investigating personnel, identification of employees, guard protection, exterior and interior illumination, fire-fighting equipment, handling of visitors, fencing of property and screening of windows, and protection of confidential blueprints and records.

As an example, in one particular plant it was found that fire-fighting equipment consisted chiefly of water pails suspended from the ceiling or the walls. The survey disclosed that all but a few of the pails were either empty, contained only a few inches of water, or had deteriorated to the point that there were no bottoms at all.

The Federal Bureau of Investigation was designated by the President in 1939 to serve as a clearinghouse and coordinating agency to handle law enforcement activities in connection with national defense matters.

To successfully handle the tremendous increase in its work since then, Director John Edgar Hoover has tripled the personnel of the FBI. There are today over 2,500 Special Agents compared to slightly more than 800 when the European War started in 1939. The clerical force of the FBI has grown from 1,400 to more than 4,400 during the same period. The work of the FBI is still increasing and if we are to continue the efficient discharge of our duties, our personnel must be increased additionally.

In the fiscal year ending June 30, 1941, a total of 68,368 matters pertaining to our national defense were received in the 55 FBI field offices. This figure compares with 16,885 such matters in 1940, and 1,651 in 1939. Thirteen new field offices have been opened in cities of strategic national defense importance throughout the United States and its territories since early in 1939.

Investigative activity of the FBI resulted in 412 convictions in national defense cases in the fiscal year 1941. However, the success of counterespionage cannot be accurately measured by arrests and convictions as in cases of kidnaping or bank robbery. Combatting espionage is like fighting fire with fire. Spies must be spied upon. Their every movement must be closely observed and their contacts determined. Their ways of communication must be uncovered and their sources of information must be ascertained. Premature arrests of spies and saboteurs would prove harmful and could easily wipe out months of hard work and painstaking effort of our Special Agents.

For more than a year Director Hoover has been planning a comprehensive project in civilian protection. In preparation for this widespread project, the Director sent officials of the Federal Bureau of Investigation to England more than a year ago. These men studied and observed the protective and preventive measures used by Scotland Yard and other civilian defense agencies in London and nearby cities.

Any plan of civilian defense must include everyone because modern conflict is not limited to battles between armies. The innocent civilians and workers in factory towns far inland and away from the battle lines at the front often suffer more than do the uniformed soldiers. Falling bombs do not discriminate and neither must the civilian defense program.

If America were the object of attack all the industries and resources that contribute to her national defense would be potential targets for enemy aircraft. Foremost on any dictator's list would be the rich manufacturing districts of our industrial northeast. You gentlemen can well imagine the destruction, the human suffering, the economic loss that would result should long-range bombers release their lethal loads from high in the skies over Pittsburgh, Detroit, or Youngstown.

That possibility gave rise to our Civilian Defense Courses for Police; programs that are of benefit to the Chief of Police of the small town as well as the police executives of our largest cities. I believe you will agree with me that Director Hoover in organizing this widespread project had in mind just such a theme as that of your annual meeting - "Defend the Defense Worker."

Long the symbol of tolerance and freedom, democracy is today threatened by the doctrines of dictatorship. But law enforcement in America is working together as never before. The spies, saboteurs and subverters of Naziism, Communism and Fascism will never succeed while we Americans stand united and strong.

##########

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Penna.

Abstract of first progress report on a study of "Sick Absenteeism in Industry," among a group of members of Industrial Hygiene Foundation presented by Dr. W. M. Gafafer, Senior Statistician, United States Public Health Service at the Foundation's sixth annual meeting held at Mellon Institute, Pittsburgh, Nov. 12, 1941.

In 1940 a number of member companies of the Industrial Hygiene Foundation recognizing the extraordinary part played in the industrial economy by non-occupational sickness and injuries expressed interest in a study of sick absenteeism in cooperation with the Foundation, the American Association of Industrial Physicians and Surgeons, and the United States Public Health Service. This interest culminated in the periodic reporting to the Foundation by 13 companies of pertinent data on sickness and non-industrial injuries disabling for 8 consecutive calendar days or longer. It is purposed in this progress report to present some of the material yielded by the 6 months' period, January-June, 1941. (Several other companies plan to participate, but have been delayed by emergency conditions).

Two monthly report forms are filled out by the participating companies and periodically mailed to the Foundation. During the latter part of August the data were received by the Public Health Service for coding, transferring to punch cards, machine tabulation, and analysis. Of the 13 participating companies, 8 reported throughout the 6 months while 5 reported from 2 to 5 months. Almost all of the diagnoses made in connection with the absences that began and terminated during the 6 months' period were reported as having been made by the family physician, and approximately 95 per cent of these absences terminated by return to work.

The 8 companies represented by an average monthly number of 42,884 male and 1,656 female employees yielded 1,899 and 99 beginning absences, respectively, or an average annual male frequency of 89.3 cases per 1,000 and a female frequency of 120.6 cases per 1,000. The male frequency rate (number of cases per thousand) is about 80 per cent of the Public Health Service rates, the difference reflecting principally the respiratory group of diseases. Several of the companies, however, show respiratory rates above the Public Health Service rate.

With regard to days lost, the 7 of the 8 companies supplying data on the closing of non-ended cases showed a loss of 51,126 days among the males. Company rates varied from 1.69 to 3.39 days per male per year, the latter rate approximating the median rate of 3.33 days experienced by companies reporting to the Public Health Service for 1935-37.

With respect to the reliability of the rates and hence the value of intercompany comparisons it is sufficient to state that the rates may reflect the operation of many factors among which are the more or less "artificial" ones such as those originating in the various regulations of a sick benefit plan. It may be safely assumed that the rates as given do not present an overstatement of the sick absenteeism situation as measured in terms of 8 day or longer absences. (One company's rate was well above the average for the others and three times higher than one. An analysis showed that two-thirds of this company's large total rate was caused by respiratory diseases. Hence the study shows up the main cause of the absences and this enables the company in question to take intelligent corrective steps).

Since this report deals only with 8 day or longer absences the question arises of how much is lost by not taking account of the shorter absences. An opportunity to provide an answer to the question presented itself when the requisite data

were made available by the 5 year record of one-day absences or longer that occurred among the employees of a public utility company, one that had been operating under a liberal disability plan for a quarter-century. The analysis of the data showed that although the males experienced annually 900 absences per 1,000 males, and the females 1,820 per 1,000 females, only 153 absences among the males and 232 absences among the females extended through the eighth day; in other words, only 17 per cent of all recorded absences among the males extended through the eighth day while 13 per cent of all recorded absences among the females extended through the eighth day. Furthermore, of the total recorded days of disability 45 per cent among the males, and 52 per cent among the females occurred during the first 7 days of disability after onset. (In other words, on the basis of this company's experience, about half of all absences are shorter than seven days).

Industry is now well aware of the fact that sick absenteeism is one of the most serious bottlenecks in the defense program. This report gives an indication of the magnitude of the problem in a sample of member companies of the Industrial Hygiene Foundation. With respect to the large numbers of new employees, night work, and overtime with its attendant fatigue, sufficient evidence has accumulated which points to an expected substantial increase in the frequency of sick absences.

TABLE 1. — Summary of data from 13 companies reporting to the Industrial Hygiene Foundation, January — June, 1941

Company letter	Months covered by the reports	Males: Annual number of cases per 1,000 males[1]	Males: Number of cases[2]	Males: Average monthly number of employees	Females: Annual number of cases per 1,000 females	Females: Number of cases[2]	Females: Average monthly number of employees
	Companies reporting continuously during the first half of 1941						
Total	Jan. — June	89.3	[illegible]	42,884	120.6	99	1,656
A	Jan. — June	65.3	194	5,988	0	0	38
B	Jan. — June	70.0	48	1,382	175.4	14	161
C	Jan. — June	73.4	395	10,856	193.9	[illegible]	52
D	Jan. — June	77.1	419	10,954	229.5	[illegible]	246
E	Jan. — June	93.5	293	[illegible]	78.1	30	775
F	Jan. — June	127.4	295	[illegible]	126.0	22	352
G	Jan. — June	143.4	32	[illegible]	0	0	6
H	Jan. — June	[illegible]	223	[illegible]	0	0	26
	Companies reporting less than 6 months during the first half of 1941						
I	Jan. — Feb.	67.2	7	918	-	-	-
J	April — June	[illegible]	62	3,474	*94.9*[3]	4	169
K	Jan. — May	128.3	25	471	165.2	11	161
L	Jan. — April	153.6	5	99	0	0	3
M	Jan. — Feb.	276.6	22	492	[illegible]	1	22

[1] All rates have been raised to an annual basis. The rate yielded by January and February, say, is multiplied by a factor by dividing 365 days by the number of days in January and February. Thus the multiplying factor is 365/59 or 6.18644.

[2] "Cases" include only those beginning during the months covered by the reports, and lasting 8 consecutive calendar days or longer; some of these cases were "unended," that is, continued beyond June 30, 1941.

[3] Italicized rates are based on less than 5 cases.

TABLE 2. — Frequency, by broad cause group, of cases of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, beginning during the first half of 1941; experience of male employees in 8 companies reporting throughout the 6 months to the Industrial Hygiene Foundation compared with companies reporting to the United States Public Health Service

Cause	Annual number of cases per 1,000 males						Ratio of Industrial Hygiene Foundation to USPHS in percent		
	Industrial Hygiene Foundation			USPHS[2]					
	First half	First quarter	Second quarter	First half	First quarter	Second quarter	First half	First quarter	Second quarter
All disabilities[1]	89.3	103.7	71.[illegible]	112.9	138.2	87.[illegible]	79	79	81
Nonindustrial injuries	9.2	9.2	9.3	10.8	11.[illegible]	10.1	85	81	92
Sickness	80.1	99.5	62.0	102.1	126.9	77.6	78	78	80
Respiratory diseases	41.9	62.7	22.6	55.7	78.9	33.2	75	79	68
Digestive diseases	13.4	12.5	14.1	13.8	14.4	13.2	97	87	107
Nonrespiratory-nondigestive diseases	23.8	23.7	23.8	29.8	30.5	28.6	80	78	83
Ill-defined and unknown causes	1.0	.6	1.5	2.8	3.1	2.6	36	19	58
Average number of males	42,884	41,537	44,232	226,712	223,884	229,739	-	-	-
Number of companies	8	8	8	26	26	24	-	-	-

[1] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not included.

[2] From references 1 and 2.

Table 3.—Frequency, by cause of cases of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, beginning during the first half of 1941; experience of male employees in 8 companies reporting throughout the 6 months to the Industrial Hygiene Foundation compared with companies reporting to the United States Public Health Service

Cause. (Numbers in parentheses are disease title numbers from the International List of Causes of Death, 1939).	Annual number of cases per 1,000 males			Number of cases		
	Industrial Hygiene Foundation		USPHS all males[3]	Industrial Hygiene Foundation		USPHS, all males
	All males	White males		All males	White males	
ALL DISABILITIES[1]	89.3	87.7	112.9	1,890	1,764	12,693
NONINDUSTRIAL INJURIES (160-195)	9.2	8.5	10.8	196	172	1,213
SICKNESS	80.1	79.2	102.1	1,703	1,592	11,480
RESPIRATORY DISEASES	41.9	41.2	55.7	891	828	6,260
Influenza and grippe (33)	24.1	23.7	30.1	513	477	3,386
Bronchitis, acute and chronic (106)	3.4	3.3	6.3	73	66	709
Diseases of the pharynx and tonsils (115b, 116)	4.0	4.1	6.5	85	83	729
Pneumonia, all forms (107-109)	4.3	3.9	5.2	92	79	584
Tuberculosis of respiratory system (23)	.6	.6	.6	12	10	70
Other respiratory diseases (104,105, 110-114)	5.5	5.6	7.0	116	113	782
NONRESPIRATORY DISEASES	37.2	37.0	43.6	790	743	4,904
Digestive diseases	13.4	13.3	13.8	284	267	1,557
Diseases of the stomach except cancer (117,118)	3.8	3.7	3.6	79	75	403
Diarrhea and enteritis (120)	1.1	1.0	1.0	22	20	117
Appendicitis (121)	4.2	4.1	4.9	90	83	553
Hernia (122a)	1.8	1.9	1.6	37	36	176
Other digestive diseases (115a,115d, 116, 122b, 123-129)	2.6	2.7	2.7	56	53	308
Nondigestive diseases	23.8	23.7	29.8	506	476	3,347
Diseases of the heart and arteries, and nephritis (90-99,102,130-132)	3.2	3.3	4.2	69	66	474
Other genitourinary diseases (133-138)	1.9	1.8	2.2	41	37	246
Neuralgia, neuritis, sciatica (87b)	1.0	1.1	2.0	21	21	228
Neurasthenia and the like (part of 84d)	1.0	1.1	.9	21	21	101
Other diseases of the nervous system (80-85, except part of 84d, and 87b)	1.0	.9	1.1	21	19	128
Rheumatism, acute and chronic (58,59).	3.1	2.9	4.1	66	59	462
Diseases of the organs of locomotion, except diseases of the joints (156b)	2.3	2.3	2.9	49	46	325
Diseases of the skin (151-153)	1.7	1.7	2.3	35	34	255
Infectious and parasitic diseases[2] (1-12, 14-24,26-29,31,32,34-44)	3.2	3.0	2.8	69	61	311
All other diseases (45-57,60-79,88,89,101, 103,154,155,156a,157,162)	5.4	5.6	7.3	114	112	817
ILL-DEFINED AND UNKNOWN CAUSES (200)	1.0	1.0	2.8	22	21	316
Average number of males	42,884	40,546	226,712	42,884	40,546	226,712
Number of companies	8	8	26	8	8	26

[1] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not included.

[2] Except influenza, respiratory tuberculosis, and the venereal diseases.

[3] From reference 2.

TABLE 4. — Frequency, by company, of cases of sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, beginning during the first half of 1941, according to broad cause group, sex and color; experience of employees in 8 companies reporting throughout the 6 months to the Industrial Hygiene Foundation.

Company letter	Annual number of cases per 1,000 employees							Average number of employees
	All disabilities[1]	Nonindustrial injuries	Sickness: Total	Respiratory diseases	Digestive diseases	Nonrespiratory-nondigestive diseases	Ill-defined and unknown causes	
All males								
Total	89.3	9.2	80.1	41.9	13.4	23.8	1.0	42,884
A	65.5	4.4	61.1	29.3	13.1	15.8	2.7	5,688
B	70.0	5.8	64.2	32.1	4.4	24.8	2.9	1,682
C	73.4	9.5	63.9	31.9	12.3	19.5	[illegible]	10,856
D	77.1	[illegible]	67.4	30.6	11.4	25.4	[illegible]	10,954
E	93.5	[illegible]	83.3	47.6	16.9	16.6	[illegible]	6,316
F	127.4	[illegible]	116.6	62.2	13.8	39.6	1.3	4,668
G	[illegible]	4.5	138.9	67.2	35.8	[illegible]	-	450
H	[illegible]	15.1	183.0	[illegible]	18.7	[illegible]	.9	2,270
White males								
Total	87.7	8.5	[illegible]	41.2	[illegible]	23.7	1.0	40,546
A	63.7	3.8	59.9	28.[illegible]	12.5	15.9	2.8	5,826
B	71.6	6.1	65.5	[illegible]	4.6	24.4	3.0	1,324
C	68.3	8.3	60.0	[illegible]	[illegible]	18.3	-	9,919
D	74.1	3.9	65.[illegible]	[illegible]	[illegible]	25.8	-	9,991
E	93.8	10.3	[illegible]	47.7	[illegible]	16.6	2.2	6,301
F	128.3	10.2	[illegible]	62.4	[illegible]	40.1	1.3	4,525
G	143.4	[illegible]	138.9	67.2	35.8	35.9	-	450
H	198.0	[illegible]	183.4	122.3	[illegible]	42.0	.9	2,210
Negro and other males								
Total	[illegible]	20.7	95.7	54.3	[illegible]	[illegible]	.8	2,338
A	124.5	24.9	99.6	49.8	37.3	12.5	-	162
B	34.8	-	34.8	-	-	34.8	-	58
C	127.0	21.5	105.5	60.3	10.8	32.3	2.1	937
D	108.9	18.9	90.0	52.3	16.8	[illegible]	-	963
E	-	-	-	-	-	-	-	15
F	98.7	28.2	70.5	56.4	-	14.1	-	143
H	201.7	33.6	168.1	67.2	33.6	67.3	-	60
White females[3]								
Total	120.6	9.7	110.9	50.0	13.4	40.2	[illegible]	1,655
A	-	-	-	-	-	-	-	38
B	-	-	-	-	-	-	-	26
C	-	-	-	-	-	-	-	6
E	78.1	-	78.1	44.3	15.6	13.0	5.2	775
F	126.0	11.4	114.6	57.3	11.5	45.8	-	352
B	176.5	37.8	138.7	50.4	-	63.1	25.2	160
C	193.9	-	193.9	77.5	38.8	38.8	38.8	52
D	229.5	24.6	204.9	65.6	16.4	114.7	8.2	246

1/ Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not included.

2/ Italicized rates are based on less than 5 cases.

3/ There was only one Negro female in the records and no case was reported for her.

TABLE 5. — Percentage distribution of case durations, by company, yielded by sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, beginning during the first half of 1941 and with known duration; experience of male employees in 7 companies reporting throughout the 6 months to the Industrial Hygiene Foundation

Company letter[1]	All disabilities[2]				Nonindustrial injuries				Sickness			
	All cases of known duration	Duration in calendar days			All cases of known duration	Duration in calendar days			All cases of known duration	Duration in calendar days		
		8-14	15-28	29 or longer		8-14	15-28	29 or longer		8-14	15-28	29 or longer
	Percentage distribution of known duration cases											
Total ..	100.0	35.0	31.0	34.0	100.0	27.7	34.9	37.4	100.0	35.9	30.5	33.6
C	100.0	14.2	39.8	46.0	100.0	14.3	38.8	46.9	100.0	14.2	40.0	45.8
D	100.0	18.0	31.5	50.5	100.0	15.2	41.3	43.5	100.0	18.7	30.1	51.2
A	100.0	41.9	32.9	25.2	100.0	11.1	22.2	66.7	100.0	43.7	33.5	22.8
F	100.0	45.3	29.2	25.5	100.0	28.0	40.0	32.0	100.0	47.0	28.1	24.9
G	100.0	55.2	20.7	24.1	100.0	-	-	100.0	100.0	57.2	21.4	21.4
B	100.0	58.5	29.3	12.2	100.0	75.0	25.0	-	100.0	56.8	29.7	13.5
E	100.0	63.5	21.5	15.0	100.0	68.7	21.9	9.4	100.0	62.8	21.5	15.7
	Number of cases of known duration											
Total ..	1,541	539	478	524	166	46	58	62	1,375	493	420	462
C	359	51	143	165	49	7	19	23	310	44	124	142
D	378	68	119	191	46	6	19	21	332	62	100	170
A	167	70	55	42	9	1	2	6	158	69	53	36
F	274	124	80	70	25	7	10	8	249	117	70	62
G	29	16	6	7	1	-	-	1	28	16	6	6
B	41	24	12	5	4	3	1	-	37	21	11	5
E	293	186	63	44	32	22	7	3	261	164	56	41

[1] Company H which did not report over the 6 months the closing of "non-ended" cases is omitted.
[2] Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not included.

TABLE 6.— Annual number of days of disability per employee, by company, yielded by sickness and nonindustrial injuries disabling for 8 consecutive calendar days or longer, beginning during the first half of 1941, according to sex and color; experience of employees in 7 companies reporting throughout the 6 months to the Industrial Hygiene Foundation.

Company letter[1]	Annual number of days per employee[2]			Number of days of disability[2]			Average number of employees
	All disabilities[3]	Nonindustrial injuries	Sickness	All disabilities[3]	Nonindustrial injuries	Sickness	
All males							
E	1.69	.16	1.53	5,294	508	4,786	3,316
B	1.69	.09	1.60	1,161	63	1,098	1,382
A	2.21	.20	2.01	6,567	607	5,960	5,988
C	2.59	.30	2.29	12,967	1,627	11,340	10,856
D	2.83	.39	2.53	15,566	1,590	13,976	10,954
G	3.27	.24	3.03	730	54	676	450
F	3.39	.28	3.11	7,341	696	7,202	4,668
White males							
E	1.69	.16	1.53	5,294	508	4,786	6,301
B	1.75	.10	1.65	1,150	63	1,087	1,324
A	2.14	.18	1.96	6,192	529	5,663	5,826
C	2.48	.28	2.20	12,182	1,348	10,834	9,919
D	2.74	.27	2.47	13,587	1,357	12,230	9,991
G	3.27	.24	3.03	730	54	676	450
F	3.39	.28	3.12	7,801	613	6,993	4,525
Negro and other males							
B	.38	-	.38	11	-	11	58
A	3.67	.97	2.70	375	78	297	162
C	3.84	.60	3.24	1,786	279	1,506	937
D	4.14	.49	3.65	1,979	233	1,746	963
F	3.38	.36	3.02	240	26	214	142
White females							
E	1.19	-	1.19	456	-	456	775
F	4.93	.16	4.77	861	29	832	352
C	6.59	-	6.59	170	-	170	52
B	7.75	.63	7.12	615	50	565	160
D	10.08	1.57	8.51	1,230	192	1,038	246

1/ Company H which did not report over the 6 month the closing of "non-ended cases" is omitted.

2/ For cases not ended June 30, the days of disability were counted to that date, inclusive. Not all companies reported cases beginning prior to January 1, 1941. Such cases have been omitted even if they had been reported by some companies; hence the days in 1941 accounted for by these cases are not included in the table.

3/ Industrial injuries, venereal diseases, and a few numerically unimportant causes of disability are not included.

WHAT THE RESULTS OF ABSENTEEISM AUDIT MEAN IN DOLLARS AND CENTS
AND
SUGGESTIONS FOR LESSENING ABSENTEEISM

INDUSTRIAL HYGIENE FOUNDATION
ANNUAL MEETING, PITTSBURGH, PA.
NOVEMBER 12, 1941
ANDREW FLETCHER

The Problem of Absenteeism

In considering this problem, many employers and employees may have the same reactions as I have had in the past - namely:

1. What do the available and somewhat complicated published absenteeism figures actually mean?

2. What is actually the cost of absenteeism - if a workman is not paid for the time he is sick, why should the employer be concerned?

3. Is it really worth while to incur the trouble and expense of collecting absenteeism data, and after it is obtained, just what good is it to anyone from a "money" or any other point of view?

1. Absenteeism Statistics

The information which has been collected by the U. S. Public Health Service and recently by the Industrial Hygiene Foundation is both constructive and enlightening as to the loss in working time that is being suffered through absenteeism. I believe, however, that the data and resultant statements should be on the basis of an absence of one day and more, and not confined to eight days and over.

The St. Joseph Lead Company, of which I am an officer, and which, as you may know, is the largest miner of lead ores in the United States and one of the larger zinc producers, keeps the data on both a one day and an eight day basis. The shorter period is used because absenteeism of more than eight days is obviously less than for a shorter period, and we are most anxious to have as much information as possible so that corrective steps can be taken to lessen the time lost.

We also express absenteeism, instead of by the number of cases per thousand employees, by the percentage of shifts lost, as this basis, in our opinion, more vividly indicates to our operating men the amount of time lost, and therefore the percentage of lost production and profits. Statistics, just as accounting statements, must be current and easily understandable by the men in charge of production. It is, of course, always interesting to know why a person died, but from my point of view I would much rather know why he is sick, so that steps might be taken to prevent death.

2. The Cost, or the "Dollars and Cents" Angle of Absenteeism

There are attached hereto certain absenteeism figures of the St. Joseph Lead Company, which show that only about 6.0% of all absenteeism is the result of accidents while at work. The other comparative percentages may be interesting for those who wish to study the situation in detail, but I am only trying to handle the problem from a rather broad point of view, with the thought of emphasizing the "money" loss of absenteeism and to suggest possible ways of lessening this loss.

For many years the St. Joseph Lead Company has made a serious effort to lessen the time lost and expense involved through accidents while at work. I might add that we have done so, not because of any altruistic or paternalistic motive. The dollars saved by this procedure of improved safety in operations is indicated by the following figures from our Southeast Missouri Division:

> Back in 1923, about ten cents per hundred dollars of payroll was spent by the Safety Department for its work, and the cost of accidents was $3.81 per hundred dollars of payroll; whereas in 1940, the Company spent 93 cents for safety, and the cost of accidents was 97 cents per hundred dollars of payroll.

The comment might be made that due to the safety expense increasing over nine times, and the accident cost only being cut about 70%, the actual saving is merely the difference in total cost, which is $1.71 per hundred dollars of payroll ($3.81 - $1.90). This is, of course, true, but the total saving is far greater than $1.71 (although this direct saving for only Southeast Missouri amounts to about $35,000 per year), because it does not include the hidden indirect costs. These indirect costs are, the extremely adverse effects of an accident on a man's own person and family, the expense of replacing an injured man with the resultant increased cost of supervision, spoilage of material, lower output, plus the cost of repairing equipment that may have been damaged in an accident.

About a year ago, Mr. Harrington, Chief of the Health and Safety Branch, U. S. Bureau of Mines, made the rather startling estimate to me that the indirect costs amount to about three times as much as the direct costs. With a direct cost of 97 cents, or approximately one dollar, the indirect costs would, therefore, be about $3.00, and the total cost about $4.00 per one hundred dollars of payroll. With a payroll of five million dollars, the accident costs may, therefore, amount to $200,000 per year.

Even though the time lost through accidents is only about 6% of the total absenteeism, we cannot estimate the total absenteeism loss by multiplying the accident percentage by some fixed amount because all operating men know that even under normal conditions there will be sickness and, therefore, extra men are carried on the payroll to insure reasonably normal operations. The direct loss of absenteeism is the amount of wages paid these "extra" men,- just as the direct loss of accidents is the compensation and medical cost. From the tables attached,

it is apparent that in Southeast Missouri, the shifts lost through absenteeism is 2.33% of the total shifts worked, at the Balmat mine 2.3%, and at Josephtown 1.7%. It may, therefore, be reasonably assumed that in our operations possibly 2% extra men are being carried; with a force of 5,000 men, there are possibly 100 extra men whose annual earnings would approximate $180,000. This figure may be considered as the "direct" loss. The "indirect" absenteeism losses are probably first as great as for accidents, especially because a man works efficiently up to the time of an accident, whereas in the case of sickness, a full day's work is probably not done before an employee is forced to lay off or just after he returns. Using the accident indirect cost of two-thirds times the direct, the sick and miscellaneous absenteeism in our operations might approximate $540,000, which with the direct loss makes a total of $720,000. However, it must be appreciated that no matter what precautions are taken, there will be some sickness and miscellaneous absenteeism, possibly 5%. Therefore, the amount that can reasonably be expected to save is $360,000, or about $70.00 per employee in a force of 5,000. If, therefore, you wish to approximate the absenteeism loss in the United States, or in your own plant, multiply the number of workers by $70.00 per year.

3. Production Lost by Absenteeism

In war-time it is essential that absenteeism be reduced to a minimum, because basic commodities cannot be transformed into finished goods without a relatively fixed number of hours of labor, and skilled mechanics are difficult to find. Many times I have heard astonishing estimates of the amount of copper, lead, etc., that we will consume in this country for war and civilian uses, also the amount of kilowatt hours that are to be required for such output. Although I have at times thought that, if the demands are actually as great as indicated, then we may even run short of sea water to float the ships that we are building, - my inner reaction, however, has always been that we could not possibly use the enormous amounts of raw materials because, as already stated, a worker can only consume a definite amount of material and kilowatt hours. We can, of course, consume more materials if we can secure more workers, but as a representative from a statistical service stated to me, "Where is it possible to obtain 40 million more workers which will be needed if the indicated consumption for war and civilian purposes is accomplished?" From purely a practical point of view, it seems to me that we should reduce civilian consumption to the extent necessary to meet war-time necessities, and from an equally practical point of view, that more man hours of employment should be secured by decreasing the amount of time lost through absenteeism.

A rough approximation of the production loss can be determined on the following basis: each worker in the United States loses about 8 days per year - if we can save 50%, or 4 days, we save 32 hours per worker; with about 7 million persons in defense industries, we would save about 200 million hours of labor, which is sufficient to build 100 destroyers, or about 300 standard cargo ships.

4. Improved Community Health is Desirable

In connection with reducing absenteeism because of sickness, the problem is even greater than in the case of accidents, because, in addition to working conditions and employee attitude, sick absenteeism is affected by the employees' home life, his housing, his food, his ability to get prompt and efficient medical service, and above all, by the general sanitary conditions in the locality in which he lives. The St. Joseph Lead Company has for the past twenty years been seriously interested in the general health of the communities in which its principal operations are located.

We have approached the men with the firm realization that the American workman does not want or expect something for nothing. We have frankly stated that many of the school children of today will be our employees of tomorrow, that we are interested in the general health of the community, and that we have done and will continue to do certain things for business and not philanthropic reasons. We have, for example, given free milk to the school children, we have spent hundreds of thousands of dollars for good water and satisfactory sewerage systems and adequate housing has been built. The communities and our men appreciate this frankness and realize the soundness of our policy that money invested in improved working and living conditions is worth while from the "dollar and cents" angle as well as from the humanitarian view point.

5. Suggestions as to Methods for Obtaining Data and Lessening Absenteeism

On the assumption that some companies will be convinced of the desirability of obtaining information on absenteeism, then I offer them the following suggestions:

> When the check-up is undertaken, tell the employees why it is being done, that the information obtained will not affect their personal liberties, and that when the data definitely shows certain conditions to be unfavorable, then the Company will seriously attempt to develop remedies. For example, if it is found that a great deal more time is lost from colds than from accidents, then a company might well consider the desirability of making available protective cold pills or vitamin capsules or sun lamps. If it would appear from absenteeism figures that an epidemic was starting, workers might be sent home immediately upon feeling sub-normal, and not be allowed to return without a doctor's permit. It is also suggested that the company's or a recognized local physician should talk to the men collectively at certain periods, that these talks should be stenographically reported and then mimeograph copies mailed to the man's home so that there would be some discussion on the part of his family - if a man has already heard the doctor's story, he will be disposed to discuss the pamphlet and, in so doing, will improve himself as well as others with the doctor's

suggestions. Another constructive method would be to follow our procedure of giving to the men or their families the Metropolitan Life bulletins on colds, penumonia, tuberculosis, etc.

But, in considering the problem of absenteeism, it should be definitely realized that the higher the wages become and the more overtime that is worked, often the more time that men will endeavor to take off and magnify a cold or some slight ailment to cover up attendance at a ball game or some equal attraction. Therefore in the collection of data, and in the issuing of any pamphlets on absenteeism, companies must not lose their sense of humor.

Conclusion

I express the definite conviction that just as industry has satisfactorily handled problems of production, sales and financing, when the information and facts are available, there is no reason why we cannot readily lessen absenteeism and therefore reduce the great wastage to employees due to lost of wages, to industry due to loss of earnings, and to our country due to lost production, - then, industry will have once more done its share in forwarding the ideals and purposes of democracy.

ST. JOSEPH LEAD COMPANY — SOUTHEAST MISSOURI MINING OPERATIONS
ABSENTEEISM REPORT FOR THIRTY-NINE WEEK PERIOD ENDING 7:00 A.M., Sept. 28, 1941

Reason for Absence	Shifts Lost	Per Cent Absenteeism Based on 513,142 Expected Shifts of Work	% of Total Shifts Lost	Losses of 15 or More Shifts by Individual Employees. No. of Cases.	No. of Shifts Lost
Industrial Injury	704	.14	[illegible]	15	423
Non-Industrial Injury	535	.10	4.47	10	311
Influenza, Grippe & Colds	3,002	.58	25.08	9	186
Nasal Fossae & Annexia	42	.01	.35		
Pharynx and Tonsils	272	.05	2.27	1	15
Penumonia	182	.04	1.52	6	176
Respiratory Tuberculosis	160	.03	1.34	2	123
Other Respiratory Diseases	82	.02	.69	2	33
Teeth and Gums	124	.02	1.04		
Stomach, Except Cancer	525	.10	4.39	5	90
Diarrhea and Enteritis	7		.06		
Appendicitis	309	.06	2.58	9	245
Hernia	17		.14		
Other Digestive Diseases	54	.01	.45		
Heart	363	.07	3.06	6	313
Hemmorhoids	87	.02	.73		
Other Circulatory Diseases	109	.02	.91	1	80
Genito-Urinary Diseases	107	.02	.90	2	126
Neuralgia, Neuritis and Sciatica	101	.02	.84	2	150
Other Diseases of Nervous System	200	.04	1.67	1	195
Organs of Vision	84	.02	.70	3	69
Ear and Mastoid Process	33	.02	.28		
Rheumatic Diseases	136	.03	1.14	1	23
Lumbago, Myositis, Etc.	289	.06	2.41	1	15
Skin Diseases	52	.01	.43	1	35
Infectious and Parasitic Diseases	167	.03	1.39	1	20
Ill-defined and Unknown Causes	1,389	.27	11.60	11	391
Illness or Death in Family	1,197	.23	10.00	1	20
Miscellaneous Personal Reasons	1,637	.32	13.68	3	82
Total	11,970	2.33	100.00	93	3,133

This report includes payroll men and salaried men who are limited to maximum hour provisions of the Fair Labor Standards Act for thirty-nine week period between December 29, 1940, to September 27, 1941, inclusive.

Bonne Terre, Missouri
October 21, 1941.

ST. JOSEPH LEAD COMPANY — BALMAT MINING OPERATIONS, NORTHERN NEW YORK
ABSENTEEISM REPORT FOR PERIOD JANUARY 1, 1941 TO FEBRUARY 28, 1941
AND
FROM MAY 1, 1941 TO SEPTEMBER 30, 1941

Reason for Absence	Shifts Lost	% Absenteeism Based on 15,890 Shifts of Work	% of Total Shifts Lost
Industrial Injury	27	0.17%	5.0%
Non-industrial Injury	6	0.04%	1.0%
Influenza, Grippe and Colds	34	0.21%	6.5%
Tonsils	20	0.13%	3.8%
Nasal Sinus and Annexes	[illegible]		
Throat, Bronchitis, Etc.	[illegible]	0.11%	3.5%
Respiratory T.B.	[illegible]	0.15%	4.6%
Total Respiratory Diseases	129	0.81%	24.0%
Teeth and Gums	11	.07%	2.0%
Stomach, except Cancer	13	.08%	2.5%
Diarrhea and Enteritis	16	.10%	3.0%
Appendicitis	[illegible]	.18%	5.6%
Heart	[illegible]	.27%	6.0%
Nervous System	[illegible]	.16%	[illegible]
Lumbago, Myositis, Etc.	19	.12%	3.5%
Disciplined	17	.11%	3.0%
Ill-defined & Unknown Causes	[illegible]	.96%	29.0%
Illness in Family	[illegible]	.04%	[illegible]
Miscellaneous Personal Reasons	[illegible]	.44%	13.0%
Weather - Car Trouble	[illegible]	.08%	2.5%
TOTAL	534	3.38%	100.0%

ST. JOSEPH LEAD COMPANY — JOSEPHTOWN ZINC SMELTING OPERATIONS, PENNSYLVANIA
SUMMARY OF EMPLOYEES' ILLNESSES

Diagnosis	1939-1940-1941-TERMINATING SEPTEMBER 30TH Reported Absences of 1 Day or More: 1939 No. Cases	1939 Days Lost	1940 No. Cases	1940 Days Lost	1941-Term.Sep.30 No. Cases	1941-Term.Sep.30 Days Lost	7-Day Absentees Ind.Hygiene Sta. 1941-Term.Sept.30 No. Cases	7-Day Absentees Ind.Hygiene Sta. 1941-Term.Sept.30 Days Lost
All respiratory	77	420	98	375	150	706	58	297
Appendectomy	24	137	4	122	2*	71*	2*	71*
Chronic Appendicitis	3	13	6	36	1	10	1	10
Digestive Tract	9	72	23	57	20	70	2	26
Hemorrhoids	1	13	1	65	-	-	-	-
Liver, Kidney, and Bladder	2	60	8	55	5	140	5	132
Teeth and Neuralgia	1	6	9	30	5	19	1	13
Typhoid and Scarlet Fever	1	38	1	28	1	9	1	9
Back Ailments (included in miscellaneous 1939 & 1940)				-	11	56	1	19
Miscellaneous	19	185	30	171	17	177	10	152
Non-Industrial Accidents	9	92	9	129	18	243	2	163
TOTAL	146	1,096	195	1,069	232	1,501	43	892
Average time lost per case	8.70 Days		5.48 Days		6.48 Days		20.74 Days	
Exposure (hours)	740,452		950,471		700,669		700,669	
Average number of employees	347		437		459		459	
Plant accidents (lost time only)	7 / 108		6 / 135		14 / 281**			
Annual number of cases per 1000 males	363		446		528		124.9	

In addition to the above listed cases, the following had not been terminated with time lost as of September 30, 1941:

Non-industrial accident	1 case	2 days	lost
Gall Bladder Operation	1 "	82 "	"
Miscellaneous	1 "	9 "	"

* Includes one case in which former employee reported that he would have to have an appendectomy at his home (some distance from Josephtown). Subsequent brief correspondence did not reveal definitely whether or not he had had the operation. He was subsequently dropped from payroll.

** Does not include one fatality.

Industrial Hygiene Foundation,
4400 Fifth Avenue,
Pittsburgh, Pa.

Abstract of "What's New In Industrial Health," report of the Foundation's Medical Committee, by Dr. A.J. Lanza, Chairman, (Assistant Medical Director, Metropolitan Life Insurance Co., N.Y.) at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 12, 1941.

The past year is memorable for the progress that has been made in industrial hygiene and in the care of the health of the industrial worker. In the defense set up there is the Office of Defense Health and Welfare Services and the Office of Scientific Research and Development, both directly stemming from the Office for Emergency Management.

In the former, a sub-committee, entitled the Industrial Health Committee, works in close cooperation with the United States Public Health Service, the National Research Council, and the Army and Navy Departments. Under the Office of Scientific Research and Development, largely centered in the National Research Council, there is also an Industrial Health Committee which personnel is identical with that of the other sub-committee on industrial health. This arrangement provides for adequate attention being given to both the administrative and research phases of industrial health in all types of defense industries. In addition, there is a Section on Industrial Hygiene in the Bureau of Preventive Medicine of the Medical Department of the Navy and also in the Medical Department of the Army.

On the governmental side also, the past year has seen an increase in State Bureaus of Industrial Hygiene so that at present there are 34 such bureaus, plus the territories of Hawaii and the Philippine Islands, in operation. These bureaus, in cooperation with the Division of Industrial Hygiene of the National Institute of Health, present a co-ordinated and integrated control such as has never before been contemplated in this country. In addition, several correlated activities are represented by sub-committees in the defense health and welfare services, namely nursing, nutrition, and morale.

The Division of Industrial Hygiene of the United States Public Health Service has appointed an industrial consulting nurse. In cooperation with the National Organization for Public Health Nursing, which has also appointed an industrial nursing consultant, a staff education program is being developed which is expected to be available in January next. This program is planned for the use of visiting nurse associations which are in a position to include service to industry among their activities. Nine states have appointed industrial nursing consultants in their Bureaus of Industrial Hygiene.

The Committee on Nutrition in Industry of the Board on Food and Nutrition of the National Research Council was created last Spring as an advisory body to the government on matters pertaining to the nutritional status of employees in defense industries. To date the Committee has concentrated mainly on the collection and the evaluation of pertinent material; attempts to stimulate a nationwide interest in the problem; and the furnishing to manufacturers and other interested parties, upon request, what advice it is in a position to give concerning the feeding of industrial workers.

As the problem of the nutritional requirements of industrial workers has not been adequately explored, the Committee, as part of its implied duty of collecting the factual data upon which any recommended remedial procedures must be based, has undertaken to institute controlled nutritional studies in several large industrial plants, located in various sections of the country.

The Sub-committee on Personal Relations in Industry is especially interested in industrial morale. This Committee is setting up a program aimed at both the educational and practical aspects of the subject. To aid in correlating the scattered material, an annotated bibliography is being prepared. This will make available to industrialists, personnel managers, and industrial physicians a wealth of material which should be helpful for guidance when emotional problems arise.

Organized medicine is represented by the Council on Industrial Health of the American Medical Association and by the Committees on Industrial Health of the State and County Medical Associations. Industry is represented by definite programs conducted by the National Association of Manufacturers and by the United States Chamber of Commerce.

The Division of Industrial Hygiene of the United States Public Health Service, through its Section on Laboratory Investigations, is conducting researches into a large number of situations and processes relating to industrial health and exposure to occupational hazards in the dangerous industries. It may be said that research is keeping pace with administration in the general field of industrial health.

It is exceedingly encouraging to note that education in industrial hygiene goes on in the technical, engineering and medical sides and is being stimulated and developed. Courses in industrial hygiene for both doctors and engineers are being established under university auspices and it is expected that these will be functioning sufficiently to meet future demands.

Our Foundation, under the able leadership of Dr. Heller and Mr. McMahon, has entered quite a wide range of activities. I need only refer you to the printed program which speaks for itself and you will hear from individual speakers in detail of what activities are under way and what has been accomplished.

##########

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Pennsylvania

Summary of findings from Foundation-supported research on best X-ray procedures for industry—"A Comparison of Stereoscopic Miniature Chest Films Single Roentgenograms on Paper, and Single Roentgenograms on Large Films" by Eugene P. Pendergrass, M.D., S. Reid Warrend, Jr., Sc.D, and D. E. Haagensen, M.S. of University of Pennsylvania, presented by Dr. Pendergrass at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 12, 1941

Single 14-inch by 17-inch roentgenograms on film and on paper, and stereoscopic 4-inch by 5-inch and 35-mm photographs of the fluorescent screen image were made during the summer of 1941 by Mr. D. E. Haagensen of patients chosen by Dr. E. P. Pendergrass. Dr. Pendergrass, Dr. Warren, and Mr. Haagensen, working with the manufacturers of the equipment used for producing miniature films, chose the techniques for all of the exposures. Several films or pairs of films were made of each patient by each method; these films differed considerably in density and contrast. The subjects chosen by Dr. Pendergrass for this series of tests included a few patients whose chests were normal and many others whose chest films provided difficult diagnostic problems.

After the films were made they were shown by Mr. Haagensen to 31 roentgenologists in Philadelphia, Washington, New York, and Cincinnati. Each of these examiners analyzed the films of from 6 to 13 patients and recorded his findings on forms. The examiner started by choosing from among the 35-mm films of a particular patient that stereoscopic pair which he liked best; he then noted whether he thought this film adequate for survey purposes and briefly what he saw in the film. He then proceeded to the 4-inch by 5-inch films of the same patient, then to the 14-inch by 17-inch paper, and finally to the large films. Finally after he had finished his examination of all of the films which time permitted him to examine he was asked whether he thought that paper roentgenograms, stereoscopic 4-inch by 5-inch films, and stereoscopic 35-mm films were satisfactory for surveys involving (1) gross pathology of the chest (2) minimal tuberculosis, (3) silicosis, and (4) industrial surveys.

Preliminary analyses of the data show that these roentgenologists believe that the order of merit for survey work of the four methods is: First—14-inch by 17-inch films; Second—14-inch by 17-inch paper; Third—stereoscopic 4-inch by 5-inch photographs of the fluorescent screen image Fourth—stereoscopic 35-mm photographs of the fluorescent screen image

Purpose	Percent Appraising Method as Satisfactory		
	14 x 17 in. Paper	Stereoscopic 4 x 5 in.	Stereoscopic 35 mm.
Detecting Gross Pathology of Chest	100	90	68
Detecting Minimal Tuberculosis	83	58	20
Detecting Silicosis	86	67	21
For Industrial Surveys	89	79	24

These results should be qualified by the following facts: (1) Many of the examiners were not practiced in the examination of small films. (2) Definite improvements in the techniques of producing both 4-inch by 5-inch films and 35-mm films have been made since the films used in these tests were prepared. (3) Limited time was available to the examiners for examination of the test results. It is probable that the results tabulated above would have been modified in the direction of more general approval of the small films for surveys if these difficulties had been avoided.

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Pa.

Abstract of report on Tuberculosis in Industry, by Dr. L. U. Gardner, Director, The Saranac (NY) Laboratory, at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 12, 1941

There is a growing tendency to account for a freshly discovered case of tuberculosis as a product of industrial environment. Our dust-conscious minds seem instinctively to think first of factors that may depress resistance to infection rather than of a source of contact with the tubercle bacillus. At the Saranac Laboratory Symposium this year on Tuberculosis in Industry, I asked nearly 30 experienced observers to report the incidence of tuberculosis in different industrial environments and to discuss the effects of factors that have been alleged to favor its development. A full report of the proceedings will be published about the first of the year by the National Tuberculosis Association. Here I can only point out a few of the general conclusions.

There has been an even greater decrease in the tuberculosis mortality in industrial groups than in the population at large. A low standard of living rather than specific environmental factors is responsible for most of the tuberculosis among wage earners. Of the respiratory irritants, including fumes and gases as well as dusts, only free silica has a specific influence upon susceptibility to tuberculosis.

In exceptional individuals causal relationships between exposure to irritants and tuberculosis may be admitted but the effect of such substances is not such that it influences the incidence of tuberculosis in occupational groups. The optimum environment desirable for the cure of tuberculosis is not essential in its prevention. The influence of nutrition, fatigue, extremes of temperature and humidity and specific intoxication like lead were discussed and it was agreed that only the first has had an appreciable effect.

In contrast to the old-hand cigar industry, which still accounts for about 75% of the workmen in this trade, a modern tobacco factory with adequate hygienic surroundings produces practically no tuberculosis. The frequence of this infection in non-siliceous dusty trades was not abnormal but high rates still obtained in foundries, granite cutting and hard rock mining involving exposure to quartz dust. But even under the latter condition, the possibilities of control are indicated by the low rates prevailing where medical programs have been in operation over a sufficient period.

###

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Pa.

Abstract of findings from a Foundation-supported research on "Effects of Arc Welding Fumes on Susceptibility to Tuberculosis." The investigation, conducted at the Saranac (NY) Laboratory, was reported by Dr. L. U. Gardner, Director, at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 12, 1941

As an example of an exposure to a pulmonary irritant that has had no significant effects upon superimposed tuberculous infection, I cite an experiment dealing with exposure to arc welding fumes. This was undertaken because of the increasing number of men being exposed to such fumes throughout industry. The program was carried on under a grant from the Industrial Hygiene Foundation.

During the first months, when the proper sublethal dose of fume was being determined, about [illegible] per cent of the 200 guinea pigs exposed died of a chemical pneumonia. On reducing the concentration of the fumes the deaths ceased within three or four days; however, many animals killed during the following 9 months have shown microscopic scars resulting from the healed inflammation of the lungs.

Half of the original group of 200 guinea pigs placed in the fume chamber had been infected with tubercle bacilli of low virulence a few days previously. In spite of the severe inflammatory reaction resulting from the excessive initial concentration of fumes their tuberculosis healed as effectively as it did in non-exposed controls. In no animal killed during the following 8 months has there been any evidence of progression of the infection such as has been regularly observed when quartz dust is inhaled.

Another group of guinea pigs has been infected with the same kind of tubercle bacilli and at intervals of 4, 6, and 8 months thereafter small groups of these animals have been exposed daily to sublethal concentrations of welding fumes. Here the purpose was to learn whether the preformed healing tubercles would be reactivated and caused to spread as has also been the case when animals are exposed to quartz dust.

No suggestion of reactivation has been observed in any animal exposed when its tuberculous foci (area) were 4, 5, or 6 months of age. The final test will be started next month to discover whether there are chronic effects of exposure to fumes in concentrations too low to produce pneumonia, which alter native susceptibility to tuberculosis. Animals kept in the fume chamber for 10 months will at that time be removed to a normal atmosphere for a week and then infected with the same kind of tubercle bacilli. From the nature of the scars in the lungs it is not anticipated that the course of the superimposed tuberculosis will be any different from that in unexposed controls.

The results thus far observed constitute evidence for the view that severe inflammation of the lungs does not necessarily influence the course of a tuberculous infection. They also indicate that exposure to even excessive concentrations of arc welding fumes is unlikely to have a bad effect upon either fresh or old tuberculous foci (area) in a worker's lungs.

Approximately 120,000 arc welders are now engaged in industry.

###

Industrial Hygiene Foundation,
4400 Fifth Avenue,
Pittsburgh, Pa.

Summary of findings from Foundation-supported research on "Reactions of Living Tissues to Silica Granules as Observed Microscopically in the Rabbit's Ear Chamber," by Dr. Eliot R. Clark and Darrow E. Haagensen, M.S., Department of Anatomy, University of Pennsylvania, presented by Eugene P. Pendergrass, M.D., of University of Pennsylvania, at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 12, 1941.

The study of the reactions of living tissues to silica granules, as observed microscopically in double-walled chambers inserted in the rabbit's ear, has been extended during the past year to include the effect of a more massive dose of silica than was used previously, and also the effect of a second dose super-imposed on the single one used in earlier studies.

With silica of particle size 1 to 3 microns (a micron = 1/25,000 of an inch) from material provided us by Dr. L.U. Gardner, (Director, Saranac (NY) Laboratory) a very massive dose was forced into the tissue in a chamber which had been previously subjected to a moderate dose. The chamber was then observed for 10 months. The results did not differ materially from those obtained from the smaller single doses. No definite silicotic nodules were formed.

The outstanding reaction was the phagocytosis (engulfing) of the silica particles by macrophages (wandering cells), which remained visible, with their enclosed silica, throughout the period of observation, and which showed a definite tendency to group together. Some of the macrophages (wandering cells) merged to form giant cells which, after days or weeks, disintegrated without causing any noticeable reaction. Evidence has accumulated which suggests that in regions where many silica-laden macrophages are grouped, there is more ready reaction to mild inflammatory irritants than elsewhere.

The general conclusions from all these studies is that the presence in the tissues of large amounts of fine silica does not of itself lead to the formation of silicotic nodules, but that it may produce a condition which may form the basis for an exaggerated reaction to mild inflammatory irritants.

##########

Industrial Hygiene Foundation,
4400 Fifth Avenue,
Pittsburgh, Pa.

Abstract of a report on the "Employability of the Physically Handicapped," by Dr. Henry H. Kessler, Medical Director, New Jersey Rehabilitation Clinic, at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 14, 1941.

A large number of persons handicapped by minor disabilities, but possessing great potentialities for vocational performance, are being rejected for military service and condemned as unemployable by industry. Thus a vast reservoir of man power is annually lost to the national economy.

Failure to employ these individuals is based not on proof of their incapacity to work but on a deep-rooted prejudice. The social and economic condemnation of the physically handicapped is rationalized on the false assumption that physical appearance and physical performance go together. However, a man's capacity to work is not the result of his anatomical make-up. His native ability, his personality, and his training all contribute to his productivity.

Physical defects are of two types: static and dynamic. The loss of a finger, a stiff joint, the paralysis of one muscle or muscle group, are stationary defects and rarely effect the individual's capacity to work. Tuberculosis, arthritis and similar systemic diseases are dynamic in that they effect the entire body and impair working efficiency. Rejection should be based on the presence of diseased states and not on static defects, except where job analysis in a specific vocation indicates unusual physical requirements.

A disabled person may not only be normally productive, but may actually excel in a chosen field. The ability of individuals with physical defects to be as fully productive as so-called normal individuals, is due largely to the safety factor. The body can accommodate itself to unusual demands despite disease, or congenital, or acquired defects. Through self repair, regeneration, adaptation to new conditions, substitution of one structure for another, such as the skin for the kidney, the body may perform efficiently. In this respect the large reservoir of traits and capacities resemble an iceberg. Less than 10% of the potential efficiency of the individual is called into play in the routine pursuits of life. Submerged, for use in an emergency, lie 90% of the physical powers of the individual. The physical defect may even act as a stimulus to overcompensation with extraordinary physical activity. Adler developed a complete system of psychology based on the idea of organ inferiority. He stated that we are equipped with materials that are rarely fully developed, yet with this imperfect development, good performances are turned out, just as our ancestors produced great works with imperfect tools.

Employers are reluctant to employ the physically handicapped because they believe their defects make them accident prone. There is enough data at hand to disprove this false contention.

What has been said about the physically handicapped may also be applied to the so-called over-age employee. Swiss studies show that the incidence of industrial accidents is much less among those aged 40 to 50 than among those from 20 to 40.

Because of the powerful psycho-social prejudice on the part of industry and society toward the physically handicapped and the over-age employee, ordinary educational methods have proved futile in finding a place for them in the national economy. This challenge has been met in a limited way by the United States government in 48 states. Agencies have been set up providing assistance to the handicapped by means of special services, including physical restoration, functional training, and placement. The objective is to reduce or remove the physical defect, provide special skills, and place them in positions consistent with their aptitudes and their limitations.

Only one state -- New Jersey -- has emphasized the objective of physical restoration. This, in my view, is paramount because only by removing the defect can productivity be increased and psychological prejudice reduced.

This principle has been in operation in New Jersey for more than 20 years. The correctness of this principle can be seen in its adoption by the government in its plans for the rehabilitation of draftees. In this program 200,000 young men with dental defects, eye defects, cardiovascular diseases, musculo-skeletal defects, peroneal diseases, mental and nervous diseases, mental defects of ears, defects of feet, defective lungs, and other miscellaneous defects will be salvaged. The army expects to accept virtually all of these 200,000 after they undergo treatment by family physicians or dentists at federal expense.

The lesson is plain. If it is good policy for the army to salvage untrained youths, it is of equal value to salvage the physically handicapped and over-age employee with great potentialities for industrial service.

########

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Penna.

Abstract of discussion of the "Employability of the Physically Handicapped," by M. M. Walter, Director, Pennsylvania State Bureau of Rehabilitation, at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 12, 1941.

Almost one-tenth of the people in the United States meet with accidents annually, and twice this number are home from work at least one week during the year because of illness. As a result of these disabling conditions, there are 4,000,000 persons with permanent physical impairments and the annual increase of new cases is about 800,000. The disabilities of about 67% do not prevent them from making their own employment adjustments. For the others, 260,000, it is necessary to provide special guidance, education and placement in order that they may engage in remunerative employment. Seventy-five thousand can be prepared for normal employment, and the rest must be adjusted through a special environment such as sheltered workshops or occupations that can be carried on in their homes.

Through expert counselling for a suitable job, plus careful vocational preparation, the handicapped become trained reliable workers and are certified as being physically and mentally capable of doing the job. They present a group of more stable employees than the so-called "physically perfect group", as shown by a study in one of our large industries. In order to carry out this experiment the physical examination was waived, and a group of handicapped workers studied with a group of non-handicapped workers. The investigation showed that among the non-handicapped workers a greater percentage (8 per cent) resigned than of the handicapped workers. Also, that among the former group there was a greater percentage (7.4 per cent) removed from their jobs because they were not suited to the type of work. It showed that of the non-handicapped cases 2 per cent more were laid off, due to lack of work, than among the handicapped.

The report of the committee which conducted the study said: "We are of the opinion that there is no real reason why people possessing certain vocation defects should not be employed by large concerns." If the emphasis is placed on the individual's abilities and he is not placed in a job where his physical handicap will penalize him, he will be able to compete successfully and stand the pace of modern production just as well as those suffering from no handicaps.

A recent review of those persons who were successfully rehabilitated in Pennsylvania for the year 1938-39, showed that more than 85% were still employed at the time of the review which was one year after placement on the selected job. Think of this saving in Labor turnover with no increased hazard of accident. In not a single instance was a second accident reported. That employers are satisfied is evidenced by the figures showing that about 42% of these people still employed are employed at an increase in wage. These figures for steadiness of employment, for reduction of labor turnover are without doubt equal to those found in any large industry and form a definite proof that, if correctly adjusted into suitable employment, the disabled man makes as satisfactory and as safe a worker as does the physically normal.

The safety of the disabled was further verified in a study made in Pennsylvania in 1937. Only 175 or 0.6% of the 29,000 handicapped drivers of automobiles in that year were involved in accidents. On the other hand, 91,000 or 4 1/2% of the other 2,000,000 drivers met with accidents.

The nature of the disability often requires the selection of special types of productive employment and the utilization of small business projects. On the other hand there are plenty of examples of the disabled fitting into regular

industrial activities in competition with normal persons. Today more than 10,000 handicapped persons are employed by the Ford Company and about 8% of the employees of the Western Electric Company are physically disabled.

A study of 6,097 rehabilitated persons revealed that they were working at 628 different types of jobs. Higher grade positions demanding ability and experience, as well as other types of employments, were being filled by disabled persons.

The rapid expansion of production in the National Defense Program has increased the demand for workers and employers are now asking specifically for qualified disabled persons because they are not apt to be called for military service; because of the need for skilled workmen; and because of the recognized efficiency of disabled experienced workers by employers.

Employers are requesting rehabilitation departments to establish facilities to prepare disabled persons for specialized occupations. In one State, a large concern, which manufactures leather products, is being supplied by the rehabilitation service with workers fitted to meet that employer's job specifications. In an eastern State a plant manufacturing fire control apparatus is in a similar manner being supplied with disabled workers, selected in advance by their personnel office, and prepared by the rehabilitation service to meet the specialized job requirements in that plant.

Another employer of machine parts is operating an evening class in his own plant in cooperation with the rehabilitation service to prepare a group of disabled persons for his employment. This plan was made possible by previous placement with this employer of several injured workers, who proved very satisfactory.

Several large optical companies are training persons in precision lens grinding.

In one city disabled persons have been trained in a school of horology. Normally one and a half years are required to prepare for watch repairing. This course has been adjusted to prepare in twenty weeks handicapped persons for employment in a plant which manufactures aviation instruments.

The viewpoint of the employer is outlined in the following statement by H. B. Duffus, Safety Engineer of Westinghouse Electric and Manufacturing Company: "The saying, 'IT IS NEVER TOO LATE TO MEND' has no better application than the occasion of the industrial employee who has through misfortune been deprived of some of his faculties to the extent that he is unable to continue on the job or profession that has provided him with the necessities of life and a few of its pleasures. Because a workman loses an arm, a leg, his hearing, or his sight, there is no reason why he should be considered as a loss to industry. Many of these men were machinists, electricians, boiler makers, foremen, pattern makers — a complete cross section of our skilled workmen. In fact, there are 93,000 industrial employees who were permanently disabled as a result of our 1940 industrial accident roll and several times that number who were permanently disabled because of accidents and disease outside the plant.

"I can recall many cases of good rehabilitation of industrial workers. There is a young fellow who lost four fingers while working on a milling machine. Four years of training in the Trade School and our Drafting Department developed him into a Junior Draftsman. There was the case of the girl who lost three fingers on a punch press and whose ambition always had been to become an inspector. Through a series of special courses, she received the necessary training and is now a very

efficient and valuable inspector. A woman twenty-one years old had her left hand amputated at the wrist. Further instruction in business, arithmetic, bookkeeping and accounting machines qualified her for work in the factory office keeping certain accounts and doing comptometer work as a part of the job."

The Pennsylvania Rehabilitation Service was invited by the Engineering Department of the Transformer Division of Westinghouse, located at Sharon, Pa., to assist the company with the selection of a number of workers for the drafting section. These workers have been successful because their positions were carefully selected on the basis of personal fitness and adequate preparation. In addition, the surmounting of difficulties in overcoming a physical handicap has built up character in the employees, a valuable factor for vocational efficiency. As stated by W. J. Dunn, Assistant Engineering Manager, "These young people are doing important work and doing it well; they have helped to meet the need for skilled draftsmen due to defense production; they have quickly adapted themselves to the work. One of the young men made the highest grade in aptitude tests in a group of 96 of our drafting apprentices."

History is replete with cases to whom adversity in the form of a handicap was a challenge to fight and who turned misfortune into a blessing. Economically the investment by society to fit the handicapped for employment is sound. In fact, in one study it was found that for every dollar spent for rehabilitation, $47.00 was returned to society.

#######

Industrial Hygiene Foundation,
4400 Fifth Avenue,
Pittsburgh, Pa.

Abstract of address, "Protection of Civilians and Industry in Wartime," by Dr. George Baehr, Chief Medical Officer, U.S. Office of Civilian Defense, at sixth annual meeting of Industrial Hygiene Foundation, held at Mellon Institute, Pittsburgh, Nov. 24, 1941.

The United State Director of the Office of Civilian Defense, Mayor F.H. LaGuardia urges the industrial physicians of the country to cooperate in the development of plans of the Medical Division of the Office of Civilian Defense for the establishment of medical protective services in States along both seaboards and in vulnerable industrial centers in the interior. In all localities in these "target areas" of the country, an Emergency Medical Service is being organized with an outstanding physician as local Chief of Emergency Medical Service.

One of the essential responsibilities of the Emergency Medical Service is the organization of an Emergency Medical Field Unit in every hospital in the "target areas", which must be ready to respond promptly at the call of the Control Center in the event of a local disaster caused by sabotage or accident or by sudden and unheralded bombing. In response to the appropriate alarm, Emergency Field Units will be despatched from hospitals in the area to set up casualty stations and advanced first aid posts close to the sites of disaster.

Another essential part of the plan of the Office of Civilian Defense calls for the organization and training of First Aid Detachments in every industrial plant, large business establishments and government departments in the country. Some industrial plants have already organized such detachments for the protection of their employees in cooperation with the American Red Cross. It is important that similar First Aid Detachments be organized in each wing of every large industrial plant so that prompt first aid can be rendered to employees in the event of an accident or other disaster. Under the direction of the plant physician, the members of the detachment should be thoroughly trained in first aid procedures and first aid drills should be held periodically thereafter. Each detachment should be in charge of a leader who has taken the advanced and instructor's courses in first aid of the American Red Cross and has been qualified as an instructor. He and other qualified instructors should then proceed to extend first aid training to other employees.

It is the object of the Office of Civilian Defense to spread first aid training widely throughout the civil population until ultimately there is someone trained in first aid in every vicinity and if possible in every house. Industrial physicians must be prepared to play an important role in this undertaking. Of all physicians, they are among the best equipped by training and experience to assume a large share of the leadership in Civilian Defense not only in their own industry but in the communities in which they live. The Office of Civilian Defense calls upon you to serve as leaders in your localities in the organization and operation of the civilian protection services which will form an important part of our national defense.

##########

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Penna.

Abstract of report of Membership Committee presented by C. E. Ralston, Chairman (Safety Director, Pittsburgh Plate Glass Co.) at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 13, 1941.

Twelve companies have affiliated with the Foundation thus far this year. They are:

Corhart Refractories Company
Hazel-Atlas Glass Company
International Business Machines Company
Merck & Company
Miamisburg Paper Company
Michigan Mutual Liability Company
Neville Company
Pittsburgh Clay Pot Company
Plaskon Company
Pyrene Manufacturing Company
Standard Lime and Stone Company
Toledo Edison Company

Two of the above are old members who dropped out in lean years but renewed their memberships during 1941. Four companies resigned. Meanwhile General Motors Corporation has just advised us of its desire to affiliate, starting January 1, 1942.

It will be impossible to make a full report on membership work until the end of the year. A campaign for new members is now in progress and we have reason to be optimistic about its results. The campaign has been necessarily held up by the procedures involved in changing the Foundation's name. This change was advocated by the Membership Committee, as well as many other persons interested in the Foundation, at the meeting here one year ago. (After circularizing the membership, and after the due processes of the law, the change from Air Hygiene Foundation to Industrial Hygiene Foundation became official only recently.)

Increasing industrial activity tends to increase health hazards—and at a time when this nation sorely needs maximum manpower. Therefore, the work of the Foundation is more important now than ever before. It helps companies keep precautions apace with production, which is the only way we can offset the increases in sick absences and occupational disease which inevitably accompany increase in industrial activity.

In endeavoring to fulfill this important function — keeping precautions in step with production — the Foundation is performing more and more field work for its member companies. During the past year our industrial hygienist, Mr. F. S. Mallette, covered approximately 25,000 miles in making plant surveys and "trouble shooting" where new processes were being installed, or new materials introduced with questionable health effects. Survey work was performed in seven states.

In August, the Staff Hygienist flew 2,700 miles in three days covering emergency work in plants scattered from Oklahoma to New Jersey. During midsummer, three hygienists were kept busy on the staff meeting the demand for survey work. Three companies are now utilizing this survey service on a year-around basis. Several other member companies are seriously considering a similar arrangement, which has many advantages.

Another membership service developed during the year, and which promises to prove highly valuable to members, is the consultation on exhaust ventilation systems. Companies planning to install such systems should submit their plans to the Foundation for a double check. This service becomes possible through the engineering study which the Foundation is supportion at University of Pennsylvania.

In closing, let me call attention to the importance of the Foundation's research on industrial health. Research doesn't excite us when we refer to it as one of the benefits companies derive from their membership. But Dr. L. U. Gardner's report yesterday, showing that arc welding fumes do not seem to affect susceptibility to tuberculosis, is of immense importance. It is definite word at last on this much discussed subject. This investigation emphatically illustrates the value of the Foundation's research for its members and for all industry — which is just another reason why all industry should vigorously support Industrial Hygiene Foundation. If any further argument for the Foundation were needed, Mr. Andrew Fletcher supplied it yesterday when he said — to approximate the absenteeism loss in your own plant, multiply the number of workmen by $70 per year.

Please bear in mind that this organization was started by industry itself and that it is a real symbol of enlightened industrial management and leadership.

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Pennsylvania

Abstract of report on "Industrial Hygiene at Work in the Defense Industries" to be presented Thursday, Nov. 13, 1941 at the sixth annual meeting of the Industrial Hygiene Foundation at Mellon Institute, Pittsburgh, by Warren A. Cook, Past President American Industrial Hygiene Association, Zurich General Accident & Liability Insurance Company, Chicago.

The purpose of industrial hygiene today is to work out methods whereby industry can utilize the optimum material and processes for a given purpose even though such material or process may involve a potential health hazard. By incorporating such protective method as the industrial hygienist stipulates, these can in practically every case be used without causing injury to the health of workers.

Among the myriad examples of materials and processes being introduced in the defense industries are the potential hazards presented by the rapidly developing magnesium foundry industry. In addition to the usual dust exposures which must be controlled in foundry practice, there is the added exposure of sulfur dioxide produced when the hot metal is poured into the mold in which sulfur is incorporated to reduce the oxidation of the metal. It is probable that exposure to ammonium silicofluoride, which may be used to replace part of the sulfur and exposure to carbon disulfide, used in testing the sulfur content of the sand, are not sufficient to produce any demonstrable injury but these exposures should be checked so that excessive absorption of these materials may be avoided before poisoning actually results.

Carbon tetrachloride has been used in connection with resin core washes particularly where thin sections require smooth finishes. Here it is necessary to guard not only against the exposure to the carbon tetrachloride vapor itself, but also to make sure that there is no exposure to phosgene into which the carbon tetrachloride is hydrolized if this vapor comes in contact with incandescent surfaces in core ovens or from freshly poured castings. Phosgene has its purposes as a war gas but it has no place in the foundry.

The more extensive use of benzol in many industrial operations where toluol had formerly been employed is also brought out as a condition which needs to be very carefully checked since demands of the munitions industry have drained the general toluol market. Even toluol may produce its narcotic effect on workers in the airplane industry where such confined areas as the blind end of the fuselage must be spray-coated.

The manufacturer is cautioned against becoming so occupied with direct production problems that he overlooks industrial hygiene. Industrial hygiene is just as much a matter of efficient production as is the provision of properly tempered tools. Another caution: operations previously innocuous may cause health injury on longer or more continuous exposure incident to increased production schedules. As a case in point, fatal poisonings have occurred in an operation involving one of the moderately toxic solvents which had previously been used on shorter schedules without any injury to health.

The value of putting industrial hygiene to work in defense industries is this —— man-power can be kept on an efficient level.

#####

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Penna.

Abstract of preliminary report on a Foundation-supported study, "An Evaluation of Present Exhaust Ventilation for the Control of Industrial Health Hazards," by Theodore Hatch and Robert H. Walpole, Jr., Department of Public Health and Preventive Medicine, University of Pennsylvania, presented by Professor Hatch at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 13, 1941.

Two important situations stand out with respect to the present procedures in designing of systems of exhaust ventilation: 1. the design is almost entirely empirical; 2. the performance of systems so designed has not been extensively correlated with the degree of control which is produced. There is need for collection and tabulation of design data, the use of which will provide for more exact control of dusts, fumes, vapors and gases.

Exhaust ventilation is applied to numberless industrial processes and to many variants of the same process. Because of the variables encountered, it is stated that design problems cannot be reduced to basic engineering relationships and that since great factors of safety must be employed power consumption is only of secondary interest. Recognizing the importance of the variable factors involved and the reliance which must be placed upon previous experience, it seems proper to inquire to what extent empirical data, based upon experience, can be translated into more basic data which will have more general application. One may also investigate the possibilities of reducing power consumption without sacrificing efficiency of control.

Dust and other contaminants are dispersed into the air by definite forces. The function of an exhaust hood is to establish counter-forces which will prevent the escape of the contaminant. In a basic engineering approach to the design of exhaust hoods, the forces of dispersion must be recognized and evaluated and related to hood performance. The major objective of the proposed investigation is to establish such relationships. It is recognized, however, that many problems cannot be solved in this way and, also, that only a few of all the processes requiring ventilation can be studied.

A general revision of design procedures and the complete elimination of empirical data are not anticipated. The development of a method of investigation will, in itself, be of value. It is hoped, for example, that through the use of such a method, the manufacturers of contaminant-producing equipment will be able to study the characteristics of their own machines and develop standards of ventilation. Such original studies will help to remove the present difficulties encountered in applying ventilation to machines and processes as an after-thought, so to speak.

At the outset of this investigation, the recent literature on exhaust ventilation has been collected and a bibliography, arranged by industry or process prepared. The list of references is not complete but sufficiently so to show that the volume of published material is not great. The importance of exhaust ventilation in the control of industrial health hazards and the cost of installing and operating such equipment are great enough today to warrant a more complete treatment of the subject.

The bibliography is attached.

######

REFERENCES ON EXHAUST VENTILATION

1930-1941

GENERAL

Air Dilution in Industrial Ventilation, Parts I, II, III, IV. W.C.L. Hemeon. Heating and Ventilating. I, 37, 39-43, Nov. 1940 -- II, 37, 42-46, Dec. 1940 -- III, 38, 40-42, Feb. 1941 -- IV, 38, 71-74, Mar. 1941.

Are We Controlling Dust? S.W. Gurney and D.S. Beyer. National Safety News. Liberty Mutual Insurance Co. Jan. 1935.

Are You Buying an Exhaust System? Part I, Fixing Suitable Branch Pressures and Obtaining Workable Piping. [illegible]vath. Heating and Ventilating. 36, 16-18, Aug. 1939.

Characteristics of Cloth Filters on Coal Dust-Air Mixtures. A.E. Mumford, A.A. Markson, T. Ravese. Trans. A.S.M.E. 62, 271, 281, May 1940.

Collecting and Reclaiming Silicosis Dusts in Roofing-Coating Industry. Penna. Dept. of Labor and Industry, Safe Practice Bulletin No. 6, 1939.

The Control of Industrial Dust: The Problem of Local Exhaust and General Ventilation. J.M. DallaValle. Mechan. Engr. 55, 621-624, Oct. 1933.

Design of Duct Work for Exhaust Systems. *Air Hygiene Foundation of America, Inc., Prev. Eng. Series Bulletin No. 2, Part 3, 1938.

Design of Exhaust Hoods. Air Hygiene Foundation of America, Inc., Prev. Eng. Series Bulletin No. 2, Part 4, April 1938.

Design of Exhaust Hoods for Dust Control Systems. T.F. Hatch. Jour. Ind. Hyg. & Tox. 18, No. 9, Nov. 1936.

Design of Industrial Exhaust Systems. John L. Alden. Published by Industrial Press, 148 Lafayette St., New York, N.Y. 220 Pages.

Determination of Cloth Area for Industrial Air Filters. C.E. Williams, Theodore Hatch, Leonard Greenburg. Heating, Piping, Air Conditioning, April, 1940.

The Determination and Control of Industrial Dust. J.J. Bloomfield; J.M. DallaValle. U.S. Pub. Health Bulletin No. 217, April 1935.

Dust and Fume Control -- A Practical Approach. H.B. Meller; F.S. Mallette. Occ. Hazards. 2, no. 11, 8-10, 12, 32, Sept. 1940.

Dust Collection Systems. Concrete, Cem. Mill Ed., 47, 147-149, April 1939.

Dust Collection. H.R.A. Davies. Jour. Ind. Heating Vent. Engrs. (British), 5, 317-336, 1937.

Dust Collection. C.A. Synder. National Safety News. 37, 16, 34, March 1938.

*Since this publication has been issued the name of the organization has been changed to Industrial Hygiene Foundation.

References on Exhaust Ventilation - 2.

Dust Control, Parts I, II, III. F.F. Kravath. Heating and Ventilating. 37, Part I, pp. 38-41, March 1940 -- 37, Part II, pp. 39-42, April 1940 -- 37, Part III, pp. 36-38, May 1940.

Dust Control Methods in an Asbestos Fabricating Plant. R.T. Page; J.J. Bloomfield. U.S. Public Health Reports. 52, 1713-1727, Nov. 26, 1937.

Dust Control, present and future design considerations. T.F. Hatch. Mechan. Engineering. 57, 154-156, March 1935.

Dust Control System Design, Installation and Operation from the Commonsense Standpoint. F.F. Kravath. Heat. & Vent. 38, 28-31, June 1941.

Dust, Fume, and Gas Elimination by Proper Prevention. R.A. Brehm. Occup. Hazards, 3, 6-10, 31-32, March 1941.

Economical Dust Control with Low Resistance Exhaust Systems. F.F. Kravath.
Part I. Analysis of the Problem. Heat. and Vent., 37, 40-42, Oct. 1940.
Part II. Hood and Branch Connections. Heat. and Vent. 37, 27-29, Nov. 1940.
Part III. Branch Junctions and Changes. Heat. and Vent. 37, 40-41, Dec. 1940.
Part IV. Filter Connection and Fan Selection. Heat. and Vent. 38, 33-35, Feb. 1941.
Part V. Summary - A Sample System. Heat. and Vent. 38, 33, Mar. 1941.
Part VI. Plenum Chamber System. Heat. and Vent. 38, 36-38, April 1941.

Economy in the Design of Exhaust Systems. T.F. Hatch. Industrial Medicine, Ind. Hyg. Sect., 1, 54-59, Oct. 1940.

Effective Exhaust Systems. John M. Kane. National Safety News, Aug. 1939.

Exhaust Hood, Collectors, and Fans Design to Control Dust. Brick and Clay Record. 98, 51-52, Feb. 1941.

Exhaust Ventilation -- Suction Versus Airflow. William N. Witheridge. Occup. Hazards. 2, No. 11, p. 21-22, 31, Sept. 1940.

Factors to Consider in Designing Dust Removal Systems. C.C. Hermann. Abrasives, 18, 14-16, 60, Sept. 1937.

Fan Selection & Nomenclature. A.A. Berestneff. Refrigeration Engineering, 32, 175-179, 1936.

The Flow of Air and its Distribution Through Ducts. J.R. Zwickl.
Part I. Frictionless Flow and Velocity Head, Heat. and Vent., 36, 15-17, Feb. 1939.
Part II. Flow with Friction-Ducts with Equal Friction. Heat. and Vent., 36, March 1939.
Part III. Elbows and Miscellaneous Resistances. Heat. and Vent., 36, 51-53, April 1939.
Part IV. Duct Layouts. Heat. and Vent., 36, 48-50, May 1939.
Parts V and VI. Fan Laws and Fan Selection. Heat. and Vent., 36, 44-45, June 1939; 64-66, July 1939.

Fundamental Factors in the Design of Exhaust Systems. T.F. Hatch. Mechan. Engineering. Feb. 1936.

Fundamentals Relating to the Design and Operation of Exhaust Systems. T.F. Hatch et al. American Standards Exhaust Code Committee No. ASA-Z9. American Standards Assoc., New York, 1936.

References on Exhaust Ventilation - 3.

Industrial Dust Control Through Exhaust Systems. W.O. Vedder. Craft Press, Inc., Fayetteville, Pa., 1936.

Industrial Dusts and Their Control. T.F. Hatch. Safety Engineering. 67, 26, June 1934.

Low Velocity Exhaust Systems. T.F. Hatch. Heat. and Vent., 37, 27-30, Oct. 1940.

How To Design Exhaust Hoods for Quartz Fusing Operations. E.C. Riley and J.M. DallaValle, Heat. and Vent., 37, 23, April 1940.

Methods for Controlling the Dust Hazard. A.D. Brandt, Sc.D. Metal Cleaning & Finishing. 9, 281-288, April, 1938.

Modern Methods of Removing Dust. F. Prockat. Staub, No. 6, 249-287, June 1938.

Operation and Maintenance of Cloth Screen Dust Collectors. W.F. Torry. Heating, Piping and Air Cond. 5, 259-304, May, June 1933.

Physical Methods for the Elimination of the Dust Hazard in Industry. H.L. Green; H.H. Watson. Med. Research Council Spec. Report No. 199, 1935.

Prevention of Silicosis Through Engineering Control. Bulletin No. 21, Part 2. U.S. Dept. of Labor, 1933.

Practical Design of Exhaust and Blower Systems. E.W. Favalore. Edwin A. Scott Publishing Co., Inc. New York, N.Y., 1935, 268 pages.

Principles of Exhaust Hood Design. J.M. DallaValle, U.S. Public Health Service, 1939.

Profits in Air. C.G. Conn, Ltd., F.A. Westbrook. Heat. and Vent., 37, 39-40, June 1940.

Profits in Air-Ford Motor Co. C. Strock. Heat. and Vent., 37, 32-38, June 1940.

Profits in Air: Woodworking Plants. T.F. Hatch; R.B. Northrup. Heat. and Vent., 37, 33-38, Feb. 1940.

Progress in Industrial Sanitation with Special Reference to the Control of Industrial Dust. T.F. Hatch. Am.Jour.of Pub.Health, 27, 671-679, July 1937.

Protecting Plant Manpower-Preventive Measures. Theodore Hatch. Special Bulletin No. 3, Page 13, U.S. Dept. of Labor, Div. of Labor Standards.

Recent Dust Exhaust Apparatus. F. Prockat. Staub. No. 6, 249-287, 1937.

Removal of Dust and Fumes; New Departures. C.W. Price. Times Trade and Eng., 42, No. 888, Factory Welfare Sect. P.X. Feb. 1938.

The Size and Frequency of Industrial Dust. J.J. Bloomfield, U.S. Pub. Health Reports, 48, 961, 1933.

Studies in the Design of Local Exhaust Hoods. J.M. DallaValle; T.F. Hatch. Trans. Am. Soc. Mech. Engr. 54, 31-37, July 1932.

Tentative Code of Recommended Practices for Testing and Measuring Air Flow in Exhaust Systems. J.R. Allan, Chr., Ind. Hygiene Codes Comm. Am. Foundrymens Assoc. A.F.A. Reprint No. 36-27.

Velocity Characteristics of Hoods under Suction. J.M. DallaValle. Heating, Piping and Air Cond., 4, 370, 1932.

When is Dust Control Effective? J.J. Bloomfield. National Safety News. 32, 17, Dec. 1935.

ABRASIVE WHEELS, GRINDING AND PORTABLE GRINDING

Abrasive Wheel Manufacture, Technical Control of Dust. F.F. Kravath. Penna. State Dept. of Labor and Industry, Safe Practice Bulletin No. 13, 1939.

Control of Abrasive Dust. F.B. Jacobs. Mill & Factory, 19, 45-48, July 1936 -- 19, 50-52, 120, Aug. 1936 -- 19, 56-59, Sept. 1936.

Down-Draft Exhaust Aids Finishing Department. Steel, 107, 30, Nov. 11, 1940.

Grinding and Sanding Castings Without Dust. Iron Age. 146, 51, Sept. 12, 1940.

Portable Hand Grinders. Foundry Safety-Liberty Mutual Ins. Co., 3, No. 1, June 1939.

Tentative Code: of Recommended Practices for Grinding, Polishing, and Buffing Equipment Sanitation. J.R. Allan, Chr., Ind. Hyg. Codes Comm. A.F.A. Am. Foundrymen's Assoc. Reprint 36-28, Dec. 1, 1936.

CERAMIC

Dust Control in Industry. T.C. Angus. Industrial Welfare. 20, 171-177, May 1938.

Dust Hazards and their Control in a Ceramic Industry. T.C. Angus and Donald Stewart. Jour. Ind. Hyg. & Tox. 19, No. 1, Jan. 1937.

Dust Prevention and Elimination. Ceramic Ind. 28, 293-302, April 1937.

Elimination of Dust in a Porcelain Plant. A.M. Morris. Ceramic Industry, June 1939.

How to Control Dust in Clay Plants. John M. Kane. Brick and Clay Record. 91, 69-71, Aug. 1937.

Plant Engineering for Dust Elimination. A.M. Morris. Proceedings of the Ceramic Section, Div. Safety & Hygiene Ind. Comm. of Ohio, April 18, 19, 20

Redesign of Working Booths to Reduce Dust Counts. Ceramic Ind. 32, 60, Jan. 1939.

Reduce Dust Counts to a Minimum with Redesigned Booths. Ceramic Ind. 30, 68-70 April 1938.

What's the Best Way to Remove Dust? Ceramic Ind. 34, 65-66, 68, 70, 72, 74, 76, 78 April 1940.

FOUNDRY

<u>ABC's of Industrial Dust Control</u>. Roy P. Warren. Occup Hazards and Safety. 1, 8-10, July 1939 -- 1, 11-13, Aug. 1939 -- 1, 14-18, Sept. 1939.

<u>The Application of Dust Control Principles to Foundry Operations</u>. R.R. Meigs. Second New England Regional Foundry Conference, M.I.T. April 8, 1938.

<u>Calcimine and Good Housekeeping</u>. Frank G. Steinbach. The Foundry Magazine. 64, 2[illegible] Mar. 1936.

<u>A Case History of Dust</u>. J.B. [illegible]. Occup. Hazards and Safety. 1, No. [illegible], 19-21, April, 1939.

<u>Cleaner Air for the Foundry</u>. E.O. Jones. National Safety News, Sept. 1934.

<u>Dust Collection and Control</u>. American Foundrymen's Assoc. Reprint 35-22.

<u>Dust Collection Needs Correct Hood Design</u>. J.G. [illegible]. National Safety News. 42, 52, Aug. 1940.

<u>Dust Collection in the Foundry</u>. S.D. Moxley. Trans. Am. Foundrymen's Assoc. 43, 191-208, 1935.

<u>Dust Concentration in Foundries</u>. Theodore Hatch; C.E. Williams; B.G. Dolin. Ind. Bulletin. N.Y. State Dept. of Labor, 18, 89-95, Feb. 1939.

<u>Dust Control in Foundries</u>. W.T. Cameron. Proc. 11th All Ohio Safety Congress. 266-272, 1940.

<u>Dust Control in the Foundry</u>. C.A. Snyder. Metal Industry. 35, 349-350, July 1937.

<u>Dust Control in the Foundry Industry</u>. J.D. Leitch; L.B. Leppard. Mimeographed pamphlet 10 pp. Div. Ind. Hygiene, Ontario Dept. of Health, Toronto, Ontario, Canada.

<u>Dust Control; Silicosis Prevention</u>. Verne A. Zimmer. Brass and Aluminum Foundry. No. 40, Nov. 9, 1940 -- No. 41, Dec. 7, 1940 -- Feb. 1941.

<u>The Dust Hazard in Foundries</u>. L.M. Merritt. Ohio Ind. Comm. Monitor, 13, 99-102 July 1940 -- Occup. Hazards, 2, No. 11, 18-20, Sept. 1940.

<u>The Exhaust of Foundry Shakeouts</u>. John M. Kane. Foundry Safety. Liberty Mutual Ins. Co. 3, No. 1, June 1939.

<u>Exhaust Requirements for Foundry Dust Control</u>. John M. Kane. Foundry Magazine. 66, 30-32, Jan. 1938.

<u>Foundry Dust Control</u>. Foundry Safety. Liberty Mutual Ins. Co. 1, No. 2, June 1937.

<u>Foundry Dust Control Measures</u>. T.F. Hatch. N.Y. State Dept. of Labor, Ind. Bulletin. 17, 114-118, Mar. 1938.

<u>The Foundry Dust Hazard and its Control</u>. M.F. Trice. Jour. American Pub. Health Assoc., 30, 760-765, July 1940.

Good Housekeeping in the Foundry. E.G. Meiter. Am. Foundrymen's Assoc. Good Housekeeping Conference. Reprint 37-30; 34-38, 1937.

Good Housekeeping at Falk. The Foundry Magazine. Feb., Mar. 1933.

Good Housekeeping in a Steel Foundry. J.E. Turner. Safe Practice Bull. No. 69, Penna. Dept. of Labor and Ind. June 1941 -- Safety Engineering, 82, 11-14, Aug. 1941.

Methods of Dust Control. J.D. Leitch. Trans. Am. Foundrymen's Assoc. 43, 209-221 1935.

No Dust, Better Health, More Output. A. Van Vlissingen. Fact. Man. & Main. 98, 79-81, Sept. 1940.

The Removal of Dust in Foundry Shakeouts of Large Steel Castings. Safe Practice Bulletin No. 61, Penna. State Dept. of Labor and Ind. 1941.

The Removal of Silica Dust from Large Casting Three Crane Size. P.S. Tanner. Occup. Hazards. 2, 21, 23, Feb. 1940.

Silicosis in the Foundry. Carey P. McCord. National Founders Assoc., 29 S. LaSalle St., Chicago.

Why Not a Dust-Free Foundry. C.B. Gordy. Fact. Man. & Main. 97, 79-80, Mar. 1939.

Won't Have Dust. Arthur Van Vlissingen. Fact. Man. & Main. 95, 83, Sept. 1937.

GRAIN

Dust Control. C.J. Alger. Am. Miller. 68, 24-25, May 1940.

Dust Control in Grain Elevators. Hylton R. Brown; J.O. Reed. Bulletin No. 1373, U.S. Dept. of Agriculture, 1929.

The Removal of Floating Dust in Grain Elevators. Report of Committee of Underwriters Laboratories, National Safety Council. 1924.

GRANITE CUTTING

Control of the Silicosis Hazard in the Hard Rock Industries -- A Laboratory Study of the Design of Dust Control Systems for Use with Pneumatic Granite Cutting Tools. T.F. Hatch; Philip Drinker; Sarah P. Choate. Jour. Ind. Hyg. & Tox. 12, No. 3, p. 75, Mar. 1930.

Dust Control. I. Exhaust Devices for Hand Pneumatic Tools. W.C.L. Hemeon. Heat. and Vent., 37, 41-45, June 1940.

Dust Control in the Granite Industry. W.C.L. Hemeon. Heat. and Vent., 37, 41-45, Aug. 1940.

Dust Control in the Granite Industry. John D. Leitch. Jour. Ind. Hyg. & Tox., 18, No. 10, Dec. 1936.

Granite Dust Control. I. Banker Exhaust Ventilation. M. Bowditch, Dir., Mass. Dept. of Labor and Industries, Div. of Occupational Hygiene, May 1938.

Requirements for Dust Control in Stone Cutting. T.F. Hatch; W.B. Harris. N.Y. State Ind. Bulletin, 18, 379-381, Dec. 1939.

A Study of Efficiency of Dust Removal Systems in Granite Cutting Plants. U.S. Public Health Reports, 44, 2505-2522, Oct. 1929.

Ventilation in the Granite Industry. Edward C.J. Urban. Jour. Ind. Hyg. & Tox. 21, No. 3, March 1939.

Dust Control. II. Exhaust for Surfacing Machines & Abrasive Blasting. W.C.L. Hemeon. Heat. and Vent., 37, 54-58, July 1940.

MILLING AND ORE CONCENTRATION OPERATIONS

Catching the Dust from a Hammer Mill. O.C. Ralston; Carl Conley. U.S. Bureau of Mines Report on Investigations, 3538, 1941.

Dust: Its Hazard, Control and Collection with Especial Reference to Surface Plants. G. E. Lynch. Min. & Met. 19, 516-520, Dec. 1938.

Dust Control in Large Scale Ore Concentrating Operations. Robert T. Pring. Am. Inst. Min. & Met. Engr. T.P. 1225, Mining Tech. 4, Sept. 1940.

Dust Control at the Hollinger Milling Plant. P.J. Dunlop. Trans. The Canadian Institute of Mining and Metallurgy, 42, 164-184, 1939.

Dust Control in Mining Operations. J.T. McIntyre. Jour. Chem. Min. & Met. Soc. So. Africa, 38, 138-147, Sept. 1937.

Ore Concentration and Milling. E.W. Engelmann. Min. & Met. 21, 36-38, Jan. 1940.

Solving the Dust Problem. F.W. Ortman, Jr. Safety Engineering, 75, 13-16, Apr. 1938.

TANK VENTILATION

Health Hazards in Chromium Plating. J.J. Bloomfield; Wm. Blum. Public Health Reports 43, 2330, 1928.

Control of Chromic Acid Mists from Plating Tanks. E.C. Riley; F.H. Goldman. Public Health Reports, 52, 172, 1937.

New Data for Practical Design of Ventilation for Electroplating. W.P. Battista; Theodore Hatch; Leonard Greenburg. Heating, Piping and Air Cond., 52, No. 2, pp. 81-85, Feb. 1941.

Ventilation of Plating Tanks. Allen D. Brandt. Ind. Med., 10, No. 7, July 1941 -- Ind. Hyg. Section, 2, section 3.

References on Exhaust Ventilation - 8.

Fundamental Factors in the Design of Lateral Exhaust Hoods for Industrial Tanks. Leslie Silverman. Jour. Ind. Hyg. & Tox. 23, No. 5, May 1941.

Safe Operation of Degreasing Tanks using Trichlorethylene. W.B. Harris; C.B. Ford; F.A. Patty; T.F. Hatch. Am. Jour. Pub. Health, 29, 603, 1939.

Trichlorethylene Degreasing Tanks and Their Safe Operation. W.B. Harris; C.B. Ford; F.A. Patty; T.F. Hatch. Industrial Bull. N.Y. State Dept. of Labor, 18, 132-134, Mar. 1939.

Ventilation of a Trichlorethylene Degreaser. W.N. Witheridge; H.T. Walworth. Jour. Ind. Hyg. & Tox. 22, 175, 1940.

Ventilation of Wire Impregnating Tanks Using Chlorinated Hydrocarbons. C.B. Yaglou; F.W. Sands; P. Brinker. Jour. Ind. Hyg. & Tox. 20, 401, 1938.

Essentials of Design for Steam Exhaust Hoods Based upon Open Tank Tests. T.F. Hatch; W.P. Battista. N.Y. State Dept. of Labor Industrial Bulletin, 19, 115, May, June 1940.

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Penna.

Abstract of report on "A Plan for Protecting Health of Top Executives." by Dr. R. R. Jones, Medical Officer, Bell Telephone Company of Pennsylvania, at sixth annual meeting of Industrial Hygiene Foundation held at Mellon Institute, Pittsburgh, Nov. 13, 1941.

Our problem in a service organization is not how to get man-power, but on the contrary, to know how well our man-power will hold up--how well it is going to work. We are attempting to evaluate the physical potentialities of all our top supervisory employees with all known and tested means that can be brought to the hands of the physician in industry, and by a well-coordinated endeavor, attempting to give to those at the top of industry, a cold, positive appraisal of themselves. At the request of Dr. [illegible] Lanza, Chairman of the Foundation's Medical Committee, I am announcing to you the initiation of this endeavor in the following outline.

1. SCOPE OF EXAMINATION: The scope of this examination should cover all known tests of value used by the physician in his effort to know how well his patient is living. To use the word, health in this work seemed inadequate, because good health is accepted by most of us to mean just a negative freedom from disease. We, therefore, set up an examination that could be made as a record so that when completed we would be able to report to the individual, on each phase of the examination, in a positive manner, rather than express a negative opinion such as a statement that the subject is in "good health." Then, too, if serious impairments are found, it will allow the bringing into the case for the examinee, his own physician, so as to make acceptable to him the constructive evaluation of the examination.

This examination as directed for the upper supervisory group of the company consists of the following steps and points to be covered:

FIRST STAGE: 1. Urinalysis, complete with microscopical study of centrifuged sediment.

2. Complete count of the peripheral blood with the differential count of the white blood cells, and hemaglobin in percentage (Dare Hemaglobinometer used).

3. Wasserman - Kahn blood test.

4. Blood chemistry to compute nitrogen in the form of non-protein nitrogen; Creatin; Sugar; and Chlorides in form of Sodium Chloride.

5. Teleoroentgenogram of chest with measurements of heart to age and size, using the Ungerleider and Clark Standards.

6. Electrocardiographic Tracing.

SECOND STAGE: (Generally one week later.) Physical examination with record of Family History, Past Personal History, Present Personal History (habits); this physical examination is made by the physician with the guidance of the laboratory reports. It is also stipulated that if any points in the examination at this stage develop, the examining physician must provide for the further indicated studies, and have them completed before going into the next succeeding step. This is done carefully and is added to the record in detail on form provided.

THIRD STAGE: The examining physician, then being in possession of all the accumulated data, is required to write a summary as he sees the case, and then present it to another associate of the staff for review and consultation. Following this, an expression of conclusion is agreed upon, and so written into the report. The examinee is now called back for a report of his record.

This final report is interesting. It is not being given at all in the negative fashion of assurance to the patient by his friend and advisor - his doctor. It is being given in the positive manner as that which his examination has developed in comparison with the accepted averages. No detail of the examination is omitted. Explanation is offered as to methods used in the laboratory for these various examinations. Every effort is made to gain the interest of the man, not alone in the result, but in the method, always being careful to give a fair construction to the variables one must expect to find.

The final expression is never made in any semblance to a superlative - never an excellent, but rather a rating stated as "a reasonable state of health." By way of explaining that expression, we endeavor to confer no guarantee or immunity to disease

In reporting positive findings that in our judgment we feel have a definite implication we are careful to only advise that he see his personal physician for his evaluation and remedial treatment. We feel that we should not enter into remedial medicine, but should conduct our work on a research basis. Such is the scope of the examination.

This study has been made on only approximately one hundred executives, divided among many departments. To overcome any embarrassment when the case warranted, we determined to bring into the examination the personal physician of the man under examination for a personal report of the conditions found, and discussion of the proper evaluation to be placed on the findings. Then when finally agreeing on the evaluation, with the employee's consent, taking the recommendation, previously agreed upon, to his superior, with definite recommendation of what to do for the man, in the interest of the man alone.

I can report of still another phase where from a Company standpoint alone it has been helpful. It has happened among such a small group of top men that we were able to demonstrate to their individual satisfaction several with either bad hearts, or potentially bad, but not one to a degree where it was thought wise to insist that the individual's case be reviewed by his superior.

But with the Superior of this group in conference, this general-over-all picture was made clear, and a recommendation of the Medical Advisor for additional personnel to share the general load was readily agreed to. This was one of the first groups reached and the chief of this department has committed himself to me as not only being satisfied that it was a wise move—but he relates an increase in what might be termed "production," to justify the expenditure required.

Finally this question is asked—what does it mean to the individual to know not only that he is in a reasonable state of health, or how he rates in various tests? My only answer at this time is how the reports have been received. First of all, the top man takes the examination, is satisfied with the scope, and routine and manner of reporting. He voluntarily expressed his appreciation then to department heads and their staffs. Up to this time I can only report on approximately 100 examinations completed. Not in one case (they have not all been happy reports) have I found a disinterested individual. I have heard only commendation for the Company in instituting the procedure, and my associates and I have been embarrassed by the compliments.

########