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CONTENTS

Public Safety

General Session

Monday, September 30, 1930

F. L. DUGGAN, Chairman
President, Western Pennsylvania Safety Council and Chairman, Pittsburgh Better Traffic Committee

The General Public Safety Session of the Nineteenth Annual Safety Congress convened with F. L. Duggan, Pittsburgh, presiding.

CHAIRMAN DUGGAN: As the chairman of this meeting and president of the Western Pennsylvania Safety Council, it is a real pleasure to welcome you one and all to Pittsburgh, the great industrial city of this country. Yesterday at the luncheon tendered to President C. E. Pettibone, Mr. Julien Harvey congratulated the Pittsburghers on the splendid work that they had accomplished in trying to make this meeting of the Congress a successful one. It wasn't work as we viewed it, but real pleasure, and I hope that we will be in a position to show you men Pittsburgh as we know it, and to point out the things that we have been doing or trying to do in Pittsburgh.

The first speaker is Dr. L. I. Dublin. Each year Dr. Dublin, chairman of our Statistics Section, presents at this time the highspots of the accident situation as revealed by statistics.

One Hundred Thousand Deaths

By LOUIS I. DUBLIN, Ph.D.
Statistician, Metropolitan Life Insurance Company, New York City

Ninety-seven thousand people were killed in the United States by accidents in 1929. Year by year the accident toll has been steadily approaching the 100,000 mark; this figure is likely to be reached before the year 1930 closes. Accidents, this year, will account for more deaths in the United States than does tuberculosis! Among males, accidents are second in importance to heart disease as a cause of death, and tuberculosis is seventh!

The accident experience of 1929 resembled that of other years in three respects: there was an increase in the total number of persons killed; the accident deathrate reckoned against population increased; and there was a marked rise in automobile deaths. The 1929 accident fatalities exceeded those of 1928 by two per cent.; but there was an increase of 28 per cent. since 1920!

The accident death toll of 97,000 last year is about 2,000 in excess of the figure

for 1928, an increase as large as any which has occurred in any single year since 1925. The increase in motor vehicle deaths alone amounted to 3,000 over 1928. Fortunately, accident mortality from causes other than the automobile decreased 1,000.

Accidents in the Home, in Industry and in Public Places

The 1929 accident fatalities had their origin in the home in 23,000 cases. The hazards of occupation accounted for another 23,000 deaths. In public places, there occurred some 51,000 deaths. The 51,000 fatalities in public places included 31,000 arising out of the use of motor vehicles. These 31,000 automobile deaths were the outcome of not less than one million injuries!

Automobiles

The outstanding item in last year's accident record was the automobile toll. This is the ever-darkening spot on America's accident record. Reductions which have been made in fatal accidents in industry and in the home have been offset heavily by the rising tide of fatalities arising out of the use of motor vehicles on our streets and highways. The automobile has become so dominant a factor in accident mortality that last year it accounted for nearly one-third of the total fatal accidents. The automobile accident deathrate in 1929 increased more than 10 per cent. over the 1928 figure. Preliminary indications for 1930, show an increase of 4 per cent for the current year. The prospect for 1930, is that some 33,000 deaths in automobile accidents will have occurred before the end of the year. It is not assuring that the motor vehicle fatality increase was 3,000 in 1929, and that for 1930 the increase may be another 2,000!

Automobile Deaths and Car Registration

Down to 1926, there had occurred each year a decrease in the number of fatalities per 100,000 cars registered. But beginning in 1927, this figure rose to 100.2 deaths for 100,000 automobiles; in 1928, the figure was 101.7 and in 1929, the fatality rate on the basis of 100,000 automobiles registered was 104.5! Evidently, down to 1926, safety measures were increasingly effective against the heavily increasing number of cars in use. Over the three past years, however, the pressure of cars on the road and the augmented speeds and horse-power of cars in use, began to show in the mortality figures reckoned against automobile registration. And so, whichever way we measure motor vehicle fatalities, we see sharp and alarming increases in the absolute number of deaths; in the deathrate per 100,000 population and in the deaths per 100,000 cars!

Automobile Deathrates in States and Cities

The record of recent years has other interesting and instructive features. The highest deathrates from automobile use occurred in the Pacific Coast States,—34.5 per 100,000 in 1928; the lowest in the West South Central States (14.1 per 100,000). Contrasting urban and rural experience, we find a smaller increase in automobile deathrates for cities than in rural areas. In cities over 100,000 population the increase was from 21.1 to 23.8 per 100,000, or 13 per cent.; in rural areas, the rate increased from 12.1 to 16.4 per 100,000 or 27 per cent.; between 1925 and 1928, or twice as fast as in the large cities!

Automobile Deaths of Children Show Decrease in 1928

Deaths of children in automobile accidents decreased from 5,110 in 1927 to 4,943 in 1928, the first time a decrease in child accidents has been observed for many years. The latest data for child mortality relate to 1928. In 1928, 19.8 per cent. of all automobile fatalities were of children under 15 years of age; in 1922, the figure was 29.4 per cent. Protection of children through school safety work and through special protective work of police departments is beginning to show results.

Automobile Fatalities at Grade Crossings Fewer in 1929

The 1929 record for grade crossing accidents was also slightly improved. According to the Interstate Commerce Commission, railroad grade crossing deaths involving automobiles were 2,102 in 1929, a decrease from 2,170 registered in 1928. Railroad crossing accidents where passenger automobiles were involved caused 1,741 deaths in 1929, a decrease from 1,820 in 1928. This improvement in the record reflects, no doubt, the vigorous efforts which have been made by the railroads to protect motorists by eliminating many of these crossings and by installing protective appliances.

The Driver Involved in Motor Accidents

Facts became available also on the actions of drivers involved in automobile accidents during 1929. For 107,000 drivers, such actions were recorded, and for both fatal and non-fatal accidents, it was found that 32 per cent of the drivers did not have the right of way, 16 per cent. were exceeding the speed limit, another 16 per cent. were on the wrong side of the road when the accident occurred and 11 per cent drove off the roadway. In fatal automobile accidents, 'exceeding the speed limit' was reported in 28 per cent of the deaths.

The Pedestrian Involved in Motor Accidents

What pedestrians were doing when injured was also of interest. Some 27 per cent of the pedestrians involved in 100,027 automobile accidents were injured while crossing intersections having no signal; another 27 per cent. were injured while crossing the street between intersections; 17 per cent were struck while at play in the street, and 19 per cent. while crossing the street against traffic signals. In 1929, 55 per cent. of the motor fatalities arose from collisions between automobiles and pedestrians, and 19 per cent. came from collisions between motor-vehicles.

Commercial Vehicles in Motor Accidents

The Statistics Section's annual report "Accident Facts, 1930" also showed accident data for 82,000,000 miles of travel by commercial vehicles. For each one hundred thousand miles traveled, 28 accidents occurred for motor busses, 25 accidents for taxi-cabs, 17 for electric vehicles, 16 for horse-drawn vehicles and 12 for commercial trucks. Since the speed of motor-busses and taxi-cabs is greater than that for other commercial vehicles, do the higher accident rates result from higher speeds?

Carbon Monoxide Deaths

In 1928, the latest year for which facts are available, the deathrate increased two per cent. over the 1927 figure.

Other Public Accidents

Other public accidents not involving a motor vehicle accounted for some 20,000 deaths last year. Of these, some 8,500 were drownings, with July as the peak month. Persons under 25 years of age accounted for 56 per cent of the drownings. Firearms account for three per cent. of all accidental deaths, or an annual toll of 3,000 in the United States.

Accidents to School Children

It was reported also to the Council that for the 30,000,000 school children in the United States, some 700,000 accidental injuries occur annually, with 6,300 ending fatally. Accidental injury accounts in all probability for about 2,700,000 days of absence in our schools annually. Especially valuable information on school accidents is likely to follow the wider use of the National Safety Council's school accident reporting system!

Accidents in the Home

The 23,000 fatalities in the home during 1929, in the United States, were also analyzed. There were four principal types of fatal home injuries; falls, burns, scalds and explosions, asphyxiation; and poisons. Falls account for 40 per cent. of domestic accidental deaths; burns, scalds and explosions for 24 per cent.; asphyxiations for 14 per cent.; and poisons for nine per cent. The home and its hazards produce as many deaths each year as industry!

The United States heads the list of all civilized countries of the world in its accident deathrate,—79.2 per 100,000. Canada was next in point of accident fatality rate, with a figure of 62.5 per 100,000; England and Wales had an accident deathrate of 41 per 100,000, almost one-half the figure for the United States.

Will the accident toll of 1930 in the United States amount to 100,000 in 1930? That figure may be exceeded if the automobile death record reaches 33,000 this year as it seems that it will from records available for the first nine months of the year. Are 100,000 deaths too great a price to pay for our access to mechanical and other dangerous aids to labor and pleasure? Are we the most heedless nation on earth, or only the most prosperous, pleasure-seeking or indifferent nation?

What has been done to check this rising toll of accidental death in the United States? Some fifteen years ago, the rudiments of industrial safety were outlined. Results have been shown to follow safety work in industry. Without the work of the industrial safety engineer, the increasing mechanization of industry during the past ten years would have resulted in a far greater loss of lives than the 23,000 deaths which arose out of employment last year. Commendable progress has been made also in developing measures leading toward the control of accidental injuries and deaths on our public highways; but here the safety movement has been overwhelmed by the tremendous increase in a few years in the number of cars on our highways, the increased mileage traveled per year per car, and the increase in power and speed, which was dictated by the density of traffic and the urge for speed. There may come a time when physical conditions—the number, breadth and condition of highways—and regulatory practices will catch up with the automobile and its use.

On the other hand, automobiles and drivers may yet have to be adapted to the facilities and conditions which promote a negligible motor vehicle deathrate. When the automobile death toll was small little impression was made upon the public mind by the published figures. When, however, 31,000 deaths and 1,000,000 injuries occur annually through one agency alone, and when the number of deaths and injuries continues to increase, among citizens whose lives and services the country cannot afford to lose, the situation becomes calamitous.

The 23,000 deaths and the 3,500,000 disabling injuries annually in the home call for inquiry and for action which, so far, has not been applied to this problem. In some cities and States, the scanty data available show that there are more fatalities from accidental injury in the home than on the public highways! About one-half of the deaths from falls in the United States occur in the home and some 50 per cent of these domestic falling injuries happen among persons 55 years of age or older. One-third of the accidental injuries which keep children from school occur in the home. Forty per cent. of the deaths from accidental poisoning happen to children under 15 years of age. What is to be done to make the home the haven of security and safety which it has been assumed to be?

One outstanding need at the present time is for more information on where and under what conditions accidents occur. The high death toll should stimulate the registrars of vital statistics of our States to inquire more closely into the facts surrounding fatal accident occurrence in our country. For this purpose, there is available the plan for supplementary reports on fatal accidents developed jointly by registrars and representatives of the National Safety Council. Work is under way also, by committees representing official and private organizations, on the improvement and utilization of facts on accidental injuries in industry. A programme of study of home accidents, school accidents and farm accidents has also been drafted by the National Safety Council. In the field of public safety there is the well-established reporting plan covering public accidents, monthly reports on which reach the National Safety Council from many States and cities. This reporting programme brought data on nearly 250,000 motor vehicle accidents for 1929.

The intensive study of these facts, relating the accident to the driver, the pedestrian, and to physical conditions affecting the vehicle, the driver and pedestrian, ought to point out what the remedies are. In general, accident control depends upon locating specific hazard situations and the correction of the same.

CHAIRMAN DUGGAN: Next to the motor vehicle, the street car is the greatest factor in modern street traffic. In addition, many street car companies are now operating buses. Our next speaker is one who is qualified to talk on this subject, and it affords me a great deal of pleasure to introduce Mr. Charles Gordon.

Organized Transportation as a Factor in Traffic Safety

By CHARLES GORDON

Managing Director, American Electric Railway Association, New York City.

Every responsible agency in the land—governmental, civic, business and educational—has for some years been genuinely concerned over the mounting toll taken by street and highway traffic accidents. During 1929 the loss in human life and suffering was indeed appalling. Thirty one thousand deaths were directly chargeable to our inability intelligently to control the use of the machines which we ourselves have created. On an average of once every 17 minutes, day and night, one of these modern products of our mechanical and business ingenuity has become a juggernaut of destruction. Once every 17 minutes throughout the year a human life was sacrificed upon the altar of recklessness. No group or class is immune. Every home in the land stands open to the sudden intrusion of cruel and choking grief. The modern mother sends her children to school with a catch in her throat and a silent prayer upon her lips. The modern father's hand trembles as he reaches to answer the telephone at home while members of the family are absent for the evening. None of us knows whose turn will come next. Though the individual may exercise reasonable care and thoughtfulness, he is constantly at the mercy of those whose temperament or lack of intelligence makes them a public menace at the wheel of a high powered car.

Using the very conservative ratio of 35 personal injuries to each death, we injured over 1,000,000 people in 1929 on the streets and highways of this country. At that rate we are maiming a human being every thirty seconds throughout the year. Think of it! I have no desire to dwell upon this gruesome picture, or to go on painting its horrid details with a recital of more figures. Nevertheless, we cannot shut our eyes to facts which should give us all grave concern. Nor can we hope for general agreement upon an effective public policy of improvement, unless we achieve an adequate perspective by examining conscientiously the several phases of this modern traffic situation—humanitarian as well as economic.

I speak to you as a man interested in the business of public transportation, about organized transportation as a factor in traffic safety. In referring to the highway accident records I do so, therefore, fully conscious of the limitations imposed by ordinary standards of good taste, upon one who has a direct interest in the transportation business. Nevertheless, I have ventured to refer to the present appalling automobile accident situation because I do not believe that it is chargeable to the automobile itself. I do not believe that the automobile is inherently dangerous, or that its builders have been remiss in providing reasonably safe designs. Quite the contrary. As a transportation machine, the automobile is a monument to the imagination and ingenuity of the men who have devoted their lives to its development. That the death rate from street and highway accidents under present conditions is not tenfold what it is today is largely attributable, it seems to me, to the inherent safety, operating reliability and flexibility of control which have been built into the modern automobile. The fault lies not in the vehicle but in our failure to exercise wise forethought in the control of its use and maintenance.

We are a nation of individualists. It is not surprising, therefore, that we have permitted the individual—with practically no regard for intelligence or temperament, and with little attention to physical defects or lack of skill—almost unbelievable freedom to drive these powerful transportation machines in crowded public streets never designed for their use. Almost the sole restriction has been the ability to own, rent or borrow a machine. Only very slowly have states even gone through the form of requiring a license to drive—and some do not do so yet. In still a smaller number is the prospective driver seriously examined for even rudimentary qualifications. And nowhere has the process of controlling the right to drive been carried to the point necessary to insure a reasonable standard of safety for all users of the highway.

But that is not the sole indictment that we must make of ourselves—those of us who claim to be intelligent citizens. With the minimum of control as to his fitness or qualifications as a driver, we permit the individual to drive when and where he pleases regardless of limitations of street and highway [illegible] or the character of his errand. We are only just beginning to give even scant attention to the mechanical condition of his vehicle. If he is willing to risk his own life in it he is permitted to endanger the lives of thousands of others in the public highway.

Millions of dollars in losses are being constantly experienced by labor, capital and the owners of valuable business sites through delays experienced in the traffic maelstrom of every large city. Nevertheless, we permit the individual, regardless of the nature of his errand, the almost unrestricted privilege of driving any old dilapidated hulk into the very heart of a congested business district and then storing it in public street space worth thousands of dollars while he goes about his private business—if he has any. I say "almost unrestricted" privilege because we are beginning to impose some regulation with respect to where and how long he may leave his conveyance. We are also beginning to give some attention to the mechanical condition of the vehicle and the qualifications of the driver. But, considering the seriousness of present traffic congestion and current accident rates, we have barely started to exercise the degree of control which the situation demands. Nor have we

even recognized yet, in addition to the factors above, the need for giving attention likewise to the nature of the errand which brings a driver into a congested area.

The suggestion has been seriously advanced that all private vehicles, except under special permit, be prohibited from entering very heavily congested central city areas. An alternative suggestion has been that of requiring the use of a distinctive municipal license tag with a nominal surcharge for all private vehicles desiring to enter and park within congested areas. I cannot feel that either scheme would be at all desirable.

Nevertheless, there is growing public alarm over present traffic inconvenience and dangers. Unless we develop a reasonable degree of orderly control that will effect substantial improvement, we may expect a rising tide of protest to bring about radical measures. The responsibility for constructive leadership rests upon those who have given necessary attention and study to the problems resulting from modern traffic conditions. This leadership must be exercised in the interest of the public and the community in order to justify public confidence and support. All too frequently our lack of effective progress in bringing about a greater degree of orderly control of traffic is chargeable to a narrow or selfish approach to the problem which defeats its own objectives. In the determination of measures for the improvement of traffic conditions the needs of the community as a whole must take precedence over the immediate interests of any particular group or section. Only upon the principle of the greatest good to the greatest number may we achieve that substantial improvement in conditions on our streets and highways which is so badly needed.

That all responsible agencies which have considered the problem in its broad aspects are agreed as to the need for effective and uniform control, was clearly indicated at the Third National Conference on Street and Highway Safety recently held in the city of Washington. Here, national organizations representing makers and users of automobiles, the National Safety Council, the United States Chamber of Commerce, insurance underwriters, railroads, electric railway and bus lines, and taxicab operators, agreed upon and presented a program of uniform regulations covered by a vehicle code, a model traffic ordinance, a drivers' license law, uniform motor vehicle registration and anti-theft acts, together with recommendations for the relief of congestion. Companies in the business of providing organized transportation service actively participated in the preparation of these recommendations of the conference and are heartily in accord with them. Local or community transportation companies engaged in transporting the relatively large proportion of people who are dependent on public vehicles for daily travel between home and work, and whose operations are conducted on city streets, are particularly concerned over the growing hazard presented by present day traffic conditions. Safety of passengers and of the public has long been among the first concerns of the transportation manager. For that reason he was quick to sense the importance of any move toward organizing the progressive forces of his community in the interests of public safety. He has taken an active part in the work of the National Safety Council and has also played an important role in the organization and development of local councils.

Safety of passengers, employees and the public represents a factor of major importance to the manager of organized transportation service, not alone from a humanitarian point of view but from that of sound business, as well. Safety, safety, safety! The word is dinned constantly into every transportation man's ears and is an important factor in nearly every decision with respect to design, maintenance or operation. It is among the first words that the new recruit for a transportation job hears spoken. At the same time it challenges the attention of the oldest veteran in every conference or meeting or from every carhouse bulletin board. Through contests, bonuses, trophies, and distinguished service emblems the importance of

guarding against accidents is kept constantly before transportation company employees individually and collectively.

In the selection and training of new employees, the factor of safety is uppermost. In many instances the aid of science has been enlisted in the selection of men so that only those who are psychologically best suited to do so will be put in charge of vehicles operating in the public street. Practically all of these companies maintain careful records of every man involved in an accident and some supplement this with periodic psychological tests designed to weed out the accident-prone employee. A number of companies maintain welfare departments whose business it is to aid in keeping employees mentally alert through aid in the reduction of home worries resulting from illness, financial problems, or others of similar nature. The results of all this are readily apparent even to the casual observer. It constitutes an important contribution by organized transportation to traffic safety, as is so well expressed in a letter which Dr. Herman N. Bundensen, coroner of Cook County, recently wrote to each of the 12,500 trainmen of the Chicago Surface Lines in acknowledgment of the important part they had played in promoting public safety on the crowded streets of the great city of Chicago. "If there is one group of men in this country deserving of credit for the maximum of caution and constant watchfulness over the safety of others in the midst of traffic jams, congestion and carelessness," said Dr. Bundensen, "it is the conductors and motormen on our street cars."

On this property there were 7,917 trainmen who operated their cars in busy city streets throughout 1929—not only without a fatality, but with an absolutely clean accident record. Of these 7,917 men, 4,887 have a clear accident record for two years and 2,915 for three years. Each one of them proudly wears a tiny button as the insignia of his membership in that great army of organized transportation employees which makes public safety on the streets its most important personal business.

But this is the record of only a single company. It is presented here because it is expressed in terms of man performance on the part of the largest single body of trainmen in the country. It affords a striking example of the important role played by organized transportation in helping to make our streets safe despite the thoughtlessness and carelessness of individuals.

In all discussions of traffic difficulties and highway accidents there is a tendency to overlook organized public transportation as an important and constructive factor in the problem. Not only does organized responsibility set an example in careful selection and training of men, but every passenger on a street car or railroad is a potential individual driver on the streets and highways. Anything which stands in the way of permitting these companies to improve their facilities and service so as to hold present riders and to attract new, will increase the number of individuals driving upon already crowded streets and highways. The public's desire to move about from place to place—its riding habit—has been greatly increased. That desire cannot be checked. It is also accompanied by a demand for increased comfort, convenience, speed and even luxury in travel facilities. There is nothing to prevent public transportation agencies from keeping pace with the growing demand and changing standards, provided the public itself will understand the importance of the function performed by these agencies, and will lend that degree of cooperation which is essential for their continued development. Unless that is done we may expect a continuance—and in fact an increase—in the demand for more and more street space for individual vehicles, accompanied by increasing, not decreasing, accident figures.

Perhaps we could understand better the degree to which organized transportation is capable of reducing our total travel accident toll, if more direct comparisons were available of the actual performance of our several classes of transportation in terms of service rendered and accidents occurring. So far as I know, no basis for such a direct comparison has ever been set up, and I venture to do so, though forced to use rather unsatisfactory and sketchy figures, in the hope that it will direct attention to the need for considering the relative utility of various methods of transportation in comparison with the price they exact in the form of accidents and sacrifice of human life.

In these modern days we are far too prone to take older things for granted and to grasp eagerly for the new, without stopping to consider very carefully just what we get for the price we pay. So far we have been unwilling to submit to adequate control of the privilege of driving our individual vehicles when and as we please. Those who would have us do so must first prove to our satisfaction that the restrictions advocated will actually make travel safer and that present accident figures for individual vehicles are out of line with the service which they furnish.

So I have endeavored to put together the best figures available in the hope of obtaining a standard of measurement which would give a clearer insight into present travel accident conditions for several transportation agencies. Unfortunately, we are forced to abandon at the very outset any serious effort to base this comparison on accidents as a whole, or even those involving personal injury. But it is possible to set up an approximate comparison on the basis of fatalities.

As a measure of utility, or service rendered in the movement of people, the passenger-mile gives a fair unit. That is to say, the number of passengers moved by any given form of transportation, multiplied by the average number of miles each passenger travels, is the number of passenger-miles and is a measure of transportation service rendered. For a more complete comparison based on total service rendered, we should also measure ton-miles of commodities moved. It is difficult, however, to divide available accident figures between freight and passenger movement and so I have based the comparison solely on the passenger unit. This is not unfair to highway traffic, because freight represents only a comparatively small proportion of the total mileage on the highways and I have credited as passengers the drivers and riders in motor trucks.

Estimates of total automobile mileage on our streets and highways can be built up only from the statistics of automotive gasoline consumption, separately for buses, trucks and private cars. The resulting totals are huge indeed—162,000,000,000 automotive vehicle-miles per year and 323,000,000,000 automotive passenger-miles per year. The passenger-miles per year for steam railroads are 31,078,000,000, and for street cars, 34,167,000,000.

Total automotive fatalities are 31,000. Of these, 600 are in collisions with street cars, leaving a balance of 30,400 chargeable to the automotive vehicle exclusive of accidents involving street cars.

Railroads killed 6,218 people in 1929 in train and train-service accidents. Of these, 2,078 were killed in grade crossing accidents with automobiles and 2,251 were trespassers. Thus public fatalities, exclusive of automobiles and trespassers, were 1,889. This figure, however, includes fatalities chargeable to freight as well as passenger train operation.

Total street car fatalities for 1929 were 1,583. Subtracting the collisions with autos leaves 983 fatalities chargeable to street cars exclusive of collisions with automobiles.

Coming now to number of passengers killed, the 1929 figures are as follows: automobiles, estimated at 15,500; steam railroad, 115; street cars, 75.

If we consider passenger-miles carried per year as a measure of the economic or social usefulness of each form of transportation, then the number of passenger-miles per fatality gives a rough measure of both usefulness and the accompanying hazard to which each form of transportation subjects the general public. Likewise, passenger-miles per *passenger fatality* measures the hazard to *passengers* actually riding on each form of transportation.

The *public hazard* figures are as follows:

	Autos	*Railroads*	*Street Cars*
Passenger-miles per fatality.....	11,400,000	16,450,000	34,760,000

In other words, for an equal amount of passenger service given, only about two-thirds as many people are likely to be killed by railroads as by automobiles on the basis of present performance. It should be remembered also, that railroad fatalities include those chargeable to freight as well as passenger service. For this reason the figures are not fairly comparable and the railroad data are indicated here only for information.

For the same number of passenger-miles of service, one-third as many people are likely to be killed by street cars as by highway vehicles. This includes pedestrians, employees, and all forms of street fatalities.

When the hazard to *passengers* only, measured in terms of passenger-miles per *passenger fatality* is compared, the results are even more striking. The figures are as follows:

	Autos	*Railroads*	*Street Cars*
Passenger-miles per passenger fatality.....	20,840,000	270,240,000	455,000,000

If averages of this type could be applied to measure individual hazards, these figures would indicate that in covering a given distance a rider in an automobile is 13 times as likely to be killed as on a railroad train, and 22 times as likely to be killed as a passenger in a street car.

Here is a concrete comparison of the relative safety of the older forms of organized transportation and the newer traffic on the highways, based on a common unit of transportation service rendered—the passenger mile. The figures must of course be accepted as entirely tentative because of the obvious approximations that are made in compiling the data for highway traffic.

Nor is the status of organized transportation as a factor in traffic safety completely developed. To do so requires that the operation of buses, taxicabs and trucks be separated from the individually owned car and that accidents chargeable to passenger transportation be distinguished from those chargeable to the movement of commodities.

Despite these obvious limitations in the analysis presented, the performance of the older forms of organized rail transportation is so striking in comparison with that of highway traffic as a whole, that it challenges our attention from purely the humanitarian point of view.

CHAIRMAN DUGGAN: What is wrong with our traffic law enforcement? This is one of the burning questions that is confronting every traffic engineer, every safety engineer, and every public official who is trying to enforce the law. Unfortunately Mr. Harry Yockey who was to handle this subject has been detained. I am going to ask the Honorable Clifford Davis, Commissioner of Fire and Police of the City of Memphis, to open this discussion.

What's Wrong With Traffic Law Enforcement?

By HONORABLE CLIFFORD DAVIS
Vice-Mayor and Commissioner of Fire and Police, Memphis, Tenn.

If you should ask the judge what is wrong with traffic law enforcement, he would unquestionably say it is because the police department is so inefficient.

I was a judge—municipal judge in the city from which I come, of a quarter of a million people. When I was on that bench I thought I could recognize the trouble with traffic law enforcement, and I always placed it at the feet of the police department. Then I was elected Fire and Police Commissioner in that same city, and when I went downstairs I immediately recognized that the whole trouble was with the judge of the traffic court.

So, my friends, when I first recognize the trouble being with the police, and then being with the judge, it is difficult to come to any real conculsion about the matter, and I think that is the picture of public safety all over the country today. There

is a growing tendency in this country toward a lack of proper respect for all law among a great many of our citizens, and if you find that in one field of criminal law, you necessarily find it in the field of traffic administration.

Today all over this country we are hearing much about law enforcement, and not quite as much about law observance. There are three E's in the program so well announced by our own National Safety Council: The E of engineering, the E of education, and the E of enforcement. Possibly the third E should better be styled control, and in control we find the enforcement of those rules wherein those who are careless and those who are not interested in the proper observance of the rules must be made to become interested in those practical statements of the common practices among drivers and walkers on our streets.

I shall not discuss the Engineering. We have been very fortunate to get a long way on uniform legislation, and the engineering talent of this country has contributed in a large measure to those safeguards and those practices which make it easy for the individual to respect the rules of the road, and at the same time much easier for the police department to enforce it.

In our own city we turn over Education absolutely to our local safety council, and I give this to you for what it may be worth, that no police department can substantially educate with the left hand and enforce rigorously with the right. There must be the general educational program which in my judgment must be divorced from the law enforcing group.

As an humble judge trying a number of thousands of cases, I have come to this one conclusion, and I am not a pessimist in it, either: that every good citizen in the community believes in the rigid and strict enforcement of the law just so long as you are not enforcing that particular law against me or a member of my household. Likewise, every good citizen believes that every judge should be fair and impartial in the adjudication of every matter that comes before him just so long as you are not trying my particular lawsuit, and when that time comes I should like to have you lean just a little bit to the explanation or defense which I am giving.

Third, every good citizen believes that every judge should remain in chambers until the opening of the court session and should not discuss any case whatsoever except it be in open court unless you are trying a particular traffic case of mine, and then I should like to present you with a little sketch or a drawing of this particular accident that I may give you the full benefit of what actually happened.

So I come to this conclusion in what is wrong with our traffic law enforcement. I say first that we are going to have to so educate our public and our citizenship that the whole idea of law observance as far as traffic regulations are concerned shall be the most popular thing in the community, first in the saving and conservation of human life, the most precious earthly possession that any of us have; and second because of the tremendous economic loss of both life and limb and property in accidents; and then that we shall bring about a respect and an understanding so that every individual in a family and that family unit shall appreciate that they have an individual responsibility to so live themselves that they shall not bring injury to their fellow man. And then, going into groups and into our local and state and national governments, we must develop the feeling that all of us have a responsibility to our fellow man to observe those things that bring about safe driving practices and conditions. That is the first big thing.

It may be surprising to you to know that in my own city (and I think it is true of many others) a little more than half of the time of the police department is devoted to the enforcement of traffic regulations, either directly or indirectly. Think of that! On the one side you have the homicides, larcenies, liquor cases and all other misdemeanors taking one-half of the time of your department, while on the other hand the traffic regulations, direct and indirect, take at least a half or more.

May I invite your attention to a fine little book written by Mr. Clarence P. Taylor,

and distributed by the National Safety Council. It was edited by none other than Dr. Miller McClintock, and it has a foreword by Professor August Vollmer. It is entitled, "The Traffic Officer's Training Manual." I have been looking for it a long time. It is here. It is wonderfully written and easy to read.

Compensating for the lack of personnel and man power, we must use our man power to the very fullest degree. So I am going to study this little book. I hope to master it. I hope to begin a class next week in my own city, of traffic officers, twenty-five at a time, in which each man will be presented a book, and in which we shall discuss it as though we were going back to school days. I tell you, my friends, that today as never before, younger men should be put in the traffic division, and they should be trained out of the experience of the master minds and the best engineers of this country to the end that we shall not only have courtesy and politeness on the part of the officer, but that we shall have that efficiency that can only come out of a recognition of the problem in its true magnitude.

So after education of our citizenship, we come to education within the police departments.

We shall find it much easier to do away with the professional fixer when there is a popular demand to enforce the law against all alike. And then if we properly train the traffic officer, he will use the judgment and the poise that will bring to court only those cases that should come to court; and when they come to court the judge, backed up by a popular demand, will sit there with an open mind and listen to a trained officer who presents the facts in the case clearly, directly, briefly, and accurately.

CHAIRMAN DUGGAN: I know you are anxious to know what other cities are doing. I am going to ask Professor McIntyre to tell you what we are doing or trying to do in the city of Pittsburgh.

LEWIS W. MCINTYRE (City Traffic Engineer, Pittsburgh): We have engaged in a most vigorous campaign for law enforcement. We agree with the speaker that we must appeal to the individual, the violator, rather than trying to castigate the professional fixer. With the cooperation of the newspapers, a large number of talks have been given before representative groups of influential citizens, and law observance has been emphasized.

The professional politician only fixes tags when the individual asks him to, and he does it rather reluctantly; he would rather get rid of it.

We have had splendid cooperation on the part of our police officials and our traffic magistrate, who has exerted himself to the utmost to resist the pressures that are naturally brought upon him and to give a real honest law enforcement. We have had the backing of every one from the mayor down. While adult fatalities for last August were 17, for August of this year they were 6, the result of the law enforcement campaign.

We also have instituted in Pittsburgh, a group of about 500 that we call the Traffic Observers. Those men are of the most responsible citizenship of the city. They are known only by number. They have pledged themselves to observe traffic law violations of the more flagrant sort, and report them. Each individual so reported receives a courteous letter calling his attention to the type of violation, and asking his cooperation in helping to reduce those violations and consequently save lives. Those reports are coming in at the rate of about thirty or thirty-five a day, and I should say offhand that 75 to 80 per cent of the responses to those letters are favorable. Here and there we find someone who calls us snoopers, and so on, but most of the individuals are glad to have the thing called to their attention and promise to be more careful. We think it a highly successful effort along the line of educating the individual violator.

CHAIRMAN DUGGAN: Mr. Burton W. Marsh, Traffic Engineer of Philadelphia, I know you will say a few words on this subject. It must be very close to your heart.

Mr. Marsh was Traffic Engineer of Pittsburgh for over five years.

BURTON W. MARSH: I am very happy to see that progress is being made here. In all the discussions on traffic you will find the group turning to this question of putting across the measures for the safety of people and for moving the traffic for the immense economic factors which are involved. Safety is paramount, but the economic cost of failing to carry out evenly the regulations which are set up to facilitate the movement of traffic is such a staggering sum that I wish to bring it to your attention.

I know that if those persons who have millions at stake in the centers of our large cities could appreciate the amounts that they are out of pocket because we are not getting results to the degree we should in the orderly, easy, convenient use of our streets, we would find the business people giving greater attention than they now do to this tag fixing, which is the curse we all face.

Too often the business man says, "But I must fix these tags. Bring your tag in, I will fix it up." The business man must be told through the educational media which we have discussed and he must be told emphatically, that he must not fix those tags; he must take the opposite attitude for the good of his pocketbook.

Philadelphia has done splendid work in making the streets of that city, many of which are three lanes wide and many one way with street car tracks in the central lane, at least twice as useful for traffic by keeping the curb lane on the non-street car loading side clear. I have been astounded, in the short time that I have been there, to note that the people of Philadelphia have apparently come to a realization that with these narrow streets it is necessary that that lane shall be kept open for free moving traffic.

Philadelphia under the administration of Director Schofield, instead of using tags, has turned to towing, and a large number of vehicles since about the first of the year, I believe around 15,000, have been towed by tow wagons owned and operated by the city of Philadelphia, to garages under contract with the city, heavily bonded, and there is no graft in those garages. These garages receive a fee for the storage; I believe it is a dollar for the first day and fifty cents a day for a certain number of days thereafter, and the city receives a $5 fee.

When this was first instituted, which was shortly before I took up the work there, there was a great deal of excitement about towing, but I have been surprised to note how this has died down and how the people—although there are kickers now and then—seem to realize that the benefits far outweigh the disadvantages.

W. R. MILLER (Rochester, N. Y.): Does Philadelphia have an ordinance which gives them the right to tow cars?

MR. MARSH: Yes, there is an ordinance, which covers the entire subject very fully, setting up the procedure as to the city's employing cars and the prices to be charged and the garages to be used under contract. The towing ordinance has recently been subjected to a court attack and has been declared valid and proper.

F. C. LYNCH (Kansas City Safety Council): I am of the opinion that the accident experience has very little relation to the enforcement of the parking ordinance. In Kansas City we went through one year with the most lax enforcement of parking ordinances that we had ever had in seven years, and had the lowest accident record that we had ever had.

I find that the accident record is dependent almost directly upon the column inches of publicity which are given to enforcement. If the police court today carries twenty-five cases before the judge and they all receive severe punishment, and if there is no reference made in the paper, only those twenty-five people know it and in addition perhaps their immediate associates.

But if it gets in the paper almost every one of his immediate associates become

conversant with the fact that he was fined in police court, and the educational effect has a very definite correlation to the accident rate in your community.

H. O. ROUNDS (Detroit Automobile Club): I just want to revert to the splendid talk by Commissioner Davis. He said something about educating the policeman, and he is absolutely right.

As the commissioner said, ..ity per cent of the work of the police department is now connected with the enforcement or regulation of traffic. That being the case, why should the director of traffic or the man who has charge of the traffic officers be under a superintendent of police whose duty it is to enforce the other laws? I feel that the man who has charge of traffic has charge of a technical activity and should not be changed every sixty days or every two or three years.

The man who has charge of traffic should be responsible only to the commissioner, and his job should be one that he will want to hang onto and become familiar with, so that the method of handling traffic will be continuous. Then people would become familiar with what the police department demands, and soon we would have a better understanding on the part of the driver and more cooperation of the driver with the police department.

CHAIRMAN DUGGAN: For the second time the Motor and Equipment Association awards a banner to the community safety council showing the best motor vehicle fatality record during the past twelve months, figured on the basis of consecutive man days free from a motor vehicle fatality.

The winners of the 1930 contest will be announced and the banner presented by Mr. Shreiner, representing the Safety Committee of the Motor and Equipment Association.

Awards in Traffic Safety Contest

R. W. SHREINER (Harrisburg, Pa.): It is with a great deal of pleasure that I stand before you representing the Motor and Equipment Association, as a substitute for Mr. A. V. Hall, chairman of our Committee, who is now in Europe.

We established last year the custom of presenting a banner to the city with the best no-fatality record.

In this contest the cities have been placed in four groups; first, cities over 500,000 population; second, cities of 300,000 to 500,000; next, cities of 100,000 to 300,000; and, fourth, cities under 100,000.

The winner of the entire contest and of this banner is the city of Baltimore.

It gives me great pleasure as a member of the Motor and Equipment Association to present this banner to you, Mr. Rostmeyer.

For nineteen days you have been without a motor fatality in the city of Baltimore. Multiplied by your population that gives you 15,300,000 man days, and you certainly deserve the banner.

JOHN P. ROSTMEYER (Baltimore Safety Council): It is a great pleasure to accept this banner for the city of Baltimore. This accomplishment was not due to any specific thing. During the past year on five or six different occasions we have gone a week without a motor vehicle fatality.

Since 1923, the Baltimore Safety Council in cooperation with the school authorities, the police department, the city departments of all kinds, has worked on an educational program, and we would like to feel that everyone in our community has something to do with the splendid record that we enjoy.

Since 1927 we have shown a decline in child fatalities from accidents. In 1927, fifty children were killed in Baltimore; in 1928, 40; in 1929, 37; and for the first eight months of this year, 22. That is striking evidence, I believe, of the value of safety education.

MR. SHREINER: The second prize in the contest has been won by Fitchburg, Massachusetts. Fitchburg has operated for 365 days without a fatality from an automobile accident, or 14,850,000 man days according to their population.

MAXWELL HALSEY (Mass. Department of Public Works): It gives me great pleasure to accept this for the city of Fitchburg.

MR. SHREINER: The third prize has been won by Evanston, Illinois. Evanston has operated for 199 days without a fatality by a motor vehicle accident, which, multiplied by their population, gives them 12,600,000 man days.

H. J. SPOERER (Evanston Safety Council): It pleases me particularly to be here to receive this award. Unlike Baltimore, we have one particular reason for feeling that we won this third place in the contest. We have just completed our first year's operation of the Bureau of Accident Prevention in our police department, and we can't help feeling that that helped a great deal in bringing about this record.

MR. SHREINER: Two cities have received honorable mention. Rochester, New York, which has operated for 38 days, giving them 12,500,000 man days, also Providence, Rhode Island, which has operated 49 days, giving them 12,400,000 man days.

In the first group in which Baltimore won the banner, second place goes to Boston, Massachusetts.

In the second group in which Rochester has won, the second place goes to Newark, New Jersey.

In the third group in which Providence has won, the second place goes to Worcester.

In the fourth group, Fitchburg and Evanston.

CHAIRMAN DUGGAN: This concludes our program for the day.

(Note. Following is the address prepared by Mr. Yockey for presentation at this session.)

What's Wrong With Our Traffic Law Enforcement?

By HARRY E. YOCKEY
President, Indianapolis Safety Council, Indianapolis, Ind.

When I was asked to speak on this subject I began to tabulate my personal observations during seven years in public offices ranging from Deputy Prosecuting Attorney to City Attorney of Indianapolis.

And, although I have had indirect contact with traffic problems since leaving public office, the situation has changed so that to gain the opinion of men now dealing with traffic problems I wrote to a list of public officials and safety men. I received replies from most of the larger cities in the United States and from half of the states.

In addition, for thirty days I made it my business to ask friends and acquaintances "What's wrong with traffic law enforcement?"

And so, although I can make no claim for originality nor any effort at complete analysis I approach this subject from a practical viewpoint based on the experiences of many.

There is no problem in the United States like that of traffic law enforcement. Everybody is affected. The difficulty lies behind rather than in enforcement itself.

The first man I questioned instantly replied, "People do not want law enforcement". One of the letters I received began, "Where is there any traffic law enforcement?" Both of these answers came from men in a position to judge. Have we come to the place where we do not want our laws enforced? Is it worthwhile considering such an indictment as *"where is there any traffic law enforcement"?* Our country was *settled* by men who wrote constitutions based upon the fundamental theories of supremacy of law, and equal rights for all. The present day accusation is that their descendants give lip service to these principles, but do not practice them.

Laws

The complications which come upon us in a diversified city life with its net-work of laws and ordinances cannot be waved aside with a declaration that we have too many laws and need to tear up our law books and start again. Such sentiment meets with popular approval but solves no problems.

Whenever a catastrophe happens or some wrong is committed, traffic or otherwise, the popular cry of the masses is for another law. "Pass a law", seems to be the slogan of reformers as the panacea for all ills. Consequently, today, after twenty-five years of traffic experience our books are loaded with obsolete, complicated and heterogeneous statutes, ordinances, rules and regulations. Too many of these are written by persons unfamiliar with traffic conditions. Too often because the decision regarding the necessity for a law is placed in the wrong agency—favoritism toward certain interests creeps into the regulation. In most instances the enforcing agencies are not consulted as to the practicability or possibility of enforcement. Provision is not made for policing and financing the enforcement. These conditions are fundamentally wrong.

Our citizens are constantly confronted with regulations which they resent and in many instances are unable to obey. Many of these regulations when put to test in our courts are held to be unconstitutional. A certain type of lawyer taking advantage of this situation is willing to advise any client that most of the traffic laws and regulations are unenforceable, and unconstitutional. As a consequence our citizenship in general feel that most traffic regulations are unenforceable and tolerate enforcement only as it suits their convenience.

Traffic problems in the main are engineering problems and under no circumstances should regulations be passed without passing the acid test of traffic engineers.

Drivers

Under this system of legal entanglements, unreasonableness and uncertainty the motorist starts forth. He is lucky if he knows what the regulations are because pamphlets containing them are not easily available or if available are often obsolete. He is compelled to a large extent to depend upon his own judgment and initiative to get by accidents and evade the clutches of the police. If the streets are posted with signs indicating regulations he gets by fairly well, but if he travels from place to place he is soon greatly confused by the lack of uniformity. He finds that enforcement is casual and spasmodic; that obedience of regulations is not general by other motorists and he soon disregards the regulations himself.

One soon finds that if he is to survive it must be by the process of the survival of the fittest. The average citizen in ordinary affairs is reasonably courteous and thoughtful of his fellow man, but once he takes the wheel of a car he apparently loses all of these qualities, throws caution to the wind and enters into the mad competition of getting quickly wherever he is going without due regard for the safety and rights of others. This makes proper law enforcement impossible; it would take law-enforcing agencies with the wisdom of Solomons to determine in most instances who is in the right or the wrong. The careful driver may be just as liable to injury and arrest as the careless; he is criticized and shouted at in traffic jams; he may get run over and his car damaged in the event he obeys traffic signals and is cautious at dangerous crossings.

The automobile has always been a dangerous instrument in the hands of most of our people. Standard signs and signals have been generally adopted but drivers apparently have forgotten them. In a questionnaire of simple traffic rules submitted recently in one of our large cities to the highest type of citizens, the average grade was below forty per cent. Drivers become heedless of railroad signals and finding that stop signals and traffic signs are unreasonable do not obey them. There are too many unreasonable stop streets; too many poor signs and signals; too many unreasonable commands given by police departments and officers. All these militate against enforcement and add to disrespect for law and order.

As long as these and other kindred conditions exist we will have bad law enforcement.

Pedestrians

In such a traffic atmosphere the poor pedestrian attempts to wind his way. By and large, our laws properly protect him, but they are not enforced. The pedestrian who attempts to obey them is soon disillusioned and finds himself stranded on a corner. In consequence he jumps and dodges through automobile traffic, risking his life in an attempt to cross the street. Vehicular traffic has about reached its saturation po.. i many of our cities and if streets are to be safe for pedestrians traffic must be slowed down in our business district and the pedestrian given a chance.

It is high time that our law enforcing agencies give to the pedestrian the rights he deserves and those which are made provision for in our laws and ordinances.

Police

Into this atmosphere steps the police officer. If he is an honest officer he attempts to enforce the law as it is written, only to find that strict law enforcement in any of its various phases upon his part does not mean promotion but rather a move to a beat in the "sticks".

Primarily our police departments are composed of men who have served a long time and who only enforce those laws which their superiors believe public sentiment demands. There are so many laws that it is impossible in our largest cities for the ordinary policeman to know very many of them. He cannot and does not enforce them. Too many of the traffic officers are of the old school, they lack sympathy for law enforcement in general and are in decided need of education as to traffic responsibility. We have entirely too few traffic officers in the average city. Although our police departments make requests for more traffic officers every year our newspapers and taxpayers join in opposing the expenditure of more money for such purposes. Automobile owners pay millions of dollars yearly in tax and license fees in excess of benefits derived. If this money were properly spent on enforcement measures, our problem would not be so acute.

We wonder how other countries which are usually pointed to with pride as to law enforcement secure such good results. It is because they have adequate police forces. America must awaken to the fact that we are decidedly under-policed in every department of law enforcement.

There is a lack of courtesy upon the part of our police and too much favoritism. Politics has its sway. Discuss traffic violations with the average policeman and he will shrug his shoulders and say, "What's the use? The people do not want law enforcement". Practically all of our traffic regulations are constantly and flagrantly disobeyed but our police department does practically nothing. True enough, there are spasmodic sprees of so-called law enforcement; they are only a farce and accomplish nothing in beneficial results.

I have no attack to make on police officers nor the police departments, they are only interpreting what they think the people want. If a policeman arrests an influential citizen he may lose his job. If he arrests the lowliest citizen the politician comes to the rescue. Why should the police officer waste his time waiting in courts and going back upon continuance after continuance, finally to see a guilty person discharged?

Anyone who understands law enforcement knows that the police department can enforce any law which it makes up its mind to but everybody knows that public

Street and Highway Traffic Section

Executive Committee, 1930-31

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Joint Session Street and Highway Traffic and Statistics Sections

Tuesday Morning, September 30, 1930

HON. LEMUEL B. SCHOFIELD, Chairman
Director of Public Safety, Philadelphia, Pa.

The joint meeting of the Street and Highway Traffic and the Statistics Sections at the Nineteenth Annual Safety Congress was called to order by Hon. Lemuel B. Schofield, Director of Public Safety, Philadelphia, Pa.

CHAIRMAN SCHOFIELD: The purpose of this session is to discuss the practical uses which can be made of accident records in preventing traffic accidents. This is a subject which has received all too little consideration and those of us who are devoting our time continuously to the traffic problem are beginning to realize that there are many uses—practical uses, not theoretical ones—to which accident records can be put, and that if we put them to those uses intelligently and intensively we will be attacking the accident problem in an effective manner.

For the first address of the morning we have a man who is a pioneer in the field of state traffic accident statistics and I understand he will discuss this morning the importance of these statistics and some of the limitations in that work.

The Story of An Accident Report

By LEON ARONOWITZ
Statistician, Bureau of Motor Vehicles, Department of Taxation and Finance, New York State

The purpose of this paper is to discuss briefly accident reports from the standpoint of the State, rather than that of the municipality. However, it is necessary to view the large picture in order to obtain a proper perspective on the local situation. It is necessary to explain how the report originated; how it is prepared; and the reason it is requested from the public.

For many years there were no available statistics or data relating to motor vehicle accidents. The number of persons killed and injured was a matter of conjecture and speculation. The amount of property damage and economic loss resulting was vague and unknown.

Motor Vehicle Bureaus formerly confined their activities merely to issuing licenses, collecting revenues, and maintaining records of those persons to whom licenses had been issued. No effort was made to determine whether an applicant was qualified to possess a license. Driving licenses were issued as a matter of course. No provision was made for securing reports of accidents so that they could be analyzed to determine what factors entered into the accident.

The increasing loss of life and property has become so marked in the past few years, however, that legislatures have recognized the magnitude of the problem and have realized that definite action must be taken to curb this ever increasing accident toll. As a result, many states have enacted laws which are aimed to correct this condition and to reduce accidents. To solve the problem it is necessary that fundamental data be obtained which can be studied and analyzed.

The primary purpose for which accident reports are required is to make available the valuable information and data necessary to a proper analysis of accidents, and to enable state authorities and other agencies to determine reasonable, proper, and effective remedies.

In New York State before a person is permitted to operate a car, he is required to demonstrate his fitness by passing both an eye and a driving test. All drivers are required to file a report of accidents on a form prepared by the Bureau of Motor Vehicles. The New York law provides that failure to file such a report with the Bureau of Motor Vehicles is a misdemeanor, and is also the basis for suspending or revoking the license of an operator. Unless this penalty was provided for failure to report, there would be great difficulty in securing information. It is, however, essential that the accident reports be considered private or confidential records, and not available for public inspection. In some states there is no provision in the law granting this protection, and, as a result, requests for copies of these reports are made by attorneys and other interested parties. The furnishing of these accident reports to attorneys interested in the prosecution of negligence actions, has a tendency to destroy the value of the reports for statistical purposes. Obviously, an operator will not set forth complete data concerning the accident if such information is going to be available to be used against him in a civil or criminal action. If the law fails to provide this protection, operators will be less frank in stating facts and circumstances, and will either color their statements to favor their side of the case, or will leave many questions unanswered.

Where a statute requires the filing of a report giving information regarding an accident, it contemplates that the statement of the facts will be accurate and true. Where the statute makes it a misdemeanor for failure to file the prescribed report, it is but reasonable and proper that protection should be afforded against the improper use of the information set forth in the report. It is manifestly unfair to require a man, under penalty of committing a misdemeanor, to file a report, and then to furnish a copy of this report to an attorney for his use in the prosecution or defense of a negligence case. In other words, such a practice would permit this report to be used against its author who, in good faith, prepared it in compliance with the statute. The sole purpose of the report should be to obtain data for statistical purposes to aid the designated authorities to solve or, at least, to alleviate the accident problem.

In some instances reports in New York State have been filed with certain questions unanswered. Upon being requested for detailed information, the reply has been that the questions were passed upon advice of counsel. As the public becomes aware of the effect of a law which does not grant privacy of reports, there will be a greater tendency for persons involved in accidents to refuse to give detailed information. The lack of this data will hinder the task of determining what remedies may be effective to reduce accidents. Facts concerning each and every action are essential if the study of these accidents is to yield beneficial results.

In New York State to further the securing of complete reports of every accident, police officers, coroners, and peace officers to whom an accident is reported, are required to investigate the accident and file a report setting forth all facts in connection therewith, in addition to the report required of the operator.

The provisions of law requiring police officers to investigate and report their finding of accidents to the State Bureau, places at the disposal of the local authorities the accident reports which can be used by them to assist in solving their local traffic problem. Some police departments chart every accident on a spot map so that they have a picture of those streets in their city which represent danger zones. This constant reminder of accidents furnishes data so that an investigation and study of those places where accidents are occurring can be undertaken. An examination of the locality might suggest that parking be prohibited; one way traffic provided; or some other remedy instituted. The State Motor Vehicle Bureau also makes analyses based on these reports when requested. This briefly indicates how an accident report can be made of value to local officials.

To obtain information, the report should be simple in form and the questions easily understandable. Only vital or important facts should be requested. Wherever possible, information requested should be arranged in tabular form so that the person

preparing the report can check the items tending to explain the accident, rather than writing a detailed explanation of the accident. This will facilitate receipt of reports, and will also insure uniformity of reporting, which will permit comparing data on different accidents. For the convenience of police officers, a report in card form should be prepared, so that the report may be carried in the officer's pocket.

Having determined upon those facts which should be reported, the accident report blanks should be easily accessible to those persons who may have need of them. A supply should be sent to each city for distribution to the various police stations. Accident report blanks should also be furnished to coroners, peace officers, clerks of courts, automobile clubs, dealers' organizations, insurance companies, and all other agencies from whom the applicant is apt to request forms or assistance in filling out same.

To assist in securing reports, a campaign of publicity should be undertaken explaining the provisions of the law requiring accident reports to be filed; where blanks may be secured; and, most important, that these accident reports are to be used to remedy conditions. It will not be difficult to secure the cooperation of the public when it is known that facts obtained from reports may act as a guide for accident prevention and assist in preventing similar accidents from occurring.

The importance of securing reports of the accidents can not be over-emphasized. In New York State the following means are employed:

The Bureau subscribes to a clipping service, which furnishes clippings of every motor vehicle accident occurring in New York State. These clippings are read and the name of the operator underlined. The clipping is then sent to the files division, where a search is made to determine if a report has been filed. If no report is located, a form letter is sent to the operator, advising him of the provisions of the law with respect to reporting accidents, and further stating that failure to file a report within ten days is a cause for the suspension of his license. This letter has a most salutary effect in compelling operators involved in accidents to file a report.

In addition to checking newspaper clippings, a report of fatal accidents is received from the chiefs of police or local safety councils in all the larger cities in New York State. Every month the fatal accidents reported to the Bureau of Motor Vehicles are checked against fatal accidents recorded by the state Health Department. If there are any discrepancies between the two sets of records, each bureau secures those reports which have not already been filed. There is a further checkup between the Bureau of Motor Vehicles and the Public Service Commission with respect to accidents occurring at grade crossings. As a result of these inter-checks, the fatal accidents occurring in New York State are, as far as possible, accurately obtained and tabulated.

For the year 1929, in New York State the difference between the motor vehicle fatalities reported to the State Health Department and to the Bureau of Motor Vehicles was less than one-half of one per cent. This discrepancy was caused by accidents occurring out of the state, with the injured parties brought within the state, where they subsequently died.

The preliminary task of obtaining accident reports is the starting point for safety activities which must be undertaken. The reports are analyzed, and the facts and circumstances surrounding these accidents are tabulated so that the results may be published for the guidance of motorists, pedestrians, traffic officers, traffic engineers, and other agencies engaged in accident prevention.

If an agency is receiving a thousand or more reports a month, it is desirable to use mechanical tabulating machines to secure the data desired.

In New York State the accident report is examined and the facts in relation thereto are entered on what is known as analysis sheets. These analysis sheets contain space to code twenty-five accidents. The information so recorded is subsequently punched on tabulating machine cards, and these cards in turn are run through the tabulating machines to prepare the tables which can be used as a guide for safety activities.

In New York State approximately 9,000 accidents are reported to the Bureau of Motor Vehicles each month. These reports are tabulated for New York State and analyses and reports are prepared for every city having a population of 10,000 or over. These tables are mailed to the leading newspapers in the State, Safety Councils in the various cities, Chiefs of Police, State Departments, insurance companies and all other agencies studying the accident problem.

It is obvious that without the accident report, the preliminary data to be studied and subsequently compiled can not be obtained.

If accidents are to be reduced and safety work is to be successful, it is essential that there be legislation enacted requiring the filing of accident reports; that the reports be kept confidential, and that a staff of clerks be provided, capable of analyzing the reports when received and of publishing the conclusions reached.

CHAIRMAN SCHOFIELD: There is a great deal of food for thought in Mr. Aronowitz's remark. One thing that impressed me particularly was the truth of his statement that traffic accident prevention is the starting point for the solution of traffic problems. I don't believe anybody will gainsay that. When a state like New York has over 9,000 traffic accident reports submitted each month, you can see the size of the problem there as well as in other states.

I know there is a great deal of discussion in connection with this problem and it is a pleasure to be able to introduce Walter W. Matthews of this state, who will open the discussion.

What Story Should the Accident Report Tell?

By WALTER W. MATTHEWS
Deputy Commissioner of Motor Vehicles for Pennsylvania, Harrisburg, Pa.

The methods used by the New York and Pennsylvania Bureaus of Motor Vehicles in collecting accident statistics are so essentially similar, that for me to comment on the system so ably outlined by Mr. Aronowitz may seem mere repetition. In fact, our procedure was largely developed from a study of New York's methods, and since we both closely approach the standard reporting system recommended by the National Safety Council, it may be that that is the very reason for my selection to discuss this paper.

Mr. Aronowitz and I are both members of the National Safety Council, active in its Statistics Section, but if my next statement be treason, make the most of it. Frankly, as an administrative officer whose duty is to promote safety education and devise ways and means to prevent and reduce motor traffic accidents, I *am not* entirely convinced that we are yet obtaining the proper story from our accident reports.

It is probably true that any system of collecting accident data is better than none at all, but if it provides us only with statistics and abstract marks on paper, with no accurate analyses of causes and no follow-up with corrective measures, we have been unsuccessful in removing the system from the realm of statistics to something which can be understood by the average person.

That brings me to one chief point of difference between the methods of our two states, which, incidentally, is a variance from the recommended system.

Pennsylvania does not require the report from the police officer. Frequently, supplemental reports or investigations are requested from the local police, but we have felt so far that we could obtain as much or more information from accident reports filled out by the operators and submitted directly to the department. In most cases the police officer will get the information in the midst of conditions not conducive to the making of the best type of report, and there is little question that the operator's own report will contain exactly the same information which the operator would give to the police officer.

The value of an impartial and unbiased report is not to be underestimated, and is frequently necessary, but with a statute requiring each accident participant to file a report, with reports from the police, the many newspaper accounts of the same accident, and, as is the case in Pennsylvania, a department investigator's report on fatal accidents, we soon arrive at a duplication in accident reporting which seems unnecessary, and one of our problems is to find some satisfactory way of reducing the number of reports of any one accident.

Neither can we hope to make the average policeman an accident statistician—we would advance the cause were we to concentrate on attempting to make him an accident analyst instead. Let him tell us what caused the accident, then we can apply the corrective measures. Don't involve him in a complicated series of statistical tables which he doesn't understand, therefore checks off something which he thinks is correct, but is really of no value. Any reports should be developed so that subsequent analysis may be aimed directly at culling out the principal driving error or other condition leading to the occurrence of the accident.

The present accident summaries of both New York and Pennsylvania contain tabulations dear to the hearts of statisticians, and perhaps carried along as a matter of routine or because there was once some demand for the data, but of no particular value in accident prevention. It is interesting, for instance, to know that the largest number of accidents occur on certain days of the week, but does that keep people off the streets on those days? It might be of more import to show how many so-called "hearse drivers" were dragging traffic on congested days, causing others to attempt impossible or hazardous passing and cutting in. Or, on the other hand, in the average street corner collision is there any particular interest in a failure to grant right of way? What we might better know is why an operator was unable to grant the right of way, why he failed to do so, or why he was unable to stop in time to prevent an accident.

The success of the compulsory equipment inspection campaigns, now in their third year in Pennsylvania, suggests some means for ascertaining what the condition of the automobile was. I mention this merely because in the first five months of this year, we were able to show a reduction of 55 fatalities in Pennsylvania over the corresponding period for 1929. It is our conviction that some of those people owed their lives to the good mechanical condition of their cars, or the cars of others, as the result of the six weeks' inspection campaign in the closing months of 1929. If accident reports show defective safety equipment, there is the remedy of withdrawing the driving privilege or the registration until the condition is corrected.

It would appear that tremendously valuable information could be obtained by the development of simple analysis methods, accomplished in part by personal hearings for the accident participants, and applicable to simplified reports. We are in danger of a trend towards serried rows of pretty figures concerning accidents, and their presentation in a purely statistical form rather than in a manner comprehensible to the average person.

Let us not forget that "The Story of an Accident Report" should be reduced to reality, so that every highway user must realize his own responsibility to keep himself from being involved in an accident.

To that end, we must have accident data—it probably is not so important as to the form or manner in which it is collected, as it is that it be collected and intelligently studied and used. We are all driving toward the same goal, and once we realize that the fundamentals underlying an automobile accident upon the public highways are exactly the same that underlie an accident either in the home or in the factory we will be able to develop information which we can get into the mental processes of highway users.

CHAIRMAN SCHOFIELD: Has anybody any questions or comments on what has been said by either Mr. Aronowitz or Mr. Matthews?

DR. W. J. MCGREGOR (Coroner, Pittsburgh, Pa.): I would like to ask the speakers, in view of the fact that they are representatives of state departments, whether they have ever taken under consideration some form of guidance for those who make the reports.

MR. ARONOWITZ: On the reverse side of our New York report we have a number of items to be checked, which will explain the accident. The first table here requests information as to what the motorist was doing, whether he was exceeding the speed limit, and so forth. The direction of travel, the condition of the motorist, condition of the vehicle, type of tires, and all the information that we request is listed in tabular form so that the motorist merely needs to check the items which will explain his accident. Then in addition we have a diagram that reflects the items checked on the reverse side and visualizes what has occurred.

CHAIRMAN SCHOFIELD: Mr. Matthews, have you any Pennsylvania forms you would like to explain?

MR. MATTHEWS: We have much the same thing, as I pointed out a little while ago. I happen to know some of Dr. McGregor's difficulties because we have considerable correspondence with the coroner's office here, and that is one of the points I wanted to raise.

We realize that there is some deficiency in our reports. From an analysis of them we sometimes find that we are unable to arrive at just how the accident happened, and that is fundamentally the information that we want. Of course we want the data concerning the accident, we want to know what kind of an accident it was, but we are now considering some clearer method by which we can have the operator visualize the accident and put it down on paper. Just what we will arrive at, it is hard to say. We have been compiling these reports only two or three years, and I am frank to say that we don't know just what we want ourselves. But we are trying to develop some way in which we can make it easier for the operator to tell us how and why he was involved in the accident.

As I said before, I am not entirely satisfied with the system of simply checking off certain items because it appears as though both the operator and the police officer may check off items which do not give us a correct report of the accident.

E. P. GOODRICH (Consulting Engineer, New York City): May I add another answer by referring to this Traffic Officer's Training Manual? I will read you the headings in Chapter II, on Accident Investigations: Reporting and investigating, reasons for specialized accident investigation work; remedial action, accident investigation squad, investigations of accidents, routine at the scene of an accident, completing the case at headquarters, equipment needed, looking after the killed and injured, principles involved, witnesses, inspection of surroundings, vehicle inspection, diagrams, hit-and-run cases.

C. C. REYNOLDS (State Highway Police, Wilmington, Del.): I would like to ask Mr. Matthews and Mr. Aronowitz if they have any repeaters or what they do with repeaters on their accidents.

MR. MATTHEWS: We have repeaters in Pennsylvania. On the second accident, the operator is warned. On the third accident, he is cited for a hearing to show cause why his license shouldn't be suspended. Incidentally, we have a provision in the Pennsylvania vehicle code whereby three convictions for reckless driving within one year call for a suspension of the license.

CHAIRMAN SCHOFIELD: Is that mandatory?

MR. MATTHEWS: Just discretionary, but he is always called in.

MR. REYNOLDS: Do you know what percentage of repeaters you have for the last year?

MR. MATTHEWS: I couldn't say off hand. I haven't analyzed it.

MR. REYNOLDS: We analyzed 700 accidents in 1929 and six out of the 700 were repeaters; a very small percentage.

JAS. R. SHEPARD, JR. (Director of Public Safety, Richmond, Va.): I would like

Using Accident Statistics In Public Education

By REYBURN P. HOFFMANN
Secretary-Manager, St. Louis Safety Council

To some people the suggestion to put accident reports to some good use, might prove a novel idea, for there are those who suppose that records are gathered so that they may be filed away and referred to, henceforth, as statistics. Such files represent an investment but pay no dividends. They are liabilities and are occupying valuable floor and wall space. If these records are worth gathering they are worth using.

To what use can they be put? First they are a source of information—an experience record which can be analyzed and studied. They provide the basis for comparisons over given periods of time for particular intersections, streets or districts.

They permit comparisons to be made with other cities throughout the land so that a better idea of local conditions may be had.

They provide information for the purpose of studying the effects of various types of paving upon traffic accidents, the effects of weather on accidents and the effects of street lighting upon accidents, and tell us what manner of driving results in accidents.

In what better way can we learn the value of a traffic signal, a "stop" sign, a turning button or center lines, than by analyzing the kind and number of accidents before and after their installation?

How can we better judge the benefits of safety campaigns and child safety instruction in the school or by radio than by observing the reaction in the accident report cards?

And after we make these comparisons and draw conclusions, what should we do next? Do we say "That's too bad" or "That's fine" and do some more filing? We should not. This information should be prepared in printable form for publicity purposes.

We begin to cash in on our investment to the fullest extent when we tell the public why they have accidents and how they may avoid them, and when we are able to tell city authorities the efficiency of various types of equipment, etc.

Now, that we have referred to cards, and records and information, and the uses to which this material can and should be put, let us look at the cards and the summary sheets before going into detail so that the background may be complete.

This card is patterned after the standard report card prepared by the National Safety Council. It is complete in the questions asked and when properly filled out tells a complete story of the accident. We work on the principle that the policeman filling out this card should simply set down the facts and should not try to make any analysis. That is a job for others. From the card any desired compilation may be made, and a complete analysis worked out. Not only is the story told, but from a study of the card, physical condition of the paving, grades, obstructions to vision, etc., may be checked and remedies recommended.

This card was approved by the Police Department and has been used since 1924. These cards all come into the St. Louis Safety Council for tabulation and filing for later use in our safety work.

If these cards had 3 sides instead of 2 there would be one suggestion which I would make. That would be to have printed thereon a typical street intersection so that the exact location of the accident could be spotted, and, in the case of collisions, the positions of the vehicles could be shown. This would help where addresses are vague, or omitted, or where there are vacant lots.

The information from the cards is then tabulated on the accident tally sheet, which is a monthly record classifying accidents, types and circumstances. These classifications or groups correspond to the information on the report cards and deal with location of accident, residence of driver, age, sex, action of driver, pedestrian, condition of pedestrian, road condition, weather, light conditions, property damage, etc. In addition to tabulating the above we run off a sheet on time of occurrence and day of occurrence.

Next, at the end of the month, the tally sheet data are transferred to the summary sheet. This gives the monthly totals, and a copy is sent to the National Safety Council.

We average about 500 accident report cards a month, so you can see how much work is involved; too much so to have this information filed away never to be used.

Possibly some of you employ other systems of reporting and recording which are serving satisfactorily. But are you using the information you have taken so much time to assemble? I say either use it to its fullest extent or employ that time to some other good purpose.

Most of you will subscribe to the statement, I believe, that ordinances and laws are expedients which produce results only in direct proportion to the degree of enforcement. It is my belief that as much, if not more, obedience results from the understanding of an ordinance than from compulsory obedience by enforcement through fines and penalties, and the results are more permanent.

If you agree with this statement you can agree then to the value of education as the best medium for promoting safe driving habits.

One of our most vicious circles is that of violation and legislation. When set in motion there is no telling which comes first and which follows. By changing this geometric form to a triangle and putting education as the base, we will begin to get somewhere in our campaign for safe and sane driving.

What is education? According to the dictionary, "Education connotes all of those processes cultivated by a given society, as means for the realization in the individual of the ideals of the community as a whole"—"It embraces all forms of human experience."

How can the individual be made to realize the ideals, and how can he know all forms of human experience? By acquainting him with facts. And how can these facts be disseminated? Through printed comments, reports, the press and radio, all forms of publicity.

Now, let us refer to concrete examples and procedure in placing before the people the facts gathered on the accident report cards.

Several years ago accident studies were made at 10 or 12 typical "stop and go" intersections to see what effect signals had on the number of accidents. All accidents were reduced 75 per cent, but those involving pedestrians were reduced but 55 per cent. This information was published in the press, in report, and is continually being used to admonish the driver, but particularly the pedestrian, to obey the automatic signals. We expect to make a follow-up study this year to see what changes have occurred.

Another two-year study was completed this September 17th, and involves the establishing of a major stop street, Compton Avenue. This street was posted September 17, 1929, for a distance of 5 miles. In this distance every important east and west artery, with two exceptions, intersects it.

The volume increase ranged from 35 per cent on its northern limits to 20 per cent near its southern limits, or an average increase of 94 per cent. In spite of this volume increase accidents showed a decrease of 15 per cent.

What better educational publicity do we need, than these figures, to show the people the benefits of driving along the major streets, which have been properly designed, paved, illuminated and protected.

Incidentally, this new street relieved a congestion along Grand Boulevard—parallel and ¾ mile distant—which had developed to an acute stage.

Having driven Compton for four years in preference to Grand Boulevard, I noticed large immediate increases in volume a few days after a notice appeared in the press urging its use, and telling of the signs being posted.

The results of our study, which will be published next week will, no doubt, bring another rush of users to this newly popular thoroughfare.

The statement that the chances of a pedestrian crossing a street safely are 50 to 1 in favor of those who use cross walks, instead of crossing in the middle of the block, should certainly make some people think, and educate not a few in the manner of safe walking. These facts were worked up from our report cards and published in the press.

When a series of collisions occur due to corner cutting, and these accidents cease after turning buttons and center lines are put in, and the papers print this fact, people will turn corners more cautiously and in the proper manner, whether or not all intersections have buttons and lines. These readers are made to embrace the experience of others by reading about it, without suffering the serious consequences.

When child fatalities in St. Louis dropped from 48 in 1926 to 29 in 1927, this just didn't happen. Checking through the records showed the period to correspond with the first year of the Careful Children's Club of the St. Louis Safety Council, organized and carried on by radio, and now having a membership of 425,000 children in 45 states, 271,500 in Missouri, and 175,000 in St. Louis and suburbs.

This period was also coincident with the first year that "Safety Teaching" was inaugurated as a part of the regular curriculum in the Public School System, under the sponsorship of the St. Louis Safety Council. The publicity and educational facts were secured from the data upon the accident report cards.

Not long ago traffic fatality statistics were published by the Committee on Traffic Accidents of the National Conference on Street and Highway Safety. Here was a chance to educate our citizens to the seriousness of the traffic fatality problem, and we did by publishing the national figures and compared our own to them. They covered the period 1922 to 1928. We had our files complete, just awaiting such an occasion.

Right here let me say don't print only the favorable results. Nice, soothing reports too often lull us into complacency—the unfavorable, revolting ones rouse us to action.

Aside from the pride which we might evince because of a comparison most favorable to our city, did not the people who read the articles better realize that certain things which we had been doing in the way of regulation, signals and markings, were producing results?

St. Louis' traffic fatality increase for the 7-year period was 23.7 per cent compared with 82.2 per cent for the nation, and while child fatalities increased 22.9 per cent throughout the nation, in St. Louis they showed a *decrease* of 17.6 per cent.

The monthly standing of cities of various population classifications published by the National Safety Council in Public Safety furnishes another source of information for comparison and educational material. We can use this national data to the best advantage if we are using our own data and records as we should.

When we read a national report that commercial vehicle accidents are not increasing as rapidly as are those of pleasure cars we look into our own records, and find substantiation. This gives us a chance to talk about our Inter-Fleet Contest with 66 fleet owners operating about 3,200 units, and to tell of their experience in accident reduction; another source of educational material.

Let me advance a word of caution in the use of such reports. Care must be used in conclusions involving non-fatal injury reports, especially for a short period of time. Many accidents go unreported if injuries are slight, or no officer appears in time to make a report.

The chance for faulty conclusions, however, decreases as the number of accidents increase, because the per cent of possible error through failure to report decreases. The same rule applies to collision accidents where there are no injuries.

Don't jump at conclusions; one swallow doesn't make a spring, nor does one fatality indicate a bad or unsafe condition. Inspection of a fatality spot map shows these locations in widely scattered sections of the city. Injury and collision maps tell the story—repetition indicates a condition calling for attention. We need a good jolt occasionally to wake us up, and the chances for editorial comment are better from a bad record than from a good record.

Now, through what media can we reach the people for educational purposes?

First, the press, the daily papers which probably provide the largest day to day spread and contact. They reach practically all homes.

Second, the community center weeklies. These editions are always available and reach a lot of people through the neighborhood interest which they maintain.

Third, publication of the Board of Education which reaches the homes through the school child each month.

Fourth, printed reports to membership, special groups; these may also be used by civics classes in high schools, etc.

Fifth, public safety meetings. They are good to get personal contact, but it is hard to reach large numbers of people, such as can be done in industrial and fleet groups.

Sixth, billboards afford good opportunity for periodic messages, and when placed in strategic locations will reach a lot of people in a week's time.

Seventh, schools afford the most fertile field for safety education, as results will prove in any city.

Eighth, the radio has come to rank with the press as a news and educational medium, and is always available for worthwhile information and educational programs.

With so many agencies available as outlets the use of accident statistics for educational purposes is unlimited, but are we using them as much as we should? The title of this paper is "Using Accident Statistics in Public Education." A slightly modified transposition reads "Using Statistics Accidentally in Public Education."

Both methods are now employed. I leave the choice to you as to which is the better.

CHAIRMAN SCHOFIELD: I believe that those of us who are charged with the responsibility of enforcing traffic rules and regulations will agree with Mr. Hoffmann that the problem is to educate the public as to the proper course to follow.

I believe that with the possible exception of the speed laws, which are generally arbitrary and unscientific and universally disregarded, the public as a whole will try to conform to reasonable regulations if they know what they are, and if they know what to do and how to do it. Therefore the task of putting the idea over to the public becomes a very important one.

I understand that Dr. McGregor of the coroner's office here in Pittsburgh has given some study to this problem. Would you care to say anything, Dr. McGregor?

DR. W. J. MCGREGOR (Coroner, Pittsburgh): I was very much interested in several of the remarks made regarding the right of way. Our conclusion has been that the question of right of way is one almost to be ignored. I can illustrate that by an occurrence that I witnessed.

I was waiting at the intersection of Grant Street and Fourth Avenue one day when I noticed a man stepping out to cross the street against the traffic signal. He was almost struck by a car which had the right of way. The traffic officer cautioned him about it and the man's reply was that the Supreme Court had ruled that immediately upon a pedestrian stepping on the street he had the right of way. Now whether that is true or not, the officer's reply, which was quick and to the point and covered the whole situation, was, "That would do you a lot of good six feet under the ground."

Here in Allegheny County, we worked up a card which I have our deputies fill out in the way that has been mentioned—by checking—but in addition, each man who investigates an accident makes a sketch of it on the back of this card.

And, in addition to his checking off such headings as type of vehicle, traffic condition, light condition, road condition, weather condition, condition of vehicle, and what the deceased was doing—of course we deal only with fatalities at the time—he gives a short resume of what he considers the cause of the accident. Then at the inquest that is corrected by us. We do not mean by that that we are always correct in our

conclusions, but this has been used by officials of the city of Pittsburgh and various officials throughout the county. We find it has worked out very satisfactorily.

CHAIRMAN SCHOFIELD: Is there any other discussion?

LEONARD L. ORMEROD (Bell Telephone Co. of Pennsylvania, Philadelphia): I was very much interested in Mr. Hoffmann's paper and the eight means for reaching the public used in St. Louis. I wish he could tell us more about them. I would like, for example, to know if they pay for the use of billboards. In this kind of work we usually have to make a few dollars go a very long ways.

The newspapers are very good to us, but nevertheless they can't just open their columns and let us use them as we would like to use them. The schools have been used here in Pittsburgh, and we are trying to set up a scheme to make the maximum use of them in Philadelphia. However, that is a rather roundabout way so far as the driver is concerned. We want to reach the adult.

I would like to ask Mr. Hoffmann also if there is not a great deal to be done through the medium of speakers. In Philadelphia there are at least 200 organizations of business men made up largely of men who operate their own cars. We should be able to reach all of those organizations during the year with a speaker.

We can do something about the police power of the city and state, but after all, we have to make safe driving popular. If we can get public opinion to sit at the bar instead of the judge, we are going to have wonderful results.

And I would like particularly to ask Mr. Hoffmann to tell us how they use billboards and whether or not they make use of speakers.

MR. HOFFMANN: When we have used billboards we have secured the billboard space free and all the Safety Council has done is to pay for the printing of the poster and the time of the man from the poster service to go out and put it up. We plan to do more of that than we have in the past. I will not tell you the name of the company which has been so charitable because I don't want to commit them to some national policy.

However, I feel sure that there are certain times of the year, and particularly now, when such an arrangement could undoubtedly be made. I believe that the bill posting service companies appreciate fully the seriousness of the problem. I don't believe that very many of you would have difficulty in making some such arrangement so that you could at least periodically get this space for what the posters cost and the time necessary to put them up.

This question, is also being considered by the National Safety Council, where it is a question of working out a policy with relation to all of its community councils whereby the National would be assured of a certain consumption on the part of the locals. I think it would be well for you gentlemen who are here from cities in which there are local councils to discuss this subject with your local council managers.

In regard to speakers, I quite agree with the gentleman that it isn't difficult to get speakers to attend these various civic club meetings. They are only too glad to know what is going on in their own community and these clubs are composed of men who are interested in the city's welfare.

We plan this year in St. Louis not only to use these clubs but to go out into the various neighborhood centers. St. Louis uses its school buildings quite extensively. We have gotten away from the idea of locking the gates at three-thirty in the afternoon. We run our playgrounds up until dark. In the evening the parent-teachers, the boy scouts, the local improvement associations, or any other organizations in the community meet in the schools quite regularly. We find that those groups are always willing to have speakers—in fact they run short of speakers and it is a job to get people to go out and talk to them.

We plan to hold a lot of public meetings in these various localities, probably drawing 1,000, 1,500, or 2,000 people. We will have regular public safety meetings, in addition, of course, to our other industrial and fleet activities.

CHAS. H. BARBER (Auto-Owners Insurance Company, Lansing, Mich.): As a former newspaper man, I should like to say that statistics at best are very dull. They need a humanizing touch, and you will find, I believe, that if you will put your statistics into the mouths of the various important men in your community when releasing them for publication that you will get a lot farther. What the banker says about safety, what the manufacturer says about safety is far better than what the Safety Council says, because after they have said it time and time again it gets to be old stuff.

W. W. MATTHEWS (State Deputy Commissioner of Motor Vehicles, Harrisburg, Pa.): As an example of safety education, we wanted to put out some information as a trailer on a state-wide news reel in connection with some of our compulsory inspection campaigns. A great many people said it couldn't be done but we went to the motion picture people and found they were very much interested in doing it provided we kept the message as short as possible and provided some real news feature with it.

C. C. REYNOLDS (State Highway Police, Wilmington, Del.): I think we should remember that billboards may cause accidents. In Delaware we are trying to pass a law to do away with billboards within 100 feet of an intersection or main highway. Of course with the number of fatal accidents posted on them it may be all right, but it is inattention that is causing a lot of accidents.

CHAIRMAN SCHOFIELD: Have you made any investigation or study in Delaware as to how many accidents can be attributed to billboards?

MR. REYNOLDS: No, we haven't. It would probably be worth while if we were to make such an investigation but we haven't done it yet.

CHAIRMAN SCHOFIELD: The next speaker is going to talk to us on the specific use of the accident data in statistical reports in solving some of our traffic problems. This gentleman has an international reputation as consulting traffic engineer in New York City, and it is my pleasure to call on Mr. Ernest P. Goodrich.

ERNEST P. GOODRICH (Consulting Traffic Engineer, New York City): In preface to what I am going to say, I have had the assistance of many of the members of the Special Traffic Engineers Committee set up by the National Council and they are assisting at the present moment in placing some of the information on the blackboard and in showing some diagrams which, however, you may not be able to see from where you sit but will be able to examine after the meeting perhaps.

The title of this discussion I think is very aptly stated. Up to the present time they have been measures which made it only possible to deduce results by means of clues. It seems, however, that it would be possible so to design traffic accident reporting forms and methods as to make possible a very much better use of that information than has thus far been secured.

Accident Records as Clues to Traffic Troubles

By ERNEST P. GOODRICH
Consulting Traffic Engineer, New York City

Two points of view are evident in considering the subject of accident records as basic data in traffic engineering. The first is to assume that the data are available in all cases as called for on the standard accident record card developed by the National Safety Council. The other point of view is to make a study of the elements of traffic engineering which involve possibilities of traffic accidents and to secure adequate record data of each accident covering the items thus indicated.

An analysis of accident records indicates three general subdivisions, as follows:

1. Deficiencies in the personnel involved.
2. Deficient education of the public.

3. Defects in city and traffic planning.

The personnel obviously include the vehicle driver on one hand and the victims on the other. The driver may have physical, mental, or moral defects. He may be driving negligently in an inexperienced manner, contrary to law, and operating a defective machine. None of these conditions seems to involve traffic engineering. The victim may be on foot or in another machine. If in the latter situation, the accident may sometimes bring the driver of that vehicle into the picture, because a skilled driver can often avert an accident with a car operated by a negligent or inefficient operator.

If the victim is on foot his category may be that of an adult or a child. If an adult, he may be making use of the highways in a negligent or unlawful manner. If the victim is a child, the accident may be due to ignorance; i.e., lack of education, or be indirectly caused by some such civic deficiency as lack of playground space, improper school location, or lack of proper traffic control either by officer, sign, or signal. Even in the case of the pedestrian, an accident is occasionally indirectly due to poor planning, in that roadway crossings are not properly located or marked so that the vehicle operator has a knowledge of their existence. Except as to the latter four categories, city and traffic planning does not enter the picture.

The education of the riding public is again hardly a matter of traffic engineering, except in so far as it is much easier to educate the public to move in accordance with simple, clearly indicated routes than where they are not sufficiently numerous, or well marked, or properly controlled.

Traffic planning involves city planning in such an intimate manner that these two slightly different phases of the engineering problem have been coupled in this discussion. In addition, certain problems of automotive engineering, such as braking distance and acceleration, come in for consideration. The principal elements of planning both city and traffic include:

1. The use of signs, signals and markings.
2. Vision obstruction, (a) due to local parking regulations, (b) due to the presence of fixed physical obstructions.
3. Intersection design.
4. Pavement design.
5. Topographic conditions.

An accident may be caused by inadequate or defective signs, signals or markings. It may be caused through lack of visibility due to parked cars, to shrubs, trees, fences, walls, or buildings located too close to a corner. It may be due primarily to cramped intersection design, or to pavements with too great a crown, or a slippery or otherwise defective surface. Finally, it may be due to peculiar topographic conditions, such as intersections at the foot of a steep hill, or halfway up it.

All of these matters are taken into consideration by experienced traffic and city planning engineers, but even after a plan has been made by an expert it may be found that some element has been overlooked. Unhappily, the only method of discovering such a situation is through accident experience, and the only source of information is a complete accident record.

The system advocated by the National Safety Council has been found to cover these requirements in a fairly satisfactory manner where accidents occur at the intersections, because then they can be adequately located. The system is, however, deficient for accidents which occur between intersections, and additional data should be required to give the precise location. This can be done either by measuring the distance from the site of the accident to the nearest intersection, or to some prominent physical point. Obviously, if a house with a number exists in the vicinity, it conforms to the latter requirement. So far as the accident record card is involved, it is believed that it includes practically all the data (except as to location between intersections) which can be adequately covered by the usual police officer. These data, however, need to be supplemented by further investigation at the hands of experts.

An accident investigating squad is, therefore, shown to be desirable. The best procedure thus far developed, to be carried out by the members of such a squad, is the preparation of collision diagrams after detailed location investigation.

The greatest difficulty encountered by the writer in traffic and city planning based upon accident data is a real dearth of the latter in most instances. Not all cities have yet installed the system of accident records advocated by the National Safety Council, and only one or two cities have followed this by the creation of an accident investigating squad. In some instances, the only data available are in the file of complaints made by citizens and addressed to the police department, the mayor, and/or other city officials. Data available from such complaints are usually too meagre to be of real value. Nevertheless, it has been found possible to discover the probable cause of an accident, even when the complaints have not given accurate information as to the site at which the accident occurred. An extended analysis of even the meagre data which have been available in the past has shown that every phase of traffic and street planning has, at one time or another, been the probable cause of an accident. A few examples may be of interest.

A considerable number of accidents occurred at two intersections of a main thoroughfare on a steep hill. One of these intersections was about half way up the hill, and the other was just at the bottom. Had this main thoroughfare been designed with a less steep gradient, more nearly parallel to the contours, these two difficulties could have been obviated. Even with the installation of traffic lights, accidents continued to occur, because of too high speed and the operation of vehicles with defective brakes.

A number of accidents occurred at one intersection in the suburbs of a large New England city, where the property owners had planted high shrubs, and in some instances built high walls out on square corners of the properties. In a Middle Western city a hedge in one instance, and a "For Sale" sign on a vacant lot in another case, were shown to be the indirect cause of accidents. The removal of these obstructions to vision, or, even better, an enlargement of the intersection by a major rounding of the corners, could have obviated the difficulty. Improper location of signs and signals so as to be hidden by parked vehicles, shrubs, or tree branches, has also caused the writer much annoyance during his motoring experience. In many of the smaller communities the location of catch basins on small radius curbed corners has created a pavement crown at that point which has been the indirect cause of accidents. The removal of the catch basins from the curb corners would obviously eliminate this difficulty. In Washington a considerable number of accidents was traced to the existence of short radius curb corners which were so small that right turning traffic was forced to move over onto the lanes normally occupied by traffic moving in the opposite direction, either before or after making the turn. An increase in the curb radius cured this difficulty. Occasionally, an extremely smooth pavement surface creates an optical delusion, which has been a great cause of accidents. One such case existed in Detroit until it was removed. The installation and maintenance of plainly marked centerlines over the tops of hills has been shown to be so effective in reducing accidents, and is now so universally accepted, that its mention is almost trite. The same applies to sharp curves where vision is in any way obstructed. The painting of such curved centerlines in one of the parks in Cincinnati immediately eliminated a continued series of accidents which had been occurring theretofore.

Analysis of the distribution of the incidence of accidents by hour of the day in different parts of the country, compared with the relative amount of traffic in New York City from hour to hour (being the only data available) shows an increasing number of accidents per unit of traffic with the time of day, starting at nine o'clock in the morning and increasing with a surprising uniformity through to ten o'clock at night. This shows that accident incidence increases both with density of traffic and with deficient illumination. The index numbers are as follows:

7	a.m.	80	4	p.m.	70
8	"	37	5	"	86
9	"	32	6	"	83
10	"	36	7	"	90
11	"	39	8	"	99
12	noon	43	9	"	100
1	p.m.	46	10	"	126
2	"	52	11	"	108
3	"	57	12	midnight	100

Similar data compiled from Connecticut accident figures show similar trends, except that the accident incidence per unit of traffic is sporadically highest for the day between six and seven a. m., falling to 35 per cent between seven and eight a. m., and again falling to the minimum between eight and nine a.m. This probably shows a lack of illumination during the early morning hours.

Some years ago in San Francisco numerous fatal accidents happened to persons while standing in a safety zone, according to the coroner's records. Upon examination it was found that the zones were not adequately lighted. After the traffic engineer had designed a new lighting scheme which was installed throughout the city, the death record was reduced to "no deaths" in safety zones during the succeeding year.

Acute angle corners have been shown in some instances to be the cause of accidents which were much reduced by a considerable enlargement of the corner radius, the installation of reflectors, warning signs, and street lighting. Accidents due to speeding have been controlled by the installation of signals of the "through street" type timed progressively and set for a moderate speed. Alternate black and white striping of poles which were formerly causes of accidents remedied this difficulty.

Other accident data derived in part from Cleveland show that an improvement in street lighting reduces traffic accidents.

Twenty years ago, when the writer first gathered New York City accident statistics on a spot map, it was shown conclusively that the islands of safety which then existed at Fifth Avenue and 23rd Street, and Fifth Avenue and 42nd Street, had been the cause of numerous accidents. Later, when these islands were removed, the accidents were reduced. A blinker light at an intersection of a lateral thoroughfare where it met an avenue about half-way up a long hill in a Midwestern city had to be rebuilt about once every three months. It was originally installed at the center of the intersection. A location on the center line of the lateral thoroughfare where it intersected the street line of the main thoroughfare would have saved this cost, to say nothing of the damage it caused. Accident records reported in the August number of *Public Safety* showed a material drop in the accident experience after the installation of Stop and Go signals at the intersection of Hinman avenue and Main street in a certain city.

On the other hand, certain Massachusetts data and the example cited in the October issue of *Public Safety* seem to indicate that signals (at least as installed) sometimes are the cause of accidents. The July number of the same publication reports a distinct reduction in accidents at the intersection of Keeney Street and Sheridan Road by the segregation of those vehicles which desired to make a right turn from those which desired to proceed straight ahead on one thoroughfare, by the use of pavement markings and mushrooms.

Analysis of the Connecticut experience of accidents by months shows an increase from January through August, with a decrease thereafter. The relationship is such that the accidents seem to vary as the square of the gasoline consumption or mileage. From year to year the annual Connecticut reports show a slight decrease on the basis of the number of accidents per million gallons consumed.

In Fresno, California, according to the *Engineering News-Record* of July 24, 1930, the installation of 190 home-made "illuminated arterial stop signs" has "shown excellent results in decreasing the number of traffic accidents at intersections."

The accurate location of accidents is important, because it was shown in one Western city that the usual method of designating an intersection as the site of an accident would have misled the investigators because on that intersection one accident was due to a jaywalker about 100 feet from a corner, another was due to a parked car close to a corner, while a third was due to a sudden decision to make a left turn, probably without hand signalling. The installation of a Stop and Go signal at that intersection, as would be the normal practice, is thus seen to be an unnecessary expense as far as these several accidents were concerned, because they would have been as likely to occur with a signal as without one. Runaway cars are the occasional cause of accidents. These are largely due to carelessness on the part of the operator, but it is equally obvious that they can usually occur only on fairly steep grades. The only known method of obviating this difficulty is maintenance of an exceedingly rough pavement, or one with diagonal ridges.

One series of accident records showed that many occurred where alleys intersected main thoroughfares. These were traced to the high speed at which delivery wagons made their exits from the alleys. "Stop" signs installed at the alley exits eliminated these accidents.

Starting approximately fifteen years ago, many cities have installed regulations prohibiting left turns or all turns. While these regulations have usually been promulgated for the expediting of traffic, it has been found that they have, at the same time, diminished accidents to some extent. A few accident reports show that pedestrians have been struck by left turning vehicles. The universal prohibition of such turns is only possible by the abandonment of the present system of traffic regulation, and the adoption of universal one-way streets, with all street crossing by vehicles eliminated, or by the redesign of all main thoroughfares so as to permit only what has lately come to be known as "steadyflow" type of operation. The next two decades may bring something like this to pass.

In connection with the analysis of accident records, it is practically essential to have available a rather large scale fully detailed map of the city streets. These maps should contain the following data: roadway widths, pavement cross-sections, pavement grades, character of pavements, temporary pavement openings, signs, signals and markings, safety zones, trees, walks, curbs, catch basins, manhole covers, buildings, and other objects which form corner obstructions, lamp posts, poles, and fire hydrants. With such maps and full accident records, it is often possible to analyze the cause of an accident without going to the site. On the other hand, many types of accidents occur for the analysis of which local investigations and the preparation of collision diagrams are essential.

Even proper maps and accident records will simply go to the files and be lost unless some machinery is set up to make use of the data secured. Pittsburgh has an accident analyst, and Philadelphia has an accident engineer. This procedure should be followed in other cities.

These few examples are to be considered only as typical of what might be accomplished were accident statistics more comprehensively studied and better application made of the results of such study toward the elimination of defects in city and traffic plans.

L. R. BROWN (New York State Railways, Rochester, N. Y.): There are two questions that I would like to ask which were brought to my mind by Mr. Goodrich's remarks. One is concerning the relationship of gasoline consumption to accidents. The other is concerning the boulevard stop signs. In Rochester they are not extending the boulevard stop sign because it is impossible to enforce it. I wonder what, in the experience of those present, is the proper method of enforcing boulevard stops.

MR. GOODRICH: To answer your first question, the consumption of gasoline is used only as a measure of mileage. It is the only measure we can get of the total number of miles operated by the cars and it is used only to get some kind of an idea of the relationship between car mileage and accidents.

As to the enforcement of stop signs, in this city to which I referred the chief of police made a visit to Washington some few months before and he backed me in my statement before the city council with this episode.

He spent one hour one afternoon at a certain intersection to watch the observance of the public with reference to one of these stop signs. He didn't find one infractor of that boulevard stop sign that day. He thought that an interesting phenomenon so he came back the next day and again for a whole hour the next day nobody went by the sign without stopping. That interested him so much that he went back the third day and while sitting there a traffic officer came along. He introduced himself and asked how it happened that in Washington these stop signs were obeyed so religiously.

The traffic officer said, "I'll tell you. When we decided to install the signs we published the location in the paper about a week before they were installed. Then they appointed 400 special traffic officers to bring in all those who disobeyed the law and a substantial fine was to be invoked. The first day we brought in about 1,000. The second day it dropped to about 400. Of course the facts were published in the paper of all infractions of that law. The third day it dropped to about 200, and after about a week we took off our officers."

MR. HAASE (Board of Estimate and Taxation, Minneapolis, Minn.): I would like to ask Mr. Goodrich the effect of stop signs on the accident incidence of pedestrians, particularly.

MR. GOODRICH: In quite a number of cities, the installation of stop signs has been found to directly reduce the accident hazard. In one instance, a sign was installed near a school and the word "School" placed in connection with the stop sign. Perhaps that was an added incentive to the vehicle operator to stop, but that was a very definite instance of protection given to that type of pedestrian at least.

C. J. LYONS (Accident Analyst, Pittsburgh): A signal interspersed every three or four blocks on a through street will serve to break up the flow of traffic and permit the pedestrian to cross, and that will tend to reduce the accident incidence.

R. W. MEADE (Peoples Motorbus Company of St. Louis, St. Louis): It seems to me that the use of a mandatory sign with the word "School" on it is a very bad thing because schools are in session only certain periods and certain days of the week; the average motorist disregards the sign at other times. In St. Louis they have very wisely changed those signs to a warning that schools are in session at certain periods and to drive carefully.

MR. BROWN: In Rochester we have tried out the system of having a fixed post on which the janitor or safety patrol inserts a marker that school is in session, and then when the children are not there it is taken out so that the motorist can keep on going.

MR. DENISON (Minneapolis, Minn.): I would like to ask Mr. Goodrich if, on certain streets not classed as through streets, he would advocate posting a slow sign.

MR. GOODRICH: The Committee of the American Engineering Council which made a report on signs, signals and marking, suggested the creation of a large number of slow signs. Some members of the Committee felt, however, that slow didn't have a definite meaning, that people would see the sign, look around, and keep on going just the same; that it was very much harder to enforce compliance with a slow sign than a stop sign.

I personally believe that many of the stop signs installed in places where I have driven should have been slow signs instead. A study, however, should be made of each intersection. There is no universal rule. It is unfortunate that it takes the accidents to bring about this kind of a study.

ALEX K. GAGE (Assistant Prosecuting Attorney, Wayne County, Detroit): Attorney-General Brucker of Michigan passed a decision that cars on the through street, the street against which the stop streets are given signals, has a right to proceed and the car on the stop street must wait until the crossing is clear. Now it may happen, and very frequently does happen, that a car coming to the through street, in obedience to the sign, stops, and the traffic on the through street keeps going and going and going and it has to wait a very long time. The question is, when is he permitted to go across, having stopped. The attorney-general says he must wait until the way is safe for him to cross.

I would like very much to hear Mr. Goodrich express his opinion as to what is the right way to handle that situation. For myself, I think that the man who is trying to get across has some right.

MR. GOODRICH: I am going to ask Mr. Gage, and all of you, to come tomorrow morning at eight-thirty and sit in at our traffic school when this particular question is to be answered. We are going to have an interesting discussion on traffic signals, and some new ideas are going to be developed.

CHAIRMAN SCHOFIELD: I personally think that the hopeful thing in this country from a traffic point of view is the growing tendency of having these problems dealt with by scientific men, men of your type, men of your standing, men of your calling, instead of the haphazard way in which it has been attempted by police departments.

ADJOURNMENT

child protection. We have something over a hundred of them in Detroit; we find they have some definite disadvantages. In the first place many of them are pretty well along in years, unable to stand up under the physical requirements of getting out in the street in inclement weather and handling traffic. Many are not sufficiently alert physically or mentally to be able to direct traffic on the streets where it is heavy. There is constant complaint from the Engineering Department of the Board of Education that where the janitor is taken from the school there is neglect in the maintenance and operation of the building itself.

I would like to bring to your attention a special instance tried out in Detroit which has, I think, considerable merit. That is the appointment of special motorcycle policemen for school child traffic protection.

A motorcycle officer was assigned to a district in the city of Detroit where it was found that accidents to children of school age were very, very numerous. He was sent out on his motorcycle and told to cruise around the neighborhood for a week or ten days, just to observe the play habits of the children in that vicinity, with a view to determining if possible what factors were causing this high accident rate. The officer had a personality well-adapted to that sort of task. After reporting his observations to Headquarters, he was sent out again to endeavor to correct them. The greatest trouble came from large groups of children playing in the street or crossing between intersections. He made it a point to approach these children and his personality immediately engaged their attention. After discussing generalities for a while he would branch into a little safety talk, and suggest that a nearby vacant lot might be more practical place to carry on their ball game from the safety standpoint. Sometimes he cooperated with the recreational department and had backstops put on some vacant lots, so that they could play better there than in the street.

The work went on for several months. While there is no absolute record, we know from the tendency of the accidents that there has been a reduction.

I believe that the time may come if our traffic problem continues to increase, when we will have definitely assigned officers in our police department who patrol the streets particularly in the more congested areas; not to drive the children off the streets, but to bring them the safety message, selling them the idea of doing the things safest for their lives.

I wonder how many cities endeavor to establish definite routes for children to travel to and from school. Too often, I think, we find we set up a very nice system of school boy patrols, police officers, semaphores, janitors, at certain intersections near the school, and make no effort to insist that the children use the prescribed route, which will necessitate availing themselves of this protection.

I believe that every principal should locate on some sort of map covering the district in which the school is located, the home of every child, and lay out a definite route for him to go to and from school. The question has recently come up in Detroit as to whether the school has the power to require the child to go to and from school by a predetermined route selected by the principal. We have had some parents who insisted that their Willy or Johnny cross at some intersection not provided with child protection. We have required that a note from the parent be sent to the principal stating that permission is requested for the child to cross there, where no patrol is placed.

Possibly in another few months we will have something definite to report along that line. In the informal report from the corporation counsel, he stated that he felt it within the province of the school to definitely state the route a child should take.

I would like to discuss protective devices. The first thing we think of in this connection is traffic signals. We have in Detroit as in many other cities, traffic signals intended for the regulation of vehicular and pedestrian traffic. We insist that our Detroit school children observe the lights and pass only on the green. We teach

them to do this in school and try to carry out the teaching in the actual movement of the children to and from school.

We have, in addition to the full time traffic signals intended primarily for vehicular movement, certain signals in operation only during the hours when children are passing to and from school. They are controlled automatically by a timing device. We do not receive complaints from motorists that the signals are in operation from twelve to eighteen hours a day, of no use to a large group of the public during many hours of the day, except to act as a general obstruction to the flow of traffic. More and more in our schools we are going to have to resort to part time operated signals, in use only during the times when the school children are passing to and from school and where vehicular traffic does not warrant full time use.

There have been experiments carried on in various sections of the country with pedestrian operated signals. We had one in Detroit which I believe is still in operation; I have not a great deal to say about it; it has not been a whirlwind success by any means. There is a tendency for children to tamper with it constantly, unless you have a highly organized safety group on duty. I do not wish to say they are useless; they have a place under certain circumstances and they may serve a definite utility. It is something for you to think about.

About pedestrian tunnels. In Detroit they have been a rather mooted question. I presume Mr. Lefferts will be ready to smite me, but we do not believe they are the solution of the school child traffic problem in Detroit. We have had one in operation for several years. I do not wish to deny the fact that it furnishes perfect protection to those who use it. There is the difficulty of enforcing its use when located at a distance of two, three or four blocks away from the school. Patrols cannot always keep the situation well in hand. Unquestionably when its use can be enforced it does furnish perfect protection for children crossing that intersection. We have had other difficulties, numerous reports of nuisances and incidents occurring at night when people have been approached in the tunnel by rather suspicious looking people, and as a result people have hesitated to use it during the evening hours.

In fact, in our case, very few adults use it in any case, at any time of the day, and of course it furnishes no benefit to vehicular traffic.

A short time ago at one of the large groups of schools in which we have a high, intermediate and elementary school located on the same grounds, a problem came up of extending a street through one end of the school grounds. At the time this possible extension was brought up it was suggested that two pedestrian tunnels be incorporated as part of the construction program. The matter was referred to the board of education for the purpose of determining whether or not tunnels would be advisable in this instance.

By laying out a plot of pupil home locations on a map of that region we could determine the number of children who would be required to cross every intersection on their way to and from school, and to determine which places were most in need of protection on the basis of the number of pupils required to use that corner.

After considering the whole matter very carefully we made the recommendation that rather than having the two tunnels at the locations proposed we felt it would be far better to install traffic semaphores at the eighteen locations around the school, some of which would be part time operated depending on vehicular traffic needs, and all of which would be done for the cost of the tunnels, furnishing protection in all directions, rather than to a relatively small group that would cross one street.

We still believe tunnels are a perfect means of protection if you can provide enough of them to do the job throughout. I agree that traffic semaphores do not provide as adequate protection as the tunnels, but dollar for dollar I believe you are getting far more value from automatic signals than from tunnels.

Of course if money is no consideration let us have the tunnels at all these intersections. But let us consider the problem of directing vehicular traffic, also. Semaphores

not only protect school children, but they regulate the movement of traffic in these rather congested areas.

That is the situation as we view it in Detroit. We have also conducted another investigation in the direction of what we call "Stop Intersections"; vehicles entering from any direction are required to come to a complete stop before proceeding across the intersection. In many cases, neither street involved is a stop street, yet the volume of traffic at that intersection is considered heavy enough to make it a stop intersection. These stop intersections prevent many accidents to school children.

We also thought it might be advisable to create a temporary stop intersection to be used during the period when the children would be coming to and from school. We have devised signs erected on standards, with a disc twelve or fourteen inches, with "Stop—School Crossing" printed on them. The standards rest in heavy concrete bases which are rolled out in the street during the time when they should be in use. They are supposed to be rolled back when not needed. The difficulty we have found with this particular type of sign is the fact that when it is on the Parkway it is still visible to the motorist; he does not know whether or not to stop; hence there is a tendency to disregard the sign at all times. If we were able to take this sign into the school when out of use, this might work to better advantage. We are now trying to devise means of erecting a sign which is more readily portable (that might be carried to the school by the janitor when not in use) which can be set up in a hole or socket in the street.

As for school zones in use in many cities, we do not use them in Detroit. We have signs or markers, near our schools warning motorists that a school is near at hand, but no ordinance providing for reduced speed past the school grounds.

As to street play areas, a number of years ago we had a number of streets blocked off from traffic and signs placed at each end of the block barring vehicular traffic. Before very long we found that these areas were disappearing rather rapidly. In many instances the permits that had been granted for streets to be used for play purposes were being revoked due to complaints of people living in the block, that they were unable to park their cars, and that children were running up on the lawns, making noise, etc. The theory was also expressed that it was rather bad psychology to train the child that the street was a safe place in which to play; that there would be times when the child would be in other blocks and would run out to play in the street from habit.

CHAIRMAN DENNIS: Mr. Graham has brought us an interesting story. We have looked to Detroit for a good many things besides cars.

I now take pleasure in introducing a man who is going to speak of what is being done in Pittsburgh, Mr. R. M. Sherrard, Assistant Superintendent of Schools, Pittsburgh. He promoted the school boy patrol for a number of years; he knows its limitations and possibilities. I am sure he has an interesting message this afternoon when he speaks on the topic of the school boy patrol, in relation to the education scheme.

Relation of the School Boy Patrol to the Educational Scheme

By R. M. SHERRARD
Assistant Superintendent of Schools, Pittsburgh, Pa.

It is not our purpose this afternoon to discuss the operation of our school boy patrols as much as I feel it is to discuss what they are doing for these girls and boys, from the educational point of view.

I made an inquiry at our last meeting of the school principals in order that I might not make any mistake as to the places where people might visit this week. Instead of saying, "Please send word how many of you have school boy patrols in your schools," I asked, "How many do not have the patrols." I received three replies, from the smaller buildings.

We have a pretty widely extended patrol system in Pittsburgh. We do not patrol the streets; our work is done on the platoon system; the guarding is done from the curb. The patrols are under the control of the Junior Safety Council, and in the high schools through the Student Council.

Now, I would like to go over into the educational side. Some five years ago in Cleveland, I said that we as teachers would feel that we had failed in meeting our full responsibility if we stopped, in dealing with boys and girls, with mere book learning; if we did not try, by precept and example to enrich the lives of these boys and girls and do something that would make them better prepared for life situations.

So it seems to me, my friends, that extra-curricular activities such as thrift, Junior Red Cross, Clean-up Campaigns come in with this grand work of safety. What is the use of educating our young people if they do not live to an age where they can make some use of this education? So these extra-curricular activities show a definite relation between education on the one hand and conduct and behavior on the other. We may put in some real work at arithmetic, be accurate at figures, but you know many a knave can be skillful at figures; the same may be true in spelling, in English; but when we get down to the fact of giving instruction in safety and then develop the Junior Safety Council and the Safety Patrol we have immediately translated that instruction into action, into the doing of the thing, and after all is not that fitting into a life situation? So a course of study in character training must be full of actual life situations, training for good citizenship, recognizing the rights of others and the willingness to accept responsibility.

It is true that the regular classroom situations are not broad enough to cover all our school problems. I suppose the main purpose of the Safety Patrol is to promote individual school and community safety, so let me give you briefly some cross-sections of our school life, brought to me by some of the elementary school principals in our city, those people most intimately connected with the development of life situations into which we put these children, those people who bring and direct instruction to these boys and girls, because we have boys and girls directing the inside activities of our schools.

Larimer School

One of the most effective methods of safety education is through the Safety Patrol. Here our boys can be trained effectively to take care of themselves and of each other. The enthusiasm of youth for reforming the world is proverbial. If this patrol is guided by a wise teacher, she will seek to find opportunities for the carrying over of the ideal which is conceived in actual practice.

If we admire initiative as developed by the leading citizens of our country, should we not give our boys the opportunity to develop this power by placing them in situations in which they naturally find themselves, one in which they can make themselves active, influential members of their group? As a member of the Safety Patrol, it seems to me the boy has this opportunity.

Greenfield School

Our Safety Council with its individual class organization and patrols is meeting a need in the elementary school. We see it clearly in our school. Pupils from fifth to eighth grade are especially responsive to organization. They are eager to be chosen for service. The wearing of the arm band by the patrols marks them as responsible for their specific duties. The band adds dignity to the office and

helps to make it a coveted honor. Last year an over-age colored boy who was something of a problem and who showed little interest in school work went to our Safety Counselor and pointing to the arm band said, "What do you have to do to wear one of those green badges?" A desire to be chosen had awakened for the first time in this boy. We have more than one boy whose attitude has changed for the better because he has been selected to serve as a patrol. This is equally true of some of our girls.

Friendship School

The 8A class is organized as a student body, and each class, from the fifth grade up, appoints a representative who meets with the student body at stated times to discuss questions of interest to the school. By taking a responsible part daily in the work of the school they have a chance to develop such characteristics as honor, reliability, dependability, initiative, obedience, and a high sense of their obligations to self, others, school, home and community.

The pupils render valuable service in their safety efforts. A good leader will soon find that he must consider others, and obey the rules laid down for all, if he expects others to respect him and to follow his instructions.

Fulton School

Outside the regular classroom procedures we find a multitude of situations that lie close to the life of the child as the regular work of the classroom. If these situations lie close to the extra school life of the child, we should develop the right forms of action in these situations. We are finding that extra-curricular activities are indispensable in the development of character training and in a program of character education.

We see the educational value of a Safety Patrol in our school as opportunities for the development of responsibility, courtesy, kindliness and consideration for the welfare and safety of fellow pupils, leadership and trustworthiness, obedience to traffic rules and respect for fellow students who are honored by appointment to the Safety Patrol.

We can only evaluate this unit of the extra-curricular activities as we know how it plays its part in the school. A Safety Patrol that knows it is achieving results through its efforts learns better and is gradually setting a standard for itself of learning and good behavior, and at the same time acquiring habits of Safety, which is one of the realities of life.

Lemington School

Educational growth comes best through self activity in typical life situations; so one important duty of the elementary school is to provide opportunities for children to form desirable civic habits and attitudes through active participation in the life of the school.

During the elementary period of their development, they are particularly receptive to learning about civic duties and responsibilities. They respond readily and are eager to cooperate in working out problems that concern their own interests.

The School Patrol and Safety Clubs are among our best agencies for giving children practice in performing their civic duties.

You may think that this speech is coming mostly from our principals; well, that is partly true. I want you to get the close touch, the reaction, because you know the best way to sober up a radical is to give him responsibility. We have had some of our principals say that the best students do not always make the best patrol squad; often it is the energy that seems to be going wrong, which when directed rightly that makes the best leaders. So another principal said:

Dilworth School

This problem may be considered in a two-fold manner:

First—The Relationship of the Safety Patrol to the Education of the individual participating in patrol duty.

Second—The Relationship of the Safety Patrol to the Education of the group of children in the school.

In considering the value of patrol service to the individual member of the patrol, there is no doubt that he becomes a better member of his school and community for:

(1) Patrol service often develops a boy's latent powers of initiative, responsibility and leadership.

(2) Due to his position of trust and respect, he becomes careful of his own conduct so that he may be a good example for others to follow.

(3) It stimulates in him a spirit of willing service and helpfulness towards others.

(4) He becomes alert in discovering dangers that may cause accidents in the school, on the playground, and on the streets.

(5) Through his own thinking and experience, a patrol leader learns how to act under varying circumstances in times of danger; and

(6) Judgment and justice are developed in controlling traffic situations and playground regulations.

In considering the second phase of the topic, the Educational Value of the Safety Patrol to the other members of the school, the following advantages are evident:

(1) Cooperation and improvement of school spirit as a result of pupil participation in the activity of the school.

(2) Through the Safety Patrol, the Safety Council of the School and principal are kept informed concerning hazards in the community.

(3) Members of the Safety Patrol teach children to refrain from rough play on the playground and on the street.

(4) The Safety Patrol aids during fire drills and participates in special safety programs.

(5) Respect for leadership of Patrol Leaders who have shown qualities that have given them their position; and

(6) To become a Safety Patrol member is a goal toward which many of the younger children aim.

Now it seems to me, my friends, that this gives us a pretty good cross-section of what we think the influence of this safety movement is upon the children themselves.

As an example of the work in the schools, I went to one of our schools not long ago, and in the third grade they had a lesson on this safety work. The subject was "The Traffic Officer." The first question was, "What is his name?" The children gave his name, I think it was George Nafe.

Then they developed "What about him out there?" They said "Well, he stands in the middle of the street." They had key words; they put down the word "middle."

"What does he do?"

"Watches as we come from home." They put down "home."

"He directs us." They put down "directs."

They used "traffic" and "children" and then came what seems to me the best part of that lesson; they swung over to the ethical side. Some child said, "He is our friend." They put down "friend."

"We must obey his signal." They put down "signal." They put down "obey." Then they made up a sentence.

I have seen the children come up to the officer as he stood in the middle of the street; they grasp his hand; they say "good morning" and "good afternoon." All right, that is what he is there for. Don't you see the swing, when they said "He is our friend—we must obey his signal?" There is the biggest lesson coming through the teaching in our schools.

We have in our schools, we get them every month, units of safety instruction, prepared not so much from any direction of ours, although they bear our address, but prepared under the direction of the Cleveland Safety Council, with different colors for the different divisions of the schools. We have just made the distribution for October. The subject in each is "Fire Prevention." While we don't have any regular course in this safety work, we keep handing out to principals and teachers all the fresh information we can get on this great subject of safety, because I don't care what your extra-curricular activity is, it requires artificial stimulation to keep up the proper interest; that is what we are trying to do

Then I want to bring to your attention the Safety Education Magazine. We put copies of this into the schools in Pittsburgh every month, making a distribution of one to each three teachers. If you just have this one magazine you have enough material for your teachers each month on the different phases of safety work. Here is a whole column "Little Lessons in Safety." There are other stories of ethical as well as practical value. I want to commend this magazine, Safety Education, to you all.

I hold in my hand now a constitution and some by-laws and a pledge under which we organize our Safety Councils, out of which the Safety Patrol comes. There are a large number of leaflets issued like this one, having on the back the Safety Pledge. I want you to notice that we think a lot of this pledge; there is only one negative in it. We have active cooperation from the Better Traffic Committee in Pittsburgh. Just now they are having an essay contest; they sent us a pledge, but it concerned traffic immediately and contained a lot of "I will not" clauses. This is the pledge each of the children learns before becoming an active member of the Safety Council:

Safety Pledge

1. I will work for the safety of others, as I would want them to work for my safety.
2. I will not take unnecessary chances, for in doing so, I may lead into danger a younger child who is not so well able to take care of himself as I am.
3. I will do my part to reduce the number of accidents in this city this year.
4. I will try to take care of my health and to be clean in thought, word and deed.
5. I will try to do right at all times telling the truth, and respecting the rights of others.
6. All this I will do for the sake of humanity and honor of my school.

Every child that gets a safety button has learned that pledge, from the fifth through the twelfth grade. It is the foundation of our work. We have a mass meeting in May, to which we invite two thousand children. It is held at one of the theatres here. Through the courtesy of the railway company we are furnished with a round trip ticket for each child. We have the Mayor or his representative, members of the Board of Education, some one who can speak to these children, and then a moving picture on some phase of safety work. Then we give gold medals to every boy and girl who has been instrumental in saving a life, or preventing a serious accident during the year.

Last May we gave out twenty-nine medals to these boys and girls of the Pittsburgh schools, for work done during the year, work of outstanding courage and heroism.

Let me summarize what I have been trying to say:

Safety Patrols: First, to translate safety instruction into conduct or habits; second to stimulate interest; third, to promote civic pride, and fourth, encourage a spirit of helpfulness and cooperation; fifth, interpret and enforce rules and regulations: sixth, protect the lives of children and seventh, to develop in members initiative, promptness, regularity, alertness, reliability, responsibility, honor, loyalty, good citizenship and morality of the highest type.

Now, why are we interested in this? Let me quote this from Daniel Webster:

"If we work upon marble, it will perish; if we work upon brass, time will efface it; if we rear temples, they will crumble into dust; but if we work upon immortal minds, if we imbue them with principles, with a just fear of God and a love of our fellow-man, we engrave upon those tablets something that will brighten them to all eternity."

CHAIRMAN DENNIS: I am sure, if we needed any convincing, we would be convinced by this talk that the public schools of America are committed in a very definite way to the safety program in the public schools.

I think it is a fine thing to look at these topics we are discussing this afternoon through the eyes of persons of different capacities as far as responsibility is concerned. We are not approaching them solely through the eyes of safety engineers and men in administrative posts in our public school systems.

The next speaker will discuss the same topic from a different angle. He is the Safety Director of the American Automobile Association, in Washington. He will speak on the operation of these school boy patrols. I am very pleased to introduce Mr. Howard M. Starling!

Operation of the School Boy Patrol

By HOWARD M. STARLING
Safety Director, American Automobile Association, Washington, D. C.

During the past ten or twelve years, one question which has been uppermost in the minds of those interested in school boy patrol work is "How should the patrols operate to be most effective?"

That school boy patrols have been effective in the reduction of accidents has been proved by a comparison of statistics in many cities where the patrols have operated over a number of years. Among those cities are Chicago, Cleveland, Detroit, Cincinnati, Washington and Philadelphia. Time will not permit going into detail regarding statistics, but "Accident Facts" published by the National Safety Council contains many elaborate presentations of comparative statistics in which you will be interested.

Ten years of effort on the part of the national organization of motor clubs encouraging and directing the safety work of its local affiliated clubs, brought forth the realization that there was no uniformity of patrol operation. It has been our belief that school boy patrol operation should be uniform throughout the country—just as much so as traffic regulations.

Early in 1930, President Henry of the A. A. A. invited representatives of the National Safety Council, the National Congress of Parents & Teachers, and the National Education Association, to participate in a conference, the ultimate object of which was to produce a standard set of rules and regulations for the operation of school boy patrols.

Committees were appointed by the national bodies, and after prolonged deliberations, a code was adopted by the A. A. A. and the National Safety Council, which it is hoped will serve as the official guide of all organizations sponsoring school boy patrols. Pamphlets containing "Standard Rules for the Operation of School

Boy Patrols", may be obtained from either the National Safety Council, the A. A. A. or the local affiliation of either organization.

In addressing you on "How School Boy Patrols Operate", I cannot say that all patrols in the country operate in this way, but it is the earnest desire of the association which I represent, that our motor clubs will bring into conformity the operation of patrols in the 1,000 cities, towns and villages in which they are now sponsoring patrols, and I know that the National Safety Council likewise is urging adherence to the standard rules.

(Mr. Starling here presented the Standard Rules.)

It must be borne in mind that school boy patrols are organized for two specific purposes: the major one is that of guiding school children in traffic and the minor one is that of providing orderly dismissal of children from school. Since neither of the primary purposes of the patrol system is to direct traffic, it is obvious that patrols should not be charged with the responsibility of directing traffic, as this position demands more responsibility and judgment than can usually be found in children from twelve to fourteen years of age, and also there is considerable doubt as to the legality of delegating police power to children.

As all pedestrians have certain rights while out on the highway, children as pedestrians have such rights, and a group of school children crossing the street under the supervision of a school boy patrol are simply exercising their rights as juvenile pedestrians. To require motorists to slow down while approaching patrols at designated points is less inconvenient to the motorists than to require them to slow down for scattered groups of children crossing the streets at various places.

In some cases patrols may be limited to keeping children on the sidewalk—it may not be necessary for them to cross a heavy traffic street. Perhaps they will be kept in a group for only a few city blocks, and yet again, in outlying sections they may travel a mile or more.

The responsibility in the second case is to keep the children in a group, and in the absence of sidewalks to require them to use the left side of the road facing oncoming traffic.

Since our cities cannot, financially, be supplied with a sufficient number of policemen to be able to detail an officer to each and every schoolhouse, it will be necessary to train older children to be patrol leaders. But in crowded sections and on heavily traveled streets where the flow of traffic is constant the patrolman from the beat or a motorcycle officer should have a fixed post at school dismissal time. In such a situation, the patrol leader conducts his groups only to the curbing nearest the policeman. Never should a policeman yield his post to a boy officer. Patrols are organized to direct school children, not to relieve the city of the responsibility of providing policemen.

Reasonable regulations as to conduct while in patrol formation should be made by the principal. Tripping, pushing, quarreling, leaving the line, and such forms of misconduct can be controlled. Discipline should be held over the patrols by the practice of requiring the leader to tell the offender to report to the principal when next the child returns to school. The leader should merely inform the principal of his order to the offender to report to the principal. All investigating and punishing is then carried on by the principal. Similarly, any member of the patrol has the right to report to the principal any leader who is abusive. This practice will control story-telling, and from experience has been found to result in good conduct on the part of both leaders and patrols.

The school boy patrol is an excellent method of teaching safety on the highway and has proved on innumerable occasions to be an exercise in good citizenship. From trial, observation and actual experience in organizing and directing patrols over a period of years, I am positive that it does teach children to stop at the curb before crossing, to look both ways, to walk—not run—across the street. Children have been taught not to cross in the middle of the block, and not to jay-walk, but to cross at right angles and at intersections. It teaches the individual the proper way to come to school, which is essential, since it has been impossible to organize patrols to conduct children the entire distance from home to school.

Under the school boy patrol form of dismissal, school yards and neighborhoods are cleared of children in much less time than without. Principals have testified to improved conduct on the part of the pupils, noticeable courtesy to younger children and to elderly people, and an evident effect in the atmosphere of the school. Parents, quite generally, have endorsed school boy patrols as they have a sense of security regarding the safety of their children. Motorists almost universally seem to recognize the rights of the children and cooperate with them to the fullest extent.

Educators agree that the proper mental attitude and habits of conduct can be acquired more easily if the educational material relates to the experiences of the person taught. Habits will be more developed, attitudes better defined, and the consciousness better formed. The subject matter of education for safety offers abundant material drawn from the experiences of the children, and to my mind, there is nothing which contributes more to the safety education of the average school child than a school boy patrol.

CHAIRMAN DENNIS: Now that there has been some reference to the police authorities, it is logical that we should hear at this time from the police power that directs these school patrols.

I am very glad, therefore, to have the privilege of introducing to you Inspector Thomas O'Reilly, of the Traffic Division, Toledo Police Department, Toledo, Ohio!

School Boy Patrol—Its Relation to the Police

By THOMAS O'REILLY
Inspector of Traffic, Toledo Police Department, Toledo, O.

I am glad to say a word in support of the school boy patrols of the Junior Safety Council.

These councils were formed in the public and parochial schools of our city in the Spring of 1925 under the direction of Jay E. Thompson, Secretary of the Toledo Safety Council. They are in operation in 45 public, 33 Catholic, 2 Lutheran and 5 county schools. They have approximately 450 officers consisting of presidents, vice-presidents, secretaries, captains of patrol and fire marshals; some 1,200 active members; 7,500 associate members and 1,200 school boy patrols. The councils consist of both boys and girls from the fourth, fifth, sixth, seventh and eighth grades with the patrols chosen from the upper grades.

The junior safety councils, of which the school boy patrols are a part, concern themselves with the big problem of accident prevention as it affects home, public and school conditions. The officers of these councils meet each Friday afternoon for a city conference on safety, following which they are entertained at the Toledo Paramount Theater. In the individual schools the junior safety councils hold meetings for safety discussion and conduct assembly programs of an educational nature in accident prevention.

As the fire marshals receive the cooperation and instruction of the Fire Department, the safety patrols receive the cooperation and instruction of the Police Department. Although primarily an educational group, the safety patrol members exercise an effective control over pedestrian traffic. They are not permitted to operate in the street nor are they permitted to direct or control vehicle traffic. This is covered by their pledge which reads:

"I hereby promise that I will fulfill the duties of my office as laid down by the

captain of patrols and in such a manner as to avoid accidental injury to myself or others.

"I furthermore promise that I will at no time attempt to operate from a position in the roadway or assume any authority over automobile traffic which, I understand, is a function of the City Police Department and the responsibility of the driver.

"In the interest of Safety, I will cooperate with my parents, the principal of my school, the Junior Safety Council, city authorities and the general public."

The school guards are detailed at each corner of the intersection and the children are told when to cross the street in the vicinity of the school. The guards are placed on as many as four intersections, depending a great deal on the number of children going and coming to and from school and by placing the school patrol at these points, they have a direct control over the children.

What has Been Accomplished by the School Boy Patrol?

1. The children have been educated in crossing the street with care and at the crosswalks, instead of running in all directions as was the custom in years gone by. This rule not only applies at school crossings, but at any crossing and we must all admit that the constant drilling along these safety lines is bound to bring results. There is no way of measuring the good that has been done by these patrols, all the Police Department can say is that they are rendering excellent service. In the past five years there have been only two fatal accidents in the vicinity of the schools, a record which I cannot help but feel must be attributed to the good work of the school patrol.

2. The school patrol has brought about a better understanding between the police officer and the school child. This understanding will gain the respect of the little ones, and will continue when they grow into men and women.

The school patrol is the logical medium through which the Police Department keeps in touch with the sixty thousand children. In this way, where we receive complaints of roller skating or playing in the streets, which in some locations is more dangerous than others, we are able, through the school patrol of that locality, to get to the seat of the trouble at once.

The school boy patrol has created a friendly rivalry of spirit in the different schools in trying to have the best accident record, all of which means a lessening of the work for the Police Department.

There are quite a number of public and parochial schools in this city, at which the Police Department has been unable to detail a regular police officer to guard the children. There are a number of these schools where the Police Department has had erected traffic signal lights, which are operated only during the time the children are going to and coming from school, which means that the lights are in operation for possibly five hours each school day.

The school boy patrol is doing excellent work at these corners, in educating the children from kindergarten upwards, along safety lines.

We have also found the school boy patrol an effective means of improving bad boys by placing them on the patrol and giving them a definite job.

I want to make it clear that the Police Department has no intention of making a policeman of the school boy patrol or of giving them police power in any manner. The sole purpose of this organization is the prevention of accidents. It is true that there are a number of schools where there is no police officer detailed and the school boy patrol takes care of the children, but at these schools we do not permit them to get out in the street to stop the traffic. They wait at the crossing until there is a chance to cross in safety, then walk across the street with the children. The placing of police officers at schools is very costly and weakens the patrol force which would be detailed to districts, but nevertheless I feel that the saving of one child's life is well worth all the money that it costs the taxpayers for the service, and I

hope that the time is not far off when there will be a police officer detailed at every school.

In conclusion, I will ask you to divide the traffic problem into its two logical sections, the motorist and the pedestrian, and will state that the solution of the latter problem is aided by the school boy patrols. We are indebted to them for their assistance and recommend them to every community.

In conclusion, I want to answer just one question that came up here about civilian school police in the city of Toledo. There are a number of schools where the police department has placed civilian police, meaning that they are working possibly about five hours a day. Personally, I don't favor this. I don't feel that the citizens get the results from them that they do from the regular policeman and it is only on account of financial considerations that the police department was compelled in the city of Toledo to place them on these corners; but I hope that the time is not far distant when we will have all regular policemen detailed at all crossings now covered by these civilian police.

In connection with the school boy patrol there is a chart placed here by Mr. Thompson of the Toledo Safety Council. I will ask him to come up here and explain it and how it works.

JAY THOMPSON (Toledo Safety Council, Toledo, O.): I will take only a minute to explain this chart. This plan is outlined to be used by the Junior Safety Council. This is an intersection used as an example for them; they are to go out and work out their own program. Of course we will help them; Inspector O'Reilly will help them if they need it.

We ask them to lay out and follow their own program through. This plan contemplates using four men at this intersection going to the school; we have a boy patrol here to direct traffic at the crossing here (indicating); he directs it all over here going to schools, to avoid sending them in this direction where they are threatened with a right hand turn. The patrol picks out an open spot in the traffic and sends the children across to this man, who in turn picks out an opening and sends them down to the school corner.

Down here (indicating) we have a man to watch traffic that might turn, and another man to watch for an opening and send the children across.

In going home, we cut out this crossing over here (indicating) which has a right hand turn hazard.

FRANKLIN KREML (Evanston): I would like to inquire from Mr. Starling what is the procedure in determining who are to be the commanding officers in the units. Does the principal of the school designate them, or the Association, or the police department, or are they elected?

MR. STARLING: No reference is made to selection of officers in the standard rules. That was discussed at considerable length in our deliberations. It was decided that it was a problem in which we were not concerned. The administration of the patrol is in the hands of the principal; she is responsible for the discipline and understands the children better. Therefore she is the one to appoint the officers, but in a great many cases we know the patrol boys themselves select their own officers. They have standards of competition set up and boys attaining the highest average in these competitions automatically become the officers.

As far as the police, or the civic organization sponsoring the patrol is concerned, they are not interested in the officers.

MR. ORMESON (Philadelphia, Pa.): I would like to ask Mr. Starling or anyone else, what are the legal aspects of the school boy patrol. In Philadelphia counsel for the Board of Education has ruled that any accident happening to a member of the patrol would render the members of the Board of Education jointly and severally liable. This is not the opinion of a court and so it cannot be appealed and finally

decided. For that reason we have no school boy patrol in Philadelphia, which we regret very much. Have you had any experience such as this?

MR. STARLING: I am familiar with the situation in Philadelphia. The trouble was that the man who was supposed to be chairman of this meeting today, sent a query to the Attorney General. One of the school superintendents in Philadelphia inquired of Dr. Keith as to the liability of the school board in case of injury to a school boy patrolman. The question was transmitted to the Attorney General of the State of Pennsylvania. I am sorry I do not have my file on liability here because to make this point clear you should have the specific question asked of the Attorney General. That question was: Can we establish a school boy patrol for the direction of traffic at and near our school? And may we arrange it so that the boys may make arrests of persons who violate orders?

The Attorney General of Pennsylvania in a ruling covering eight or ten pages, rules that no school board had any police power; therefore they could not delegate power to a school boy patrolman; that precipitated the discussion in Philadelphia. I was called there by Dr. Brown, the Superintendent; I attended the full meeting of the Board and we discussed the problem of liability pro and con for several hours. A member of the school board stated that the opinion of his counsel was that in the event of injury to a school boy patrolman detailed by the principal or by the school board the principal and the school board were liable. That again was not an official opinion. Then they asked for an opinion of the City Solicitor, or whatever the title is of the city attorney there, who expressed the same opinion, but in no case in Philadelphia or Pennsylvania was the question submitted in the right way.

Mr. Owen Roberts, of Philadelphia, now a member of the Supreme Court of the United States gave an opinion in which he stated that the school board would not be liable, and neither would the principal be liable, provided the patrols were organized for guiding children in traffic, and not for directing vehicular traffic.

MISS EMMA A. SCHAD (Baltimore, Md.): I should like to ask if six months is the best time to be on patrol duty. If they serve four times a day, day after day for six months, how do you keep up the interest?

MR. STARLING: I knew that question was going to come up. I rather hoped it wouldn't.

The reason for my regret is that therein is the problem for the civic sponsoring body. I do not mean to be blowing the horn of the motor clubs or the Safety Council in this connection, but the civic sponsoring body, their chief responsibility, duty, in administering effective school boy patrols is to provide that incentive to keep the boys on their toes, as it were. That is done in Washington by the A. A. A. We have a merit plan by which the boys are rewarded for promptness, neatness, courtesy and so on, entirely apart from the school system. We have different types of awards. It is very easy there. Each of our thirteen policemen supervises the patrol and sees that every patrol is in operation in his precinct at least once a week when he checks up on the promptness of the patrols. He makes out a report which is submitted to the principal of the school through the captain of the patrol for the approval of the teacher.

The faculty is the sponsor of the patrols; we have no trouble in our own city, yet there are a great many places where the civic institutions who have been interested in the organization of the patrol, purchased elaborate equipment, and got the citizenry worked up over the movement, immediately forget about them when they are organized.

You cannot leave boys from twelve to fifteen to work out their own problems effectively; they must have some interest back of it. It is through the civic sponsoring body that this interest must be supplied. If you speak with any manager of a local safety council he will tell you that that is part of the program. Inspector

O'Reilly spoke in his address of entertainment, and Mr. Sherrard spoke of making awards. That plan is followed pretty generally.

CHAIRMAN DENNIS: I understand that it is the captain of patrol who may serve a minimum time, unless he is inefficient, but your time for the patrol members is six weeks, rather than six months; it is the captain who runs through for six months.

MISS SCHAD: I meant that, but the point I wanted to get is would there be any objection to having two sets of patrols operating; we have found that six weeks does not work.

MR. STARLING: The rules are standard, based on what those people who have had experience in about a thousand cities in the United States believe to be the best. We do not feel that we have met local conditions in the rules and recommendations we have tried to lay down. We say these rules are not iron-clad. You may go further if you desire, but do not violate the fundamentals which we have tried to lay down on which you may build and to which you may add. There are so many local conditions entering into the operation of any plan that it would be impossible to lay down standard rules to meet all requirements.

We have no objection to more groups; this has been suggested as being necessary on account of staggered dismissal.

CHAIRMAN DENNIS: What is the prevailing time among the groups represented. In the city of Toledo it is six weeks as a minimum; it would probably run to six months' service as a member.

MR. THOMPSON: In Toledo we run from five to seven or eight; the captains about fifty-fifty serving one year, or half a school year of constant service, energized by the special activities for that particular fellow. We have some members working in the morning and some at night; we give them a plan to build on.

MR. SHERRARD: In Pittsburgh we organize once each semester. We have enough so one boy does not have too much to do. I am rather surprised at this question—what happens if they are not interested. We order arm bands by the thousands; it is a privilege to belong; we have no trouble about boys not wanting to serve. I am surprised. Why, if a boy happens to be sick and not on his corner, there is immediately a boy ready to stand there if he can get hold of an arm band. We would rather appoint a boy, but we have more trouble keeping them off than in putting them on.

MR. GRAHAM: Our boys in Detroit all operate for the period of a full semester except in case of sickness or other difficulties arising to cause the term to be shorter, but it is generally a full semester. This is constant, daily service. One very important point should be made in connection with dismissal times. An order has gone through our system in Detroit that all the rooms in any one school dismiss and assemble at the same time, which obviates the necessity of having additional groups of patrol boys to handle the stagger system.

I might mention with regard to the idea of incentive that the boys are taken to a big league baseball game once a year, and a good football game in Detroit; there are several theatre parties without cost to the boys, or any obligation at all.

F. C. BERRY (Minneapolis, Minn.): I think Mr. Starling mentioned that these patrols could and perhaps should be organized in all schools of the sixth, seventh and eighth grades. There are a good many innovations recently which have brought about changes; so many junior high schools have been introduced with the result that many grade schools, a large proportion in the city I want to refer to, go through the sixth grade, and a definite opposition has arisen there from the teaching staff. They consider that the boys in the sixth grade are too young to serve in the capacity of patrols. I would like to ask the opinion of any one here, as to their experience on this matter of age.

E. B. LEFFERTS (Auto Club of Southern California, Los Angeles, Cal.): We are operating in southern California on the six-three-three plan; we have in the city of Los Angeles two hundred and eighty-three elementary schools; I believe that is the number, practically one hundred per cent organized with a Safety Committee Plan. That means that elementary schools stop at the sixth grade. Our Safety Committee is formed from the fourth, fifth and sixth grades. The patrol that has the responsibility at intersections is a sub-committee of the entire Safety Committee, usually chosen from among the sixth grade boys and girls.

While I am on my feet, I thought it might be of interest to the lady from Baltimore to state that in our program we have a forty week school year. Our Safety Committee members are elected for a period of ten weeks, one half the term, or a quarter of the school year. We figure that the Safety Committee is one medium of education, therefore the larger turnover we can get on the Safety Committee the more interested the children will be in the subject of safety and protection of themselves and their playmates. We encourage a maximum turnover. Remember our patrols in no instance attempt to direct traffic; they are limited to work on the sidewalks except in those schools where we have the tunnels.

Mr. Graham made a reference in his address to the tunnels, of which we have forty-odd in Los Angeles. I cannot agree with him as he anticipated, that they are not a successful method of handling traffic. First, they eliminate the vehicular delays and therefore they are of more benefit than a stop and go system, because no stop is necessary.

They are not put at every intersection by a long way, but at the most dangerous, and they have enabled us to replace traffic officers except where the traffic has been so great that police control has been necessary. Our tunnels average a cost of slightly over eight thousand dollars. From a monetary standpoint they are a good investment; this amount would not begin to pay for even temporary police protection.

MR. GRAHAM: We have no objections not surmountable; we have three thousand patrols operating; we have no parental objections.

MR. HALL (Minneapolis, Minn.): Our objections do not come from the parents, but from the principals of the schools. I would like to hear some of these principals, some of the educators. What is their attitude, the attitude of the people actually engaged in the instruction of the children?

MR. STARLING: We have fifty-six elementary schools in Washington; the sixth grade is the highest. Every one is organized with a patrol, both the colored and the white schools, and every competition we have had has been won by a sixth grade school. We find they make the best patrols. After a boy gets up into the junior high school he has other outside interests, and is not so much interested in patrol work. We feel that the sixth grade boys not only can but do make exceptionally good school boy patrols.

MR. DANIELSON (Department of State, South Dakota): Our problems are different from those of industrial sections. We have a population of only seven hundred thousand people; in the largest city in the state, Sioux Falls, there is a population of only twenty-six thousand people. We have a Young Citizens League, some of you may have heard of it, organized by the present superintendent, Mr. E. C. Gifford. Since the essential of safety is education, we have the foundation laid in South Dakota for the main purpose of teaching better citizenship; we not only teach the children the laws of the road, but all the laws of the state. There is a League in every school in our state; they hold state meetings every year with three delegates from each county.

I wish some of you could sit in and listen to that body when it is in session. I believe it would be a good thing for the various states to look into that organization. With the teaching of citizenship we believe we will eventually have a class of citizens who will really grow up and be able to run an automobile on the highway, and observe practically all the laws of our state.

MR. LEFFERTS: Some one asked me if we stopped at the elementary schools with our plan. We have the same general type of organization with different insignia in the junior high schools, and this year it has been taken up in our senior high schools. The same type of organization as in our elementary schools has spread to the others, and I think it will be just as effective there.

ADJOURNMENT

Tuesday Luncheon Session
September 30, 1930

COMMISSIONER CLIFFORD DAVIS, Chairman
Vice-Chairman, Street and Highway Traffic Section

This was the first annual business meeting of the Section. Eighty-eight members attended.

The following reports of chairmen of standing committees were accepted:

Burton W. Marsh, Chairman of the Committee on Annual Congress Program, reported arrangements for seven sectional meetings, a Traffic Observation Tour, and a luncheon-business meeting for the Nineteenth Annual Safety Congress.

Oscar G. Olander, Chairman of the Committee on Uniformity, was unable to attend because of illness in his family and no report was given.

William C. Knoelk, Chairman of the Committee on Public Education, reported twenty-five articles in PUBLIC SAFETY and three in the NATIONAL SAFETY NEWS during the past year, furnished by the Street and Highway Traffic Section or reporting its activities.

Judge Lee E. Steed, Chairman of the Committee on Enforcement, reported committee participation in the Central States Safety Congress and the arousal of considerable interest in accident investigation squad activities in several cities.

Commissioner Clifford Davis, Chairman of the Committee on Membership, reported a total of 475 members, 268 in the Public Safety classification and 207 others. All states are represented in the membership except Arizona, New Mexico, Nevada, North Dakota, South Carolina, Vermont, and Wyoming.

Sidney J. Williams, expressed the appreciation of the National Safety Council's staff for the results accomplished by the Section during its first year of activity. He stressed the importance of drivers' license legislation, explaining that studies of traffic fatalities before and after the passage of drivers' license legislation in nine states showed that fatalities were 50 per cent fewer than they would have been had their fatality rates increased in proportion to the states without drivers' license laws.

A motion by Alexander K. Cragg that the Street and Highway Traffic Section should seek the passage of drivers' license laws and promote uniform legislation regulating the operation of vehicles, was carried.

Judge Levi M. Hall, Chairman of the Nominating Committee, recommended re-election of the following three elective officers of the Section:

Chairman, Professor August Vollmer, Department of Police Administration, Chicago University, and Chief of Police, Berkeley, Calif.

Vice-Chairman, Honorable Clifford Davis, Vice-Mayor and Commissioner of Fire and Police, Memphis, Tenn.

Vice-Chairman, Major George A. Parker, Registrar of Motor Vehicles of Massachusetts.

It was voted to adopt the report of the Nominating Committee.

ADJOURNMENT

Enforcement Methods

Wednesday Morning, October 1, 1930

HON. CLIFFORD DAVIS, Chairman
Vice-Chairman, Street and Highway Traffic Section

The second session was presided over by Honorable Clifford Davis, vice-chairman of the section and Vice-Mayor and Commissioner of Fire and Police, Memphis, Tenn.

CHAIRMAN DAVIS: Mr. Leonard Ormerod will present a safety motion picture this morning.

LEONARD ORMEROD (Assistant to V. Pres., Bell Telephone Company of Penn., Philadelphia, Pa.): This picture, made for the Philadelphia Safety Council, is an attempt to illustrate the traffic problem in a popular one reel film. It has no sound track.

(The motion picture was shown.)

MR. ORMEROD: If you want prints, you can get them at cost, by writing to Mr. Fred Johnson of the Citizens Safety Committee, care of the Philadelphia Chamber of Commerce.

CHAIRMAN DAVIS: The first paper was to have been delivered by Captain W. C. Price, who has made a reputation for himself in the selection of good men.

CAPTAIN W. C. PRICE (Superintendent, Pennsylvania State Highway Patrol): I have just passed through an operation that has made it practically impossible for me to deliver an address. But my assistant, Captain P. J. Dorr, will do it for me.

Selecting and Training Traffic Officers

By CAPTAIN W. C. PRICE
Superintendent of the Pennsylvania State Highway Patrol

We have the largest training school for police officers in the country, outside of the city of New York. We are continually training 50 to 75 men.

Each applicant who is considered for the highway patrol must be between the ages of 21 and 40, preferably 25 to 35. He must be single, must have a good reputation in the community in which he resides, and must be physically fit. He is taken in order of his application. A character card, is sent to the station nearest this man's home. On it is the man's address, his physical description, and his age.

The patrolman to whom this card is sent goes immediately to the applicant's home, but instead of interviewing the references the applicant has listed on his application, the investigator, will visit the chief of police, the post master, a business man, and a banker. Later on, he will call upon the applicant, measure him, study him, and tell him frankly just what is going to happen to his papers.

The application is returned with the recommendations of this officer. If he is turned down, his cards and papers are placed in the inactive file. Often the applicant lists his height as five feet, eight, the required height, but when actually measured he is found to be only five feet, six. Consequently he is turned down immediately.

When a vacancy occurs we do not call an individual, but rather a class of 25, 30 or sometimes 40. The applicant is called in on a certain date along with a number of others, possibly double the number we expect to select.

He is given a mental test, which is more less elementary, but he is given a very rigid and thorough physical examination by our own physician. If he is successful in

passing, he is given a fatigue outfit which by no means resembles the snappy uniform that he wears after he graduates, and as a tryout for a couple of weeks he does his share of kitchen police. He scrubs floors, digs ditches, washes dishes, and cleans the rooms of the officers. It is considered to be a disgrace if he is unsuccessful in "going over the hump," as we call it.

We build character. We also build men physically. We are continually looking out for men who have had previous service for the sole purpose of discipline. We find that the man who comes from the army, navy or marine corps has instilled in him the discipline that we want.

After his third or fourth week the student takes his regular classes indoors. He arises at five-thirty in the morning during the summer. We give him one-half hour to make his bed. For the next 45 minutes, until a quarter to seven, he is given outside calisthenics; nothing inside regardless of the weather. This consists of close order drill, some boxing, tumbling, and, of course, the usual run in the morning. At a quarter to seven he is brought in and compelled to take a shower bath under the watchful eye of non-commissioned officers, and I don't mind telling you that some of them try to escape the terrible ordeal of taking a bath in the morning.

At seven-fifteen he has breakfast; at seven forty-five the general call for fatigue. The barracks are the most complete of their kind in the country. Everything in the kitchen is electric. There is linoleum on the floors, we have receptions rooms, class rooms, and dormitories. It is a perfectly equipped training school—a model that other states throughout the country are following.

After his fatigue the student has a regular schedule of classes, criminal procedure, motor laws, elementary spelling, arithmetic, writing, and typewriting, at the end of the day—(his day ends, as far as the classes are concerned, at four forty-five)—he is pretty well tired out. He has his supper at five followed by a period of relaxation until approximately seven-thirty. Then there is a study period until eight-thirty or nine, and that study period is supervised!

At ten o'clock the lights are out. A bed check is taken to prevent men from using the fire escapes and coming back at all hours.

The same system is also in effect in training the state police. The only difference is that they use horses and we use motorcycles.

The student, after ten or twelve weeks of this intentise training, is given a complete new outfit. To train this student for the first ten weeks of his service, salary included, costs the Commonwealth of Pennsylvania in the neighborhood of $700. That includes his equipment and when he leaves for his tour of duty he is nattily equipped with a new uniform, usually a new motorcycle, new puttees; all of his leather equipment is new. He is assigned to a substation under the watchful eye of a non-commissioned officer who has been in the field for years and knows his business.

He is not welcomed into the substation with a brass band, but rather a scowl from the man in charge and, "Put your equipment around in the garage and remember you are out here under me now."

In the field he is introduced to the justice of the peace who resides in the community.

Soon he thinks, "Well, I have learned the law, I know the fundamentals of the police game, I learned it under capable instructors; I will quit this job and get a job as the chief of police at home." Then we lose a good man after training him. The Commonwealth has paid for it, yet the local community, if the man follows the police game, is going to benefit by this man's services.

If he sticks, he gets along after a while with the non-commissioned officers. Later, maybe he gets a station himself and then he becomes high hat. He becomes a sergeant and then a lieutenant. When he is a lieutenant and wears a bar, of course, there is no holding him back. He is going to stick to the organization, be loyal to his superiors, and do anything in the world for them because he wants that double bar, the most coveted position in the organization.

I have carried you through our system of training the students, but I just want to add that our training school is open to any police organization in this country or Canada and we would like to have you come and visit us; there is plenty of room. Send your men there if you want them trained. It would cost you only a nominal sum. That is an open invitation to every police organization in the state and in the country.

CHAIRMAN DAVIS: Do you permit the officers to marry?

CAPT. DORR: We have had some sad experiences with married men, but after a year's satisfactory service, with the recommendation of the immediate superior and approvals on up to the superintendent, he may marry.

CAPT. PRICE: The Pennsylvania Highway Patrol has 67 stations in Pennsylvania. The men must always be available for call. With one man living on the north side, one on the south side, and one on the east side, they are not available.

We select the home. We pay the board and we specify the hours that they shall be there and accessible to meet the public's call. Three married men at one substation, living in different localities, are an absolute failure.

A patrolman gets $90 per month as base pay, and he gets his board, lodging, clothing, and equipment. He must learn to live within that $90 every month before we will permit him to marry.

We feel that in one year he knows our regulations and what is expected of him. After that, his record being good, we will permit him to marry.

NATHAN HARRIS (Engineer, Board of Estimate & Taxation, Minneapolis, Minn.): Do you require candidates to be residents of Pennsylvania?

CAPT. DORR: No, but we try to keep it pretty well within our own state. We have men from the outside, usually with military experience.

W. R. KELLY (Sec'y, Citizens Safety Committee, Chamber of Commerce, Philadelphia, Pa.): What percentage of the men resign within a year after being graduated?

CAPT. PRICE: That runs between 10 and 11 per cent, but we weed out many in the school. Only about 40 per cent of those taken on finally get over the "hump".

E. H. BARBER (Chief of Police, Duluth, Minn.): Do your state highway patrolmen have police powers in other than highway duties?

CAPT. PRICE: The state highway patrol of Pennsylvania have full police power, greater power than any other officer in the state. They are the only men who may arrest upon sight for a motor violation in Pennsylvania. That is denied to every other officer.

However, we shall attempt to change that in the next legislature because I have had two men within the last four months shot to death in attempting apprehension for felonies. We have 440 men to patrol 14,000 miles of improved highway plus 70,000 miles of unimproved highway. They ride the country alone with full police powers, but do not interfere with minor criminal misdemeanors. We take up felonies and motor violations only, unless there is a brawl in our presence, in which we are required to interfere.

MR. BARBER: Which do you consider better for patrolling highways, an automobile or a motorcycle?

CAPT. PRICE: The automobile is not flexible enough for highways. The motorcycle is the only thing to get in and relieve congestion with.

CHAIRMAN DAVIS: Our next address is "Accident Investigation for Conviction of Violators," by Franklin M. Kreml, who has gained national recognition in the last year on this particular subject.

Accident Investigation for Conviction of Violators

By FRANKLIN M. KREML
Director, Accident Prevention Bureau, Evanston Police Department, Evanston, Ill.

In our city, immediately adjoining Chicago on the north, we found we were being swept along in traffic accidents with that great city. Our people were being injured and killed. Hence, at the request of The Evanston Safety Council, a Bureau of Accident Prevention was organized in the police department.

We have developed eight major activities in this Bureau to date. This morning I am going to tell you about one of them; namely, accident investigation. For just a moment, however, I should like to say a word or two about the other things that we are doing so that I can give to you a complete picture, so that you shan't go away from here feeling that I have told you that accident investigation alone is going to prevent traffic accidents. I believe to prevent accidents we must take unto ourselves every activity which we can and go ahead on a full steam basis, not for safety week or safety month, but all year around!

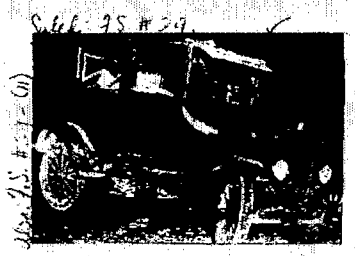


Fig. 1—Photographic evidence of which car hit which. Note imprint of headlight on door.

The Evanston Police Department is a typical city police department. It perhaps would be a typical small town police department except that we are so close to Chicago.

Our accident records were in the same shape that the records of many police departments are in now. We had a wealth of information stored away in books with records filed in chronological order, a wealth of information we never could get to. We changed that and put in another record system by which they are filed by location. When we had done that, we began to do research work on bad intersections as indicated by the spot map. From an estimate made just before I came to this Congress, I concluded that we have prevented 176 accidents at 60 intersections which we have treated by the use of collision diagrams.

We carry on publicity and educational work. We put publicity in our street cars and on our street cars, in our busses and on our busses, in our movie houses, on the sides of our trucks, in the windows of our taxicabs. It is changed each month. Each month we attack something else. It isn't just general educational publicity. It isn't a question of, Be Careful! Stop Accidents! Don't do this and don't do that. It

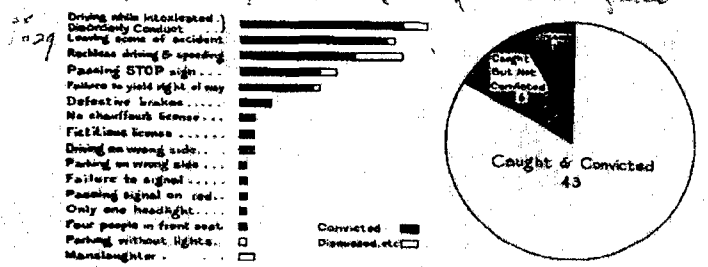


Fig. 2—Percentage of accidents resulting in investigations, arrests and convictions.

Fig. 3—Hit-and-run drivers, Evanston, Ill., 50 weeks ending Sept. 15, 1930.

is a constant attempt to attack those specific problems which we feel are causing accidents.

I would like to say here that we know what our specific problems are because our records tell us what they are. For example, we had an average of seventy personal injury accidents a month over a period of eight months. Fifty-six accidents were a result of pedestrians getting off the front end of a bus and walking in front of traffic passing on the left. We put an 8" x 4" card up in front of each bus which read, "Don't run in front of this car. Be careful. Evanston Police Department." In a survey made after the signs were placed we found only three people who passed in front of a bus and were injured.

We are using license revocations and we are conducting a drivers' school.

We began to use our spot map by plotting certain danger zones in our city for the direction of motorcycle police. We found that our motorcycle men were riding Sheridan Road, a beautiful drive along the lake, close to Northwestern University. We found also that there were few accidents there because there are no intersecting streets from the lakeside. We found, on the other hand, that the southwest corner of the city, was the location of 70 per cent of the fatalities. Traffic does not move very fast down there, but it is a foreign section where many children play in the streets for hours at a time. They were being killed.

We sent some motorcycle police down. They didn't make many arrests, and those they made weren't for driving fast as they would have been on Sheridan Road. They found the things they had to do were different than the things they had done on Sheridan Road. They had to take children out of the street and make Polish or Lithuanian mothers understand that they had to be kept out of the street. Accidents were reduced in that particular section, however.

Those are things we are doing in addition to our investigation work.

At the time we organized the Bureau, we looked into the matter of accident investigation for about six weeks. We found that we were getting very few convictions following accidents. We found that hit-and-run drivers, not being charged to any particular officer, bureau, or division of the police department, were generally allowed to go their way. There was no real follow-up; nobody charged with it—why worry about it?

The police officers would go to the scene of the accident, ask your name, address, and telephone number. How old are you? Which way were you going?

He would do the same for the other driver. Then he would say, "Do you want to sign a complaint against this man?"

"Well, no, I don't. I am practicing law in Chicago and I am on my way down to court. I don't care to be bothered with this sort of thing." And so it went. It may have been that the man at fault was going 50 or 55 miles an hour. He may have violated a stop sign or traffic signal caused some damage, but nobody was seriously hurt or killed, and because of the officer's reluctance to sign a complaint he would say, "All right, that is all. Go ahead."

Or if the injured individual did want to sign a complaint, the other driver said, "All right, if you are going to sign a complaint, if you want trouble, I will sign a complaint, too," and so both of them signed a complaint. The case would come up in court and what could the judge do? One driver told his story; the other driver told his—both stories contradictory—no witnesses—the case dismissed.

Yet our motorcycle policemen might have seen this same offender going down

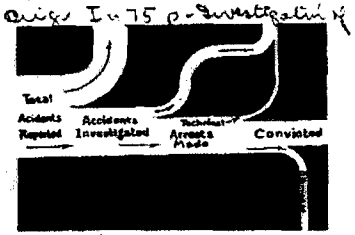


Fig. 4—Types of convictions obtained in connection with investigated accidents.

Sheridan Road at 36 or 37 miles an hour the day before and have taken him into court, where he was fined. The next day he went 55 miles an hour through a stop sign, crashed into another car, and the officer had to say, "I didn't see it. I can't take him in unless a complaint is signed by someone else."

It didn't seem right, so we instituted our accident investigation squad. We have two eight-hour shifts on this squad. The men ride around in a Ford sedan. They cover every accident in the city. Whether I am a motorcycle officer, a detective in a flivver squad, or a patrolman walking my beat, I am under orders to telephone immediately to the station and call for the accident investigation squad if I come upon an accident, and I must hold the parties until the squad arrives. I can't handle the accident and if I do I am violating my chief's orders.

Right here I would like to refute the contention that this thing is expensive. You have to send somebody to the accident, don't you? What difference does it make whether you send two men who are particularly trained in handling such situations, or send men whom you happen to get on your box telephone or who happen to be in the station at that time. I would like to say further that these squads are on the streets doing flivver squad patrol duty when they are not covering accidents. The public does not lose their protection; not by any means. They are sent to the scene of the accident by the red light recall system. We are not using radio yet.

The squad car is lettered "Bureau of Accident Prevention." A white cross is the insignia of our particular bureau. The men work out of the office, but they are

photos on this page used and filed Film Strip #29.

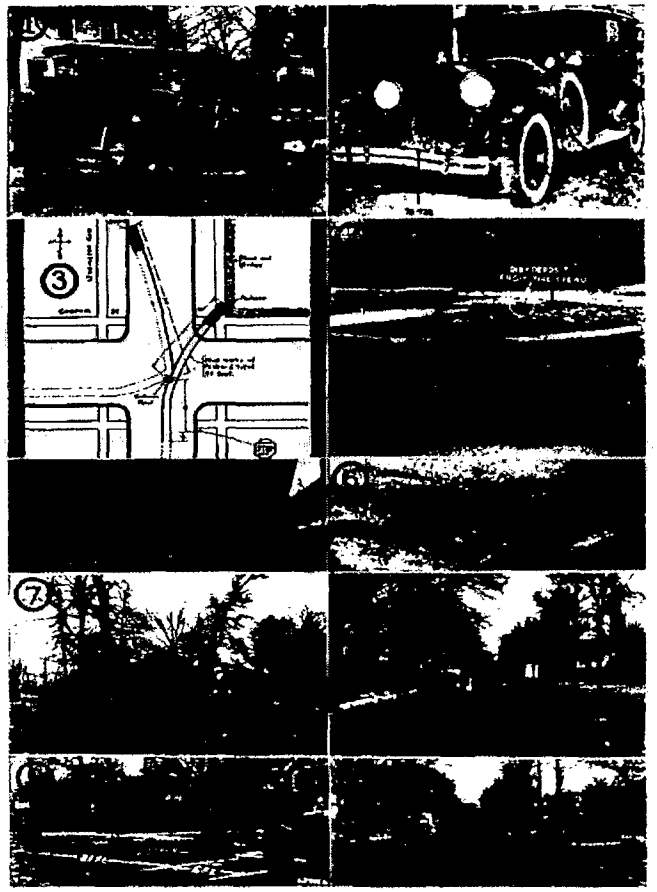


Fig. 5—Nine illustrations depicting one accident which supplemented statements of witnesses and obtained conviction of driver.

on the streets doing patrol duty and are accessible to answer any call. If we have four flivver squads for general patroling the other squads will be sent first, so that there will be an investigation squad on hand if an accident call comes in.

Each squad carries a camera, a flash gun, flash powder, tripod, 100-ft. steel tape, first aid kit, portable typewriter and the necessary papers.

Pictures are taken of the scene. Many people have asked me if we took pictures of every accident or if we took pictures of just the serious accidents. We don't do either. We take pictures of accidents where we think the pictures will assist us in making a case out against one of the drivers in court. The question of the seriousness of the accident has nothing to do with it. We do make pictures of every accident where the pictures will help us in court. We have had serious accidents where we took no pictures except perhaps one or two of the intersection as an explanation to the court as to how and where the accident happened.

MR. BARNES: After you have taken the pictures, do you allow the attorneys chasing accidents to see them?

MR. KREML: We do not. You know, as an officer, that if we did, our men would be in civil courts nearly all of the time. We have never given these pictures to the attorneys, although in one case the superior court issued a writ for the pictures and we had to take them down.

Measurements are always made of skid marks, and one of the officers must take a statement from each witness on the spot. If you are a witness at the scene of an accident in Evanston, and you say, "I saw that fellow come along about 50 miles an hour right through the stop light," our man says, "That is fine, Mr. Jones. Come over here with me and sit down." Then out comes a typewriter down goes the statement. The witness signs it and is given a copy of it.

CHAIRMAN DAVIS: Is the statement sworn to?

MR. KREML: The officers cannot administer an oath in a case of that kind. I doubt if such a statement would hold water unless in the form of a deposition and I question whether officers may take depositions. However, I don't believe it is necessary. You have the man's signed statement. You can call him as a court witness. He has a copy of what he said. If he alters any statement which he has made to the policeman at the time, you may impeach him.

Figure 1 is a general summary of the accidents that we handled in the year ending September 1, 1930. At the left is the total accidents reported. A certain number of minor ones are immediately discarded. For instance, two drivers come together at a deserted intersection at two o'clock in the morning. Each driver said, "It was my fault, I was sleeping at the wheel. It wasn't his fault." Neither one was going fast and there were no witnesses. There was really nothing you could do in a case of that kind. That sort is not investigated further.

The remainder are investigated but a certain number are deflected where we find no basis for a complaint. We must, of course, find an actual law violation. There is no crime on the books such as running into a man's car, and we cannot arrest a man just because he had an accident unless we find he was speeding or passed a stop sign, or did any one of a number of things which constitutes a violation of an actual law.

A certain number of technical arrests are made. For instance, if you live in Pittsburgh, and, driving through Evanston, seriously injure someone, it is necessary for the officers of the squad to get your name and address and have a bond set so that if the person dies you will be available for the coroner's inquest. There is no intention of prosecuting.

After deducting the technical arrests, we have left the number convicted, compared with those dismissed. Unfortunately, we do not win all cases.

We have no property damage limit on the accidents we file or investigate. Formerly we had a $25 limit, but we have come to agree that it is not a question of the amount of damage to the automobile, but the fact that the cars came together which shows that something is wrong somewhere. We cover every accident and some of the best convictions we have had have been in comparatively minor cases.

ALDERMAN O. A. PEARSON (Minneapolis, Minn.): Have you had any experience with a man who has been bumped and gives a statement to the officer, but who, when summoned into court as a witness, tries to change his testimony because the man who bumped him has made a settlement?

MR. KREML: There has been a tendency toward that, but the difficulty has not grown serious. We do not ask private individuals to sign complaints. When officers operating on the investigation squads believe that they have sufficient grounds for an investigation, they make the arrest themselves, and sign the compaint themselves. The witnesses are subpoenaed into court.

We finished a hit-and-run case like that two weeks ago. It took six weeks to get the driver, but we got him. He paid $275 to the man he hit; $225 for damages and a $50 bonus. The injured man came in and said, "I would like to withdraw the complaint I made."

It was my pleasure to tell him, "I am sorry, sir. You have no complaint to withdraw. The complaint was made by Officer Egebrecht, and you will appear in answer to summons or the court will issue a warrant for your arrest." When the case came up for hearing the offender received a $50 fine. If the court and the prosecuting attorney are vigorous in combating that difficulty I don't believe you will find that it is a serious question, but you will find that there are some people who are so unscrupulous and have so much cupidity that nothing will sway them after they have received their damages.

ALDERMAN PEARSON: We have had a little trouble in our squad with men coming in and changing their testimony. We were discussing it the other day and it was suggested that we have the officers on the accident prevention squad sworn in as notary publics, then they could make out an affidavit and have the witnesses sign it.

MR. KREML: I don't see any objection to that.

JUDGE LEVI N. HALL (Minneapolis, Minn.): There wouldn't be, except in the case of the defendant. You couldn't use such an affidavit against him.

MR. KREML: I have here about six pictures, one from each of six cases and also a series of pictures of a single case showing how we handled it by several pictures, as we almost always do.

Figure 2 is from a case which the stop and go light was in operation and apparently one driver ran the red. By talking to several witnesses who really didn't know who went through the stop light, but who knew something about the accident we came to the conclusion that whoever did the hitting in this accident was the one who went through the stop light. We talked the case over with the city prosecutor who agreed with us.

He went before the judge and brought out the evidence. He put the witnesses on the stand and finally, at the conclusion of the case, he introduced this picture, indicating to the court the print of the headlight of the other car on this car. The other driver was fined for passing a stop light.

In the first case we had, our friend, Harry Stein, driving down Judson Av. and approaching Main which is a through street, hit a Buick car driven by a woman. They were the only witnesses. She said he didn't stop. He said he did. He hit her car in the right rear fender without doing much damage.

There were skid marks, and the officer asked Stein, "Did you you make any attempt to stop?"

"Sure I did," he replied. "Don't you see those skid marks?" He pointed to the marks while the officer took his picture. The marks started 17 feet before the stop was reached and continued uninterruptedly 7 feet beyond! He was easily convicted of failure to stop.

Another case was that of a wealthy coal dealer's car versus a cab in which a lady who for years wouldn't ride in a cab because she was afraid to. She asked the driver to be particularly careful. He promised to do so, but they had gone only five blocks when the coal dealer struck the side of the cab.

We secured a conviction against the coal dealer on the basis of pictures showing his skid marks. We had two witnesses identifying them and testifying that they started back behind the stop sign. He was convicted on a charge of going through a stop sign.

One hit-and-run case was peculiar, the kind we don't often get. A young Swede carpenter came in one evening about six o'clock all excited. He told us he had seen an accident. A big black sedan hit a boy on a bicycle. The sedan went on. He had chased it nine or ten blocks and then lost it. He said there were four or five men in the car.

We sent the investigation squad out but they didn't find the boy, the bicycle, or anything. We thought the Swede must have been drunk, but we posted the accident on the board. Our detective bureau squad was driving up an [illegible] and they saw a Stutz sedan being driven into a private garage by a colored chauffeur. They stopped him and found a dent on the right fender and a spot of something there. They scraped the spot off and took it over to Northwestern University to be analyzed. It was human blood. Two or three hours later they found the boy. He had been picked up and taken home.

We confronted the driver with the picture showing the dent, and the analysis of the blood on the fender of his car. He entered a plea of guilty for leaving the scene of the accident; the sentence was $75 and ten days.

Another picture we took showed a car which hit a tree at a street and you wouldn't know whether the driver was drunk or crazy or whether the steering knuckles broke, or what happened, from the way the wreck occurred. The accident happened at four o'clock on a very foggy morning. There was no light where the street ended at a cross street. The accident is easily understood. The city council understands it now, too. We had asked for street end lights for about a year. Four rather prominent boys were hurt in this accident and they have the street end lights up now. This boy had driven straight on, not knowing the street ended there.

In another case, a woman drove her car into the canal. This accident occurred outside our jurisdiction and once again it is an illustration of what pictures can show. This happened at two o'clock in the morning. A bridge was out over the sanitary Canal at Dempster street. The woman became excited and drove through the barricade into the canal. She was going along Dempster Street and then over the end where the bridge should have been but was saved from going into deep water by a caisson.

A sketch was made to show where she hit the first barricade, traveled 187 feet, 6 inches, hit the second barricade, knocked it down. It is 36 feet horizontally from the end of the paving to where she landed and it is estimated she traveled 44 feet diagonally landing with all four wheels in the water. She said she was going 15 miles an hour. She had one bone broken in her ankle. She wasn't drunk either.

Now photographic evidence works both ways. One case, for example was a pure and simple shakedown. A pedestrian was hit and the only witness was a second cousin or something of the injured person. A young boy about 21 years of age was driving the car and because he was young and driving a big car, it was assumed that he was a speeder. The complainants thought, "Let's get together, get all we can, and we will split."

After we got their story we took some pictures. We had one of the officers of the accident squad stand in the position of the pedestrian, and then we brought both of the witnesses back and put the pictures down on the table and had them tell their story again, one at a time. We heard one story and then let him go out and brought the other in, and after repeating that process three times we didn't need to tell them they were liars; they knew it. They walked out and we heard no more from them.

These squads have utility in other matters besides accidents. We have a large negro population in Evanston. It is the servant center for the elite who live along the North Shore. The colored boys and girls will drink alcohol and get into trouble. We had one suffering from alcoholism who had also gone fanatic on the subject of religion. He shot two colored women coming out of the wrong church. He didn't like that church and wouldn't have anybody going to it if he could help it.

The police detective bureau squad was sent out and as they were going down the street the accident investigation squad saw them and tagged on behind. They found the two women wounded and lying on the sidewalk. The sergeant in charge asked them to unload their equipment and take the women to the hospital. They put the women in the car and started.

In the meantime, the fanatic gunman had been located, and an officer taking a couple of shots at him as he ran, killed him. The camera was there and they had a picture of that negro within a minute and a half after he had been killed. They didn't have to call a photographer and spend half an hour waiting for a picture while a crowd collected and got a lot of bad feeling started. They took two fine pictures. The next day at the coroner's inquest those pictures of that killing served as a real utility and economy.

Besides all that, the officer who was going to the hospital in the squad car got just four blocks away when a drunken negro in a Haines car ran into him and turned him upside down. He sent the women on to the hospital in another car, sent a civilian for his equipment, got a picture, and convicted the negro of drunken driving. A good night's work!

I can't think of a case where we have taken only one picture. We have usually taken three or four, and in cases which would be difficult to explain to the court we have taken as many as ten or eleven pictures. In one case we had the following photographs. (See Figure 3.)

1. Car No. 1, a Packard, which had been north bound on Orrington Avenue, approaching Central Street, a through street with stop sign.

2. Car No. 2, an Essex, going east on Central Street. It had the right of way on the through street, but was struck by the Packard going north. The side of the Essex was broken open, and two women riding with the driver fell into the street. The Packard drove over them and broke both their backs.

3. A diagram of the accident showing how the Essex was going east and the Packard north. The two women in the Essex knew only that they had been riding and heard a crash and woke up in the hospital. The people living in the neighboring houses heard a crash; that was all. There was not a real eye witness except the two drivers. Jack Swartz, the man in the Packard, was the most expert liar that I ever met. He had us doubting that we even knew that the things we saw were there. The driver of the other car, said, "I swear he didn't stop and I swear he was going 50 or 55 miles an hour," but in a criminal case all the defense has to do is to cast a reasonable doubt, and the state's case is lost. We were afraid of that reasonable doubt.

4. We found a skid mark but the Packard car was gone. We couldn't trace this skid mark up to the Packard to show it continuous. Babcock identified it as the Packard's skid mark. Swartz denied it, and there was the reasonable doubt. So we had to look for something tangible to connect up with these skid marks, something to substantiate the testimony of Babcock.

5. We photographed the left rear tire of the Packard car driven by Swartz.

6. We also photographed the print that we found at the termination of the skid marks. This matched identically in pattern, size and dimension, the tread of the

tire. Now that really would not be enough to convict, but it was enough to substantiate the testimony of Babcock and we felt we had something worth while.

7. Another photograph shows how the skid mark started 6 feet back of the stop sign and continued 31 feet beyond to the point of impact. The impact knocked the Essex 94 feet north. The testimony of Babcock, the pictures, the length of the skid marks was enough to get an indictment before the grand jury. The case is now pending in criminal court, and I think we will get Mr. Swartz.

8. A picture of the whole corner shows it was open to view. There was no reason why Swartz shouldn't have seen the other car coming. The reason for the other fellow not seeing him was the high speed of Swartz' car.

9. An additional picture shows the skid mark which started within 31 feet of the point of impact and then went from the point of impact in a northeasterly direction 35 feet.

10. The last picture in the set shows the Essex where it come to rest.

One thing I would like to emphasize most forcibly in our accident investigation work is that our squads are charged with the job of finding hit-and-run drivers. (See Figure 4.) We put it up on the board and it stays on the board until they find that driver. We have had 71 cases since September 1 last year. We have only six names on that board now. We have apprehended 65 of them.

Of the charges preferred, driving while intoxicated and disorderly conduct come first. Disorderly conduct is grouped with driving while intoxicated because, in many cases when the evidence is not strong, and we are taking a chance of a dismissal by preferring the charge of driving while intoxicated, we change the charge to disorderly conduct and it is much easier to get the conviction.

Leaving the scene of the accident, although it has nothing to do with the accident itself, is the second largest offense so far as convictions are concerned. Passing stop signs, reckless driving and speeding, failure to yield right of way, defective brakes, and so on, are all charges preferred on which we get convictions. These are not the true indications, of course, of the causes of accidents. The cause of the accident may have been that the man fell asleep, but if we find he has defective brakes that is what he will be charged with. Whatever statutory violation we can find constitutes the charge.

Before I tell you what the final results of this thing have been, I want you to remember please that we immediately adjoin the city of Chicago on the north, that it is very difficult for us to reach the citizens of the city of Chicago with any of our educational propaganda.

Since we have instituted this system, our convictions following accidents have gone up 190 per cent and we have shown this year a 62.5 per cent reduction in fatal accidents. The people who were killed were in every instance Chicagoans; so were the drivers of both cars. We do not recommend this as a utopian plan. There are many things yet to be done. We are trying to improve our own system every day and there is much to be learned and many more activities that we could go into and hope to go into, but we do feel that we have made some real progress in the last year.

JUDGE HALL: The chief trouble we have is with failure to yield the right of way. In those cases do you require evidence of some other violation before you take the case to court, or do you go into court with simple complaint of failure to yield the right of way?

MR. KREML: We do, but we are extremely careful when we make an arrest for that violation. We wouldn't go into court on such evidence, for instance, as the statement of a driver and somebody in the car with him, and a picture showing that the car at the left, which did not have the right of way, hit the car at the right on the left rear fender. Ordinarily that would seem like a pretty good case, but it has to be stronger than that. That is, we demand in our office a higher degree of proof before going to court on that particular violation.

C. W. BARKER (Director of Police, Rochester, N. Y.): How is it that your investigating squad can make an arrest, or as you express it, file a complaint, for a misdemeanor which they do not see.

MR. KREML: Before we started we realized that if we couldn't do that, we could only serve as an agency for people interested in collecting damages. We wouldn't have gone ahead on that basis.

Therefore we appealed to the corporation counsel, to the city attorney, and also to J. Allen Davis, who drafted the Model Municipal Traffic Ordinance and Uniform Vehicle Code for the Hoover Conference. After investigating for several weeks, Mr. Davis felt that, unless expressly prohibited by statute, the officers had a right to make that kind of arrest, and that the only recourse the individual so arrested would have, would be a charge of malicious prosecution, in which case he would have to show an element in that suit of malice in fact, not in law. In other words, they would have to show that this officer had malice for the particular person arrested. In practically all cases, needless to say, the officers have never seen the defendant before so of course a malice in fact would be hard to prove.

If you are expressly prohibited by statute in New York State from such arrests, then of course you can't do it, but if you are not expressly prohibited by statute then it is a false belief than an officer cannot make an arrest for a misdemeanor unless he witnessed it. If there is no actual malice and he has reasonable grounds to believe and does believe that there was a violation, then he may sign a complaint.

BURTON W. MARSH (Traffic Engineer, Philadelphia, Pa.): In all the congress sessions I have ever attended, and they are quite a few, this is the most outstanding presentation I have ever heard. I should like to offer a resolution that this talk, with such discussion as may be deemed advantageous, and with the pictures, be published as a separate paper. Then we in other parts of the country who, are not getting the almost utopian results which Mr. Kreml is getting—may have the opportunity to distribute this to persons in those cities who should become interested in that fact that it can be done.

CHAIRMAN DAVIS: Mr. Kreml says that the National Safety Council has several copies of this film strip No. 29, accompanied by a special lecture which has been written on the basis of his experiences. Public Safety Memo. No. 39, also covers this subject. I received a copy of it during the summer and was very much interested in it. But I think it ought to make Kreml feel good to have this resolution passed. (The resolution was adopted unanimously.)

This all goes to show what you can make out of a motorcycle officer. But you will never ride one of them again, Kreml, I will tell you that.

The Prosecutor's View of Enforcement

By ALEXANDER K. GAGE
Assistant Prosecuting Attorney, Wayne County, Detroit, Mich.

No one who loves his fellow-men can consider the appalling toll of street and highway traffic without registering a high resolve to do his part to help in solving this great human problem.

Modern living with all its complexities is presenting problems and conditions which the fixed principles of our common law cannot satisfy. We need an adjustment of these old and honored principles to modern industrial practice and social and economic conditions. In no particular, is this more true than in connection with

street and highway traffic in our cities and indeed wherever, throughout the land, we find the hard road and the paved highway.

In this adjustment, the police and kindred agencies are recording great progress in the accumulation and intelligent use of statistics and the formulating of regulations based upon them. The police, in our metropolitan districts especially, have made notable advances in the technique of initial investigation and in the apprehension of law violators.

The Courts also, by structural alteration and procedural reforms, have shown a truly modern spirit of progress. The separate Traffic Court in the larger municipalities has made the accurate observation of any surviving maladjustment very much more easy and effective.

The Prosecuting Attorney deals directly with the Police and kindred agencies, on the one hand, and with the Courts, on the other. His duties not only require him to direct and scrutinize investigations and the apprehension of law violators; but, also, to supervise the preparation of the evidence and to present the legal basis for the discipline and punishment to be imposed by the Courts. And, so, his is a position of peculiar advantage as well as great responsibility in finding a "definite practical relationship between the statutes as enacted and their enforceability, as a part of the reality rather than the theory of government."*

In most metropolitan districts, the investigation, apprehension and punishment of minor traffic violations are left to the direct supervision of the special accident investigation bureau in the police department and to the Courts. The prosecutor's office is called upon only in cases of major infractions and the more complicated and serious instances of reckless driving. In the City of Detroit and environs which are included in the County of Wayne, these cases number between five and six hundred, every year. In all of these cases, there is a wide range of degree of guilty intent. The facts are often poorly observed and the witnesses lamentably unskilled in telling what they saw. The physical facts are recorded in remote locations. The pressure of ever newer cases and other casualties interferes with the prompt investigation and recording of these facts; the interest and prejudices of the parties and witnesses must be determined and discounted, if not overthrown; the witnesses must be persuaded that the case and their testimony is a part of a great public emergency existing which calls for patriotic sacrifice of personal convenience and cost. Often the office investigation shows that the occurence was the result of no unlawful act upon the part of the driver or that the victim was primarily at fault. Often, the facts are so contradictory that a further determination is required by reference to a Coroner's Inquest. And, in many cases, the surviving driver is held upon a warrant based upon probable cause where all the elements of the crime charged are present and proof thereof available.

When these cases are finally prepared, and ready for trial, they must compete for the time of the Court, with thousands of other cases. The line of demarcation between a negligent homicide or a manslaughter case and a reckless driving case is only in the degree of danger to other persons and vehicles. And, thus, we find great difficulty in securing deliberate and patient attention from the Courts and Juries. This condition is greatly relieved in those cities where there are Special Traffic Courts.

Why is there such difficulty in securing just punishment for the guilty in Traffic Cases? What is the cause of the oft-heard complaint that there is an absence of even-handed justice? What are the remedies, if any, for the resulting situation? Is our present system of laws inadequate to cope with the solution of this great modern problem?

In answering these questions, I may be pardoned if I refer to an experience of

*THE IRRITATING EFFICACY OF ENGLISH CRIMINAL JUSTICE, by George W. Alger in the *ATLANTIC for August 1928.*

nearly five years in the office of the Prosecuting Attorney of Wayne County, at Detroit, during which time I have had charge of the investigations in approximately 3,000 major traffic cases and have assisted in preparing and trying at least a thousand cases.

Let us commence our inquiry by a close examination of the final act in the dreadful drama of motor mania. Court's in Session! The case is called. The jury's impanelled. Most of the jurors are, themselves, drivers. They're pedestrians, too. The people present their case; a long list of witnesses testify to the various elements contained in the charge. Much of this testimony is routine and entirely lacking in dramatic appeal. Most of the testimony is fragmentary and unsatisfactory because of poor observation or lack of skill in the telling. Oftentimes, important witnesses fail to appear.

Case is closed. Arguments of counsel. The judge's charge: presumption of innocence, reasonable doubt, unlawful act or the violation of some Statute, intent (whether required or not—whether implied or not), the weight of evidence, interest, bias, ability and capacity to observe on the part of witnesses; and, again, reasonable doubt and presumption of innocence. The jury retires. The evidence is considered. The "intangibles" are also considered. The verdict.

I yield to none in my adherence to the belief "that the average American jury, when properly made aware of the seriousness of its task, is intelligent, conscientious, fair-minded, and frequently amazingly able to comprehend complicated situations of fact and pass upon them. Corruption in juries is a rare and uncommon thing, and, because of the rule of law that verdicts must be unanimous, exceedingly difficult of successful accomplishment.

"The fault for miscarriages of justice lies primarily, I am convinced, not with the juries, but with the antiquated concepts of law with which they are shackled in arriving at their verdicts. Within the limitations of these shackles, the average American jury is as competent a tribunal for the finding of fact and the even-handed doing of justice as any that mankind has yet devised."*

Yet, how can it be that, with the facts practically undisputed, our juries so often bring in a verdict of "not guilty?" Is it the "intangibles?" Is it sympathy for the driver or his family—are the members of the jury totally devoid of sympathy for the victim and his dear ones? Is it unwillingness to credit defendant with any intention to do wrong? Is it a strange insistence upon the fundamental principles that an act and an evil intent must combine to produce a crime; that no amount of intent alone or of act alone, is sufficient; that the two must combine; that the act and intent must concur in point of time; that the evil intent must be fairly deducible from the facts and proofs? These rules are elemental and have subsisted as long as the Jury system itself. Are these tests applied to the evidence in the case during the jury's quest for a "reasonable doubt" so insisted upon by defense and carefully (sometimes, it would seem, overcarefully) stated by the Judge in his charge? It is true that the Court may have fully charged the Jury as to whether or not it is necessary to prove intent; and also (where gross negligence is charged) as to the degree of negligence which may take the place of intent. But does this careful safeguarding of the people's case overthrow the intangible influence of these fundamental principles which are ingrained in every freeman's breast and which are so skillfully set in vibration by the oft repeated reference to conviction "beyond a reasonable doubt?"

Our juries are cross sections of the current lives and thought of the great mass of our people. Their verdicts reflect the thought and spirit of the day. We must not be impatient with their findings; we must seek to truly interpret this thought and the correct rule of life to our juries. And there is one point (and one point only), it seems to me, which must be carried, in order to secure this correct inter-

*Are American Juries at Fault, by Victor House—in the ATLANTIC for August 1928.

pretation of the true thought and sound spirit of the day. And that point is this: An Automobile *is* a "dangerous instrumentality" and, when recklessly and heedlessly employed, it is just as deadly as a gun or knife or any other instrument of destruction. We all know this, drivers of cars know the truth of the fact: but do they understand and appreciate their individual responsibility?

How do we enforce this individual responsibility?

The Accident Analysis Committee of the Public Safety League on February 6th, 1930, at Detroit, made the following recommendation:

"The experience of States requiring operator's license, shows that although 25 per cent of the applicants fail on the first examination, much less than 5 per cent are refused licenses. Records in Detroit show that in less than three years motorists who have physical defects have been involved in 8 fatal and 66 injury accidents. Private concerns employing large number of bus and truck drivers state that only about 20 per cent of the applicants who apply to them for positions are able to pass the company's requirements, although all the applicants have operator's licenses. The passage of an operator's license law which requires a more strict examination before a license is issued, and that each motor vehicle driver be required to renew his license periodically."

Have we been able, in the comparatively few years since the coming of the motor car, to alter our streets and highways to meet the needs of the enormous growth of vehicular traffic? "We need to rebuild our cities."* Have we done all we can to require all the people to have the necessary skill and *judgment* to cope with the multiplicity of hazards which have resulted?

Are these hazards of the highway known and charted? A more definite and widespread public knowledge of the effects of alcohol used in quantities much less than will result in obvious intoxication but which often tend to decrease motor control and appreciably lessen the sense of individual responsibility must be proven and admitted. One drink may be enough to make a driver take a chance. Even small amounts of alcohol, quite insufficient to intoxicate, tend to decrease the higher forms of skill and perhaps also to lessen the sense of individual responsibility. Do our people understand that "most accidents result from a combination of causes rather than from a single cause;" that, in most serious and fatal accidents, speed is either a primary or secondary cause; that very few of the 30,000 annual deaths from street or highway casualties are, strictly speaking, unavoidable?

Many casualties might have been avoided were the hazards known or fully appreciated. Disregarding these hazards, either because of ignorance or heedlessness, a casualty becomes imminent, no longer preventable. In the abstract, all casualties may be avoided; most, can be prevented by the exercise of care and diligence coupled with knowledge of the hazards of the highway and a deep and abiding sense of individual responsibility. When the public at large is willing to subscribe to these proven facts, a cross-section of that public as found upon our juries will reflect their convictions in their verdicts.

Let it not be thought that we are unmindful of the many methods and expedients available for improving and remedying conditions. These were succinctly pointed out in the report of the Committees on Enforcement and on Causes of Accidents of the Hoover Conference in 1926:

"There are three broad methods of approach to remedy.

1st, through prevention and safeguard,

2nd, through much stronger punishment for violation of the rights of others,

3rd, through public education as to its responsibilities.

"Special traffic courts are recommended for the largest cities, and special traffic sessions of the general courts for smaller cities. Uniformity will be promoted if the traffic cases are handled by the smallest number of judges able to handle them. Judges who confine their attention solely to traffic matters are most likely to administer adequate and even-handed justice.

"Fines are the only feasible penalties for small offenses, and probably have a deterring effect if materially increased with each subsequent offense. Suspension or revocation of operators' licenses is probably the strongest deterrent, whether the holder operates vehicles for (1) pleasure, (2) necessity, (3) or as a means of earning a livelihood. Suspension should be mandatory for the most serious offenses, either in addition to or in lieu of other punishment.

"Whenever the owner of a motor vehicle causes or permits it to be operated in violation of the traffic laws, both the owner and the operator should be subject to the penalties provided by law.

"Uniform, impartial enforcement of reasonable requirements by adequate and properly organized police is a primary necessity in reducing street and highway accidents. Far too little attention is given by the police administration in most communities to utilization of the general police patrolmen in the enforcement of motor vehicle laws and regulations.

"It is highly important to conserve the time of apprehending officers. Officers required to remain hours in court, particularly on their own time, are naturally less likely to apprehend violators than if their cases can be disposed of quickly.

"Because of the wide range of degrees of guilty intent in traffic violations, as well as of degrees of danger to other persons and vehicles, and because of the difficulty of obtaining convictions if the penalties are too severe, most of such offenses should be classed as misdemeanors, giving the courts wide latitude in suiting the punishment to the offense. Only maximum fines and terms of imprisonment should be provided in such cases. In the case of major offenses, however, which are essentially dangerous and intolerable, there should be minimum penalties, severe enough in every case to act as a real deterrent, and more severe for second or subsequent than for first offenses. The major offenses for which minimum penalties are recommended are:

(1) reckless driving,
(2) operating while intoxicated or under the influence of drugs, and
(3) evading identification in cases involving personal injury.

"Imprisonment is a much more effective deterrent than the levying of fines, no matter how large, and there should be prison sentences for major offenses. Undoubtedly prison sentences are also often necessary to discipline habitual violators.

"One of the most important parts of the enforcement machinery consists of the record of convictions of traffic violations. The record should be a permanent one for each individual and should show, besides his convictions, any suspension or revocation of his license and any denial of his application for a license. Recording violations on the operator's license card is recommended as a ready guide to the past record of a person apprehended.

"Successful law enforcement is impossible in the long run without the backing of public opinion. The Organization of public opinion to support law enforcement must be just as continuous and just as energetic as the efforts to defeat it. The aim should be to create a community feeling that the traffic police and courts are performing an important public duty.

"In any event investment in a study of primary causes and contributory circumstances that produce accidents, and a comparative evaluation of the ways used in New York and other states to encourage safe driving, to develop competence, courtesy and consideration in all users of the highways, to eliminate recklessness, to discover and remove unnecessary hazards, and to put the enormous weight of public opinion behind this movement for the conservation of human life will yield to the nation returns whose value is beyond measure."

*Andrew H. Green, Jr., in conversation with the author, 1929.

This last paragraph is, from the standpoint of your speaker, especially significant. Too long have our public authorities, especially those chargeable with law enforcement, regarded the traffic authorities as a by-product, as an appendage, to the more serious agencies for preventing crime and apprehending and punishing criminals. When the public is brought to realize not only the tragedies of traffic but also the tremendous economic loss involved, they may be ready and glad to treat their agencies chargeable with traffic enforcement with a much more liberal, even a lavish hand. The utmost latitude, within reason, should be allowed and will, without doubt, show large returns in the swiftness, certainty and appropriateness of judgments secured.

As was said, the methods and expedients available are many and effective. But there are certain aspects of the traffic problem which cannot be adequately solved under our present system. These aspects are partly social, partly economic and partly juristic.

Let us consider the case of Jim Maloney. Jim was a hard-working, sober man. He had a good wife, three little girls and a neat, tidy home. He had a good job. One day, while he was at work and the little girls were at school, his wife went to the store around the corner to buy some supplies.

It was a cold, bleak morning; there had been an ice storm the night before and the streets were like glass. She crossed to the middle of the roadway past the traffic bound toward town and stood waiting for a heavy duty truck, loaded with cement, to pass in the opposite direction close to the curb on the further side of the broad highway. As she stood there, entirely on the left or further side of the street, a light roadster driven by a man of social and financial prominence in the community, approached the intersecting street at a reasonably moderate speed, even under the apparent condition of the road. A car approaching the thoroughfare from the right appeared not to intend to stop. Our suburban driver put on his brakes in order to slow down and give the impatient driver from the side street more room to pass. The icy surface offered no traction for the locked wheels. The little roadster seemed to gather momentum even as it sailed out into the intersection. The driver of the roadster twisted his steering wheel this way and that in a frantic effort to avoid a collision. Suddenly his car drifted to the left; and, for the first time, the driver discovered Mrs. Maloney standing in his sidelong path, all unconsciously looking in the opposite direction toward the slowly approaching truck. With horrid terror he realized that nothing could be done to avert striking her.

The impact threw or rather slid her underneath the wheels of the truck. The little lady never knew the terrible fate that befell her. An inquest was ordered. There was little proof of the facts of the occurrence, beyond the physical conditions. The driver of the car from the side street had turned the corner on to the thoroughfare and had continued on his way without seeing what took place. The driver of the truck saw the lady standing in the roadway as the cab of his truck passed by only an instant before she was struck by the other car and thrown beneath his rear wheels. The only other eye witness was a lady whose car was struck by the still sliding roadster as it reached the rear of the truck.

The Coroner's jury found the driver of the roadster responsible for the death of the little wife and mother. While we were considering the filing of complaint and issuance of a warrant, Jim Maloney presented himself at our office. In the two or three weeks which had passed since the tragedy, he had faced the problem of his future and of his three motherless little girls. The driver and his insurance company had indicated their willingness and desire to pay him a substantial settlement but that they could not do so while possible criminal proceedings were pending. They could not do anything which might be construed as admitting liability in any way. Distress and sympathy were not lacking for his bereavement.

"If I don't get this mony now, I'll either have to give up my job or break up my home. Are you going to add to my burden by forcing me to wait for the Courts to give me what I am entitled to or will you grant my request to refrain from prosecution so that I can be free to accept settlement without waiting many months, possibly years?"

What answer would you give? Suppose the driver were poor and not responsible financially? Suppose there were no economic complications? Is this even-handed justice? What effect does such a case have upon other cases where no such considerations are present?

Of the social aspects, I would presume to say or write little. Hours might be consumed and volumes might be written upon such a subject. Upon the economic aspects, "A Study of Compensation for Automobile Accidents," by Arthur A. Ballantine of the New York Bar in the February issue of American Bar Association Journal offers some very interesting suggestions.

"The most far-reaching suggestion, urged as meeting most of the evils of the present system, is that persons injured by motor vehicles should be enabled to recover moderate fixed statutory compensation, regardless of the fault of the defendants, through expeditious procedure, on the analogy of the workmen's compensation acts.

"Desirable as a compensation plan may appear to be, there are obviously questions of the greatest difficulty as to whether the plan which has worked so satisfactorily in its own field is adaptable to the field of motor vehicle accidents. No one has yet formulated such a plan in detail or made an intelligent estimate of its cost or furnished a basis for determining whether the plan would meet constitutional requirements. These questions require extensive investigation and study before intelligent discussion of the merits of the plan is possible. Some of these problems may be briefly indicated.

"What the compensation plan would accomplish depends largely upon the actual relief it would afford. There is obvious difficulty in this instance. In the case of compensation for workmen this was comparatively easy because wages and salaries were always available as the basis for compensation. In the case of motor vehicle accidents a considerable number of the injured would be persons whose income could hardly be expected to be reflected in fixed statutory compensation. A major question is, therefore, whether a practicable basis of compensation can be worked out at all, and whether such a basis would be likely to be reasonably satisfactory to injured persons or their dependents.

"Can a compensation plan be effectively administered by the Courts, or should it be administered by a special agency as in the case of workmen's compensation? If so, how are the constitutional requirements as to jury trials to be met? On the legal and constitutional side there are the fundamental problems as to whether injured persons can be required or induced to accept fixed statutory compensation and whether owners can be subjected to liability without fault and perhaps required to contribute to the indemnity of persons who may have been injured by others. There is also the question as to the bearing of a compensation plan upon the promotion of safety on the ways."

Upwards of two years ago, I suggested to a number of leaders in our great motor car industry a modification of the plan just now being considered by this committee:—a Foundation to supply funds and to direct the proper placing of financial responsibility in cases where innocent victims of traffic casualties might be unable to bear the cost and burden of "the law's delay." The administration of such a foundation might be limited to a certain jurisdiction as a sort of laboratory experiment until such time as the State or even some national association might take over the enterprise.

This suggestion was offered as a practical method of meeting that certain resentment, which, it is believed, is not unlikely to express itself in three already often discussed programs of legislation for:—

(1) Mechanical speed control.

(2) Drastic license laws limiting very greatly the number of drivers.

(3) Compulsory liability insurance or some approved assurance of the financial responsibility of drivers.

The greatest result likely to flow from the success of such a plan or suggestion would be that the excuse for any lack of law enforcement—with even handed justice to all—would be forever lost. The economic status of the victim or of the accused would no longer interfere with swift, certain and adequate punishment and the consequent universal respect for the law.

In conclusion, may I suggest an analogy which may point the way for a possible adjustment of our street and highway traffic problems to a reasonable and proper law enforcement policy. There is no human activity which is more nearly similar to the operation of a motor car than the navigation of a ship. The law of the roadstead is the Civil Law, the Roman or Continental Law. No "presumption of innocence" there—no—"beyond a reasonable doubt." If a master has a collision or loses his ship, "he's out", to use the vernacular, until he has proven his innocence. His license and his command are taken from him.

Remember that no traffic casualty happens which was not, strictly speaking, avoidable. An accident is an event which is unexpected or the cause of which was unforeseen. How many so-called traffic accidents could not have been foreseen or how many might not be expected as the result—the necessary and almost inevitable result—of the conduct of the driver, if long enough persisted in by him?

If a collision occurs or any other untoward event happens in traffic, is not the driver in a better situation to prove the manner in which he was operating than is the public to show that he was guilty of some unlawful or reckless act—"beyond a reasonable doubt?" If traffic accidents are those happenings which are unexpected or the causes of which are unforeseen, is it not a complete answer to say we must learn to expect anything; we must foresee any result from all the factors—of weight, power and speed which contribute to make up the inherent menace of the motor vehicle? Is it a paradox to say that motor *accidents* never happen, they can always be foreseen, be avoided; someone is always responsible for every happening.

Of course, I am fully aware of the constitutional and legal obstacles in the way of the present adoption of these suggestions. But they have the spark of truth in them and they may form a scientific hypothesis upon which one or the other of our Schools of Legal Research may base some interesting theses. The exploits of the English Court of Criminal Appeals encourages one to hope that there may be room in our common law—"more common than the English common law"—for some "civil" adjustments of the "practical, effective relationship of law, not to the theory, but to the reality of government"—and to the effective, just and even-handed enforcement of our street and highway traffic laws.

ADJOURNMENT

Traffic Administration Problems

Thursday Morning, October 2, 1930

MAJOR GEORGE A. PARKER, Chairman
Vice-Chairman, Street and Highway Traffic Section

Major George A. Parker, Vice Chairman of the Section and State Registrar of Motor Vehicles, Boston, Mass., presided.

CHAIRMAN PARKER: Frank C. Hanrahan, city manager of Portsmouth, Virginia, is to discuss with you the problem of the control of traffic in a city the size which he represents. He tells me that he rode in the first automobile in his community and he has been bothered with automobiles ever since.

What the Small City Thinks About Traffic

By FRANK C. HANRAHAN
City Manager, Portsmouth, Va.

When invitation was extended to me by the Traffic Section of this body to address you I felt that I should not hesitate to give my opinion and offer it for your consideration, because I feel it is the duty of all public officials charged with traffic control to cooperate with an organization such as the National Safety Council in the constant effort to eliminate accidents and save human life. My talk will be confined strictly to my own experience—just as I find things—without quoting anyone or any authority on traffic problems.

What an interesting subject this is to me—looking back to the time when I was a small boy, in the days of the old shell streets, cart houses, and when the greatest traffic accident we boys knew of was a runaway horse, which usually received big head lines in the daily papers—then to have the good fortune of riding in the first automobile ever to arrive in my city, and to see the many changes constantly taking place in this motor age. It is interesting and yet more than perplexing constantly to study ways and means of handling this situation. I find the one big barrier in the way with all of us, in our efforts to solve the traffic problem with any degree of satisfaction, is that age-old heart and brain disease "Selfishness or Self-Interest", which manifests itself in traffic as in other things; that savage trait in mortal man that crops up at times in most people, causing lack of thought for the other fellow, or little or no thought for the big idea of "What is best for the group or majority." This may be noticed particularly among those who sometimes seem prone to feel that they have reached a position in life by virtue of which they are deserving of some special recognition—yet it may occur with the merchant, the banker, baker, or candle-stick maker, because, in a small city, their contacts with the police authority are more intimate and because that the old selfish interest has a natural chance to work. It sometimes works to such a degree that they are successful in interesting other splendid citizens by magnifying their complaint in regard to some particular traffic order or rule to the extent that those who never once thought of objecting to the order, immediately become intensely interested in the matter and it can often be traced back to that selfish interest.

It is agreed that in the smaller city, the individuals and groups are somewhat closer together and become interested in each other's problems. My many years of municipal experience, particularly in the matter of handling traffic in my city, have taught me that the executive in charge of traffic control should think well before he places a new traffic order into effect and not blindly follow the other

fellow's example. Conditions may be entirely different in his city. I believe our problems will be better solved, if we study the condition from all angles before putting an order into effect. Once put into effect—be firm and enforce the order unless thoroughly convinced that it is wrong, and under no circumstances change it because some influential citizen or group of citizens demands a change. If the governing body of the city should demand the change, then the responsibility would not be yours.

I have found that it is much better to allow a reasonable latitude in business sections, both uptown and downtown, than to be so strict that people will feel you are making it too hard for them to conduct business. Remember the thousands of private automobile owners in your city have not been taught as yet, or do not fully realize that the time has arrived when they can no longer shop conveniently from store to store with the automobile; and the folks from the nearby rural sections who feel they have a right to demand parking space ahead of the other fellow, have not learned that we are fast coming to the time when he must park his car in the garage as his father used to leave his horse and carriage at the cart house. A very large number of our citizens and country neighbors are learning this lesson almost daily, and find that convenient shopping can be done only in the latter way. The restrictions, according to my judgment, should be put on gradually, and only when it is found necessary for the orderly and safe flow of traffic, and there should be reasonable warnings before arrests are made. I believe better progress can be made in this way.

There are certain fundamentals in traffic which it is hardly necessary to discuss, such as restrictions on parking near or at fire plugs, stop streets, and at dangerous or congested points, which are common-place in most cities. For the information of those who are not well acquainted with my section of the country, I should tell you that Portsmouth is situated on the land side of the Elizabeth River. Important trunk highways converge on Portsmouth, and more than a half-million tourists from all parts of the world pass through our city each year, visiting the U. S. Navy Yard and Government Hospital, then to Norfolk, just across the river, where they visit Virginia Beach on the Atlantic Ocean, and several other summer resorts. We have more than twenty-five miles of white sand beach extending from Ocean View, Lynnhaven and Ocean Park on Chesapeake Bay to Cape Henry and Virginia Beach. The Portsmouth-Norfolk area, or what is often called Tidewater Virginia, has no extremes of temperature, either in winter or summer. The winters are mild and the summers are not uncomfortably warm. Owing to the proximity of the ocean, nights are cool and pleasant. Outdoor games are enjoyed the year around. The mean annual temperature is 59.4 degrees. We can accommodate lovers of the ocean and bay. To those who love fresh water sport, we can say that there are more fresh water lakes abounding in fish, within a radius of twenty miles of Portsmouth-Norfolk area, than in any similar section of the country. In fact our section is the Cradle of the Republic—Jamestown, Yorktown, Williamsburg, and many other points of interest are within a few hours drive of Portsmouth. I have mentioned this, not particularly to tell you of our section, but you must know that the American people always have the reputation of knowing a good thing when they see it. They have found that our section is a good place to come to, and since the good roads have been gradually linked up so they can visit us, they are coming in very large numbers. This, of course, adds to our traffic problem, and although our population is small, our traffic problem increases because of our location. These tourists are made up of all classes of people and from every country. This increases our burden of care.

We have an experienced chief of police, a traffic squad consisting of seven men, headed by a lieutenant who has grown up with the traffic problem for many years—before there was a problem. We have recently appointed a younger man, one of our ablest traffic officers, as sergeant, to care better for the situation. We, like most

cities of our size, find it difficult to appropriate sufficient money for employment of officers needed for required service. We have recently installed a modern system of traffic "stop and go" lights, on our main street, which is sixty feet wide from curb to curb. This system is timed to the flow of traffic at each particular section so that a motorist can go through the entire street at a rate of eighteen to twenty miles an hour, with all traffic stopped at cross streets (in safety). If his rate of speed is less or greater than the specified rate, the red flashes in front of him. This system was installed after much study and because the cost of such protection with police officers would be prohibitive to us, but I state very frankly, now that I have tried it out, I would not place the officers at the corners, even though the city could afford it, because our streets are laid off in such a manner that this light system gives excellent control, and, in my opinion, it would be spending money unwisely to place men at each intersection, or even at a few of them.

However, more officers are needed for other sections not controlled by lights. These highways are constantly patrolled by motorcycle officers, who make arrests when necessary. We have changed the curb radius at several of our busy corners, which has helped wonderfully. We have resurfaced old cobble-stone streets, which had not been used to any extent. These streets parallel our up and down-town streets and have taken considerable traffic from these main thoroughfares. We have established safety zones, commonly known as the Number 2 type—only we have introduced our own new type of V-shaped concrete bumper, about four feet and eight inches long, and 22 inches high, at the head of each zone. We keep them painted white with black stripes, with red and green glass reflectors at the edge of each of them. A car will not be wrecked if it hits one, yet it is a safety zone, which provides a reasonable amount of safety for the bus and car passengers boarding in the center of the street. Traffic goes to the right or left of the zones; slow-moving traffic to the extreme right; those making left-hand turns go to the center of the street, left of the zone, where they find the arrow pointing to left-hand turns. Operating in this manner, we have not as yet found it necessary to eliminate the left-hand turn, though, as time goes on, it may be necessary in some sections of the street.

Finding the traffic problem growing, with so many opinions being offered by some of our leading citizens, and feeling convinced that it is a matter requiring close and constant study, I came to the conclusion that no matter what type of citizen became interested, or how much I respected his opinions on other matters, I could not afford to give serious consideration to his ideas on traffic unless he had studied the situation in a broad way. I appointed each of my department heads on a Traffic Committee. They meet each week to study the matter and discuss it from every angle. They are all city officials and all are interested. I believe this method is much better than to call on unofficial citizens' committees, the members of which can not afford to give it their time. However, neither this committee nor myself feel that we know it all, but we are interested and feel it our duty to study the matter. Our interest and responsibility is not like that of the fellow who wants a little mental exercise from his business and who may unconsciously lead you into the wrong path and before you know it you are back to the 'selfishness or self-interest' again, just where you started. We listen to suggestions and do not despise them in any way, but we feel a keen sense of responsibility in the whole matter.

Since organizing this body, we have adopted the accident spot map. Our traffic officers meet together. Our Chief of Police, who is a member of this committee, receives inspiration weekly from these meetings—it 'peps' him; he in turn 'peps' his men and the men pass this on to those thoughtless, discourteous, inattentive, selfish motorists, who drive over our streets, by carrying them where they belong—to the place we Southerners sometimes call the 'jail house'. These people are drivers who are turning this country into a slaughter house for human beings, using automobiles for the slaughtering machinery, and Portsmouth is doing its best to put a stop to this type of driving in our city. That is why my city is a member of the National

Safety Council—that is why I am here today, to contribute all I can to the one outstanding organization which has done and is doing so much to awaken the citizens of these United States to a keener sense of safety, to the end of saving human life and to lessen the toll of accidents.

Our health departments have appropriations to teach the mothers how to care for themselves and their unborn children; the same health departments record births and care for the children, furnishing nourishment and shelter, if necessary. All is done to develop normal citizens of them—then why not exert every effort to protect the lives of mothers and children in this modern age, from the dangers that are far greater in many instances than diphtheria, scarlet fever, bowel complaints, and many other dreaded diseases. The campaign of education must keep up—it must be enlarged. The people must be taught this great lesson of 'Safety'.

A. F. FILKINS (Traffic Lieutenant, Peoria, Ill.): In Peoria we gave out shopper's parking tickets for five or six years. When the traffic commission was formed, I asked them to discontinue that shopper's permit because the business district was congested.

They discontinued that shopper's ticket, and a delegation of 57 prominent business men signed a petition, came before our body, and told me that I was wrecking their business. They told me I was doing away with something that was established all over the country. I would like to know if anybody here has run across this thing or if they use it in their city. I would like to take that information back to our traffic commission and city government.

MR. HANRAHAN: I don't see how you could handle it with shoppers' tickets. I had to show the merchants in my city that the confusion and congestion of parking for four or five hours did not help their business. I believe I told some of them they were losing money because of it. The streets were not made for that purpose. I believe you did the right thing and I believe I did the right thing. Stick by it and convert them.

LIEUTENANT FILKINS: To get around that condition, we got a piece of ground down on the levee by the river and put a municipal parking ground there. We don't charge for the parking. I haven't gone back to the shopper's ticket and if I can help it I am not going to.

P. J. PREWITT (Dir., Birmingham Safety Council): What do you do when some good citizen gets a ticket and a well-known and influential man calls to try to get the ticket taken up.

J. M. BROUGHMAN (Chief of Police, Portsmouth, Va.): I don't think I ought to let Mr. Hanrahan answer that. As I told you he has exclusive control of the management of our city government. It doesn't matter whether it is the Admiral, who is a resident of Portsmouth, or the poorest man in the city, he never stands for it. He has been city manager six or seven years, and he has never stood for anybody fixing a ticket. If a man is accused of violating a traffic law he has to come to the police station and either be exonerated by the justice or pay a fine. I don't know of any time in my experience under him as city manager that he has ever hinted or recommended that anybody be allowed to escape the penalty of a fine if he violated the law.

MR. HANRAHAN: He told you what I do. I am going to tell you how I do it. Use force to enforce the law only when needed. Good citizens cannot afford not to respond to the man who is firm.

I don't care if it is my brother who gets the ticket. There is no use of his coming to me. Don't think that everybody who violates a traffic law in Portsmouth pays a fine. That is not so. We want to be reasonable. We had a case of a man worth three or four hundred thousand dollars. He had been warned that he couldn't come down to the bank, double park, and go in to make his deposit. He was warned two or three times and then he paid his fine. We couldn't be bothered any more.

People must respect you. Be considerate and reasonably firm; when people approach you on the street you mustn't lose your head, but tell them plainly what the law is. As far as influential men are concerned, you can reply to them in the same way. If you are wrong and convinced that you are wrong, admit it. Don't think that you are right all the time. And then above everything else, conduct yourself in a manner that you will be respected for. Respect the law yourself and make everybody in the city under you respect the law.

JUDGE LEVI M. HALL (Minneapolis, Minn.): In Minneapolis we have a triplicate tagging system so that if a man starts out to fix a tag he has to fix three of the public officials rather than one. We find it works very effectively. We don't have to depend upon the honesty or efficiency of any single official. We have a system that works almost perfectly in a city of 465,000.

CHAIRMAN PARKER: The next speaker is Inspector Greenwood of the Toronto Police Department.

Whats Doing in Canadian Traffic

By CHARLES GREENWOOD
Inspector Police Department, Toronto, Canada

The most significant fact that impresses one in connection with the traffic situation in Canada today is the tremendous increase in the number of motor vehicles. In the Province of Ontario away back in 1904 we were the proud possessors of 535 motor vehicles. Ten years later, in 1914, the stupendous figure of 31,724 had been reached, 6,000 of which were owned by tourists, who in those days were required to procure a license for every State or Province they entered. Then we take another jump of 10 years to 1924, and find that 271,341 passenger cars were registered during that year. Five years later, in 1929, the increase is again quite noticeable by reason of the fact that 473,222 passenger cars were registered. These figures do not include commercial vehicles or motorcycles.

If one were not convinced that traffic had become a serious problem, perhaps the following record of tourist traffic in the Province of Ontario during the year 1929 might eliminate any doubt as to that. 2,922,536 motor vehicles entered the Province for a period of 24 hours or less; 582,128 motor vehicles entered the Province for a period not exceeding 60 days, and 830 motor vehicles entered the Province for a period of from 60 days to six months.

So much for the increase in the volume of traffic.

Now a word as to its accommodation. The development of provincial highways was taken up seriously in 1918 when we were very pleased with our 42 miles of hard surface roads. At the end of 1929 this had been increased to 2,437 miles of good highways and future programmes that called for very extensive additions and developments had been formulated. In the cities and other congested and densely populated areas the development has not been in keeping with the increase in the number of motor vehicles, consequently serious congestion has become manifest, and to take care of this extensive programmes that include street widening, the creation of new and extremely wide thoroughfares, grade separations, viaducts, etc., have been drawn up and are being carried out as speedily as possible.

In the city of Toronto, Ontario, which I have the honor to represent, there is a population of 805,000, and the total registration of motor vehicles of all classes for 1929 numbered 125,000. The down-town or business area is approximately one-half mile square. The streets in this section are very narrow and practically all of them carry street car traffic in both directions. This fact, as you can well imagine, adds materially to the difficult task of creating a safe and steady movement of vehicular and pedestrian traffic. The knowledge and data gained by participation in the various con-

ferences on uniform traffic regulation and the practical use of control equipment, traffic signs, street painting etc., has helped in no small measure to solve this most contentious problem. Nevertheless the number of fatalities and serious accidents directly attributable to the presence of motor vehicles on our highways has steadily risen until it has become a matter of grave importance. By reason of this fact it has become imperative that very urgent corrective measures are necessary to eliminate the hazards that now exist, and it is the duty of every one of us to assist to the best of our ability whether it be by educational or regulative methods.

Progress along these lines has been accomplished in Ontario and particularly in the city of Toronto where, I am pleased to be able to say some measure of success has been the result of our efforts.

In May, 1928, Brigadier General D. C. Draper was appointed Chief Constable in the city of Toronto, and was not long in finding out that there was a great deal of room for improvement in regard to the handling of traffic and the elimination of danger elements. After giving the matter due consideration it was decided to start a methodical system of checking up on the roadworthiness of motor vehicles. This service was started on the 1st October, 1928, and continued until the 30th November, 1928. The information gained during this period was somewhat alarming for it was found that of the 18,000 vehicles examined 81 per cent of this number were found to be defective in some manner. A more intensive campaign was commenced on the 1st of April, 1929, and continued until the end of November of that year, when it was found that out of the 80,000 vehicles examined the percentage of defectives had been reduced to 19½ per cent.

Notwithstanding this improvement, 67 persons were killed on the streets of Toronto through the medium of the motor vehicle during 1929. I do not wish to convey that the operators of the various motor vehicles that figured in these fatalities were entirely to blame, for such was not the case. In fact, in the great majority of cases the pedestrian was the party at fault. This figure, I might add, is comparatively low in comparison with other cities of the same size, but one cannot help but feel that every effort should be put forth to eliminate this needless loss of human life.

On the 1st of April of this year, subsequent to an educational campaign through the medium of the Press, the inspection of motor vehicles was resumed, and up to and including the 31st of August, 90,000 motor vehicles have been tested and examined. The response from the motoring public has been very gratifying, but the most pleasing aspect is the reduction in the number of fatalities and serious accidents. From the 1st of January, 1929, to the 31st of August, 1929, 42 persons were killed by automobiles on the streets of the City of Toronto. During the corresponding period of 1930, 22 persons were killed or nearly 50 per cent less than in 1929, notwithstanding the increase in the number of motor vehicles. The accident list was reduced in like proportion. These figures are very significant and in this connection I would like to state that it is a debatable question as to whether the periodical save-a-life campaign is as meritorious as the persistent educational and corrective one. The method of test in Toronto is as follows.

Three voluntary stations are maintained and operated by the traffic department, and open from 8:00 a.m., to 8:00 p.m., each day, Sundays excepted. Windshield stickers are given to those who conform with the regulations. The color of the sticker is changed every month. Those who do not pass are given a certificate to that effect, and a reasonable amout of time to effect the necessary repairs and adjustments, and then the vehicle must be submitted for re-examination before the owner is allowed to operate it on the city streets. At the same time all officers of the traffic squad who operate throughout the entire city for 24 hours each day, are stopping motor vehicles at random, that do not bear the sticker for the current month.

Each car is subjected to the customary test which includes brakes, horn, lights, steering, rear vision mirror, muffler, and all necessary licenses must be produced at this time. If the test is passed successfully a sticker is issued, but if such is not the case, and carelessness or negligence is evident, the owner or operator is summoned to court. In addition to this all necessary repairs must be made, as soon as possible and the vehicle re-examined at one of the voluntary stations within a stipulated period of time. Through this medium a large number of decrepit and dilapidated old cars and trucks that were beyond that stage where they could have been made road-worthy have been removed from our streets, for in such cases the vehicles are ordered off the street and the license plates orderd to be turned in.

The thought may arise that this is rather an expensive method of enforcing maintenance regulations, but the experience in Toronto is that the revenue derived from the careless and negligent owner or operator adequately covers the cost of enforcement and the psychological effect is constant and lasting.

To further assist us in the promotion of safety in connection with traffic, a financial responsibility law came into effect in the Province of Ontario on the 1st of September this year, and is quite similar in its construction to those in operation for some time past in about a dozen states in the Union. The substance of this new law is as follows:—

The law was passed by the Legislature of Ontario on recommendation of the Honourable Mr. Justice Hodgins, as Royal Commissioner, after careful inquiry by him in Canada, England and the United States. It has been endorsed by the Ontario Motor League, by the Canadian Manufacturers' Association, by the Ontario Associated Boards of Trade and Chambers of Commerce, by the Toronto Board of Trade, and by the Canadian Automobile Underwriters' Association. This law applies to all automobiles, motor trucks, trailers, motorcycles and tractors. The Act will apply penalties only to those who bring themselves under it It is intended to encourage safe and careful driving and to penalize reckless or careless drivers. Under this law the operator's license and his motor vehicle permit will be suspended until the holder has given proof of his financial responsibility if any of the following offenses have been committed in Ontario or in any other Province of the Dominion of Canada or in any of the states of the United States; or if he has not paid any final judgment against him for damages caused to any person to the limit of $5,000 for one person and $10,000 if two or more persons have been injured, or to the property of another in excess of $100 and up to $1,000 arising out of a motor vehicle accident, whether such judgment be rendered against him in Ontario or in any other Province of Canada. The following are the offences mentioned in the act:

Reckless driving if any injury to any person or property occurs in connection therewith.
Racing on a highway.
Exceeding the speed limit if any injury to any person or property occurs in connection therewith.
Failing to remain at or return to the scene of an accident.
Driving without holding a license.
Any criminal offence involving use of a motor vehicle which includes any conviction for driving a motor car while intoxicated.

The suspension of an owner's permit will apply to all the cars owned by the offender. If damage be done to the person or property of others the operator's license or motor vehicle permit which has been suspended will not be restored until damages awarded by a court in Ontario or in any other Province of Canada have been paid. Payment of damages by installments may be authorized by the court in Ontario which gave judgment. Proof of financial responsibility will also be required for the future. Proof of financial responsibility may be given by any one of the following methods:

Filing of a policy of an authorized insurance company with limits of $5,000/10,000 for public liability and $1,000 for property damage.
Filing of bond of an authorized guarantee or surety company.
Filing of a bond by two sureties approved by the county judge.
Deposit of securities to amount of $11,000.

When proof of financial responsibility has been required, such must be continued for three years. If the person to whom an insurance policy was issued has violated its terms whether by misstatement in his application for insurance or on breach of the conditions of the policy, the person injured may still claim against the insurance company, but in that event the insurance company by a provision in their policy, may have a right of action against their policyholder for recovery of the damages paid on his behalf.

Every motor accident in Ontario resulting in injury to any person, or damage to property which apparently exceeds $50, must be reported to the police by the persons involved and by the Police to the Registrar of Motor Vehicles in Ontario. The Registrar will keep a permanent record for each person involved in an accident and a copy of such driving record may be obtained on request, and payment of a fee of $1.00.

Under reciprocal arrangements with other Provinces and States of the United States any driving offence by an Ontario motorist committed outside of Ontario will be reported to the Registrar of Motor Vehicles in Ontario, who may then require proof of financial responsibility. Also Ontario will report any offence in Ontario by drivers of cars of other Provinces and States to the official who issued the license.

Any person insured may obtain a certificate of insurance from the company which has issued a policy to him and file it with the Registrar to show his financial responsibility so that in the event of an offence under the Act his license or permit would not be immediately suspended. No filing of insurance certificates or other proof of financial responsibility can be made with the Registrar of Motor Vehicles until after September 1st, 1930, when the Act comes into force.

There is no doubt in my mind that this law will eventually materially aid in the elimination of carelessness and negligence which are so ever present on our highways and byways.

Accident reports no matter how great or small are essential. In this new law in Ontario, penalties are provided for in the case of those who neglect to report accidents. The reconstruction of accidents as soon as possible after their occurrence, by competent and disinterested persons, is to my mind, very valuable data, and in the city of Toronto two experienced men are on duty at all times, expressly for the purpose of repairing to the scenes of accidents immediately, and ascertaining the true facts, such as: skid marks, damage to vehicles, conditions of operators, condition of roadways, visibility, weather conditions etc., and this report is filed away and follows any subsequent case or action until same is completed. To obtain any results that are commendable, enforcing authorities must have the necessary backing and confidence of the judicial departments, and in this respect Toronto, Ontario, and in fact the Dominion of Canada as a whole is 100 per cent, by reason of the fact that wherever negligence or carelessness is proven, or evidence of disregard for existing regulations is shown, little or no consideration is given to offenders.

In closing I would like to emphasize the point that while I am of the opinion that any safety movement, no matter how great or small, is commendable to obtain any great or lasting results the movement must be constant and the co-operation of all concerned is essential. In Toronto, the Safety League, Motor League and all right thinking motorists have been largely instrumental in bringing about results that have been obtained, and I feel that if the campaign had been pursued along the lines of prosecution instead of through the channels of cooperation and education it would have been a dismal failure.

The Board of Trade of the city of Toronto created what is known as the Joint Traffic Committee, whose object it is to discuss the various traffic problems, and formulate solutions; and submit recommendations to the authorities for consideration. This committee is comprised of representatives from all of the various business organizations, members of the Safety and Motor Leagues, officials from the Transportation and Police Departments. It functions 100 per cent and such a body would be a decided acquisition and invaluable in connection with the promotion of good local traffic conditions, in any modern city. Under abnormal conditions the help and advice of such a committee is very necessary. The Shrine Convention was held in Toronto in June of this year, and we had approximately 80,000 strangers within our gates during that period. Our records show that there was not a single motor fatality in Toronto during the month of June, neither was there a single serious accident during the Shrine Convention.

Another very strenuous period that occurs annually in Toronto is the Canadian National Exhibition, which attracts tourists and visitors from all over the North American Continent. The average attendance during the two weeks of the Exhibition, which is generally held the last week of August and the first week of September, is two million. It is not unusual, particularly on a public holiday, such as Labor Day, to see ten thousand cars parked in and about the grounds, from not only every Province in the Dominion of Canada, but from every state in the United States. It will be readily seen that on such occasions we have many visitors unfamiliar with our local traffic regulations, and that there is every possibility of unintentional violation. Notwithstanding this condition, the violations are infinitesimal, due to the splendid co-operation which is extended to the authorities by all concerned, without which it would be impossible to handle this situation.

J. F. H. Wyse (Gen'l. Mgr., Canadian National Safety League, Toronto, Ont.): Inspector Greenwood, with his usual modesty, has not told us anything about the traffic lights of which he is in charge. The assembly should hear something about the success with which he has met in this connection.

Inspector Greenwood: To tell you about them would be an absolute repetition of what you heard from Mr. Marsh. We have 125 controlled intersections in Toronto and have yet to have a serious or fatal accident at one of them.

F. C. Berry (Mgr. Safety Dept., Minneapolis Automobile Club, Minneapolis, Minn.): Where the police prosecute and bring about convictions, what becomes of liability suits based upon the conviction which may be assiduously followed up by lawyers?

Inspector Greenwood: In the Dominion of Canada, you cannot make the police court a collecting agency in any way. Any collecting done in connection with any accident is done outside of the police court. That is, a charge is simply laid against the man and that is heard and damages do not enter into the action at all. Civil courts are provided for that.

Ed. J. Bath (Legislation & Public Affairs Division, Ohio Farm Bureau Federation, Columbus, O.): How do you determine who is subject to this financial responsibility act. Must one be convicted in a court of record or is it determined on the basis of police judgment? Do both parties to the accident become subject to the act?

Inspector Greenwood: One must be convicted in a court of record before he comes under the new financial responsibility law.

Franklin M. Kreml (Director, Accident Prevention Bureau, Police Department, Evanston, Ill.): Is driving while intoxicated the first violation in point of numbers, or the second or third or fourth, in your opinion?

Inspector Greenwood: Without any statistics, I would say that driving while intoxicated is not the greatest cause of accidents in the city of Toronto. We keep a very, very strict hand upon those who would drive while intoxicated, and even upon those who take liquor and are not what you could absolutely call intoxicated. Our men are especially trained for that feature. If liquor is smelled on the breath of the operator, he can be charged with reckless driving, but, of course, he cannot be convicted of driving while intoxicated.

We have to prove that he is drunk before we can get a conviction so we take the lesser charge of reckless driving, which is generally followed by a very stiff fine and loss of license for about six months. We find we have the number of intoxicated

drivers reduced to a minimum. An intoxicated driver is sure of a minimum of 14 days in jail.

M. W. TORKELSON (Reg. Plan. Director, Wisconsin Highway Commission, Madison, Wis.): To whom do you issue a summons, the driver or owner of the car?

INSPECTOR GREENWOOD: We have an advantage in that point. The summons is always issued to the owner of the car.

The policeman reports a violation on a card. Subsequently information and two summonses are made out. All go to the police court and must be sworn to by a magistrate. Then the two summonses come back and go to the point of service. The man in that division who serves the summons goes up to the house, and possibly the gentleman who owns the car is not at home, but the leaving of a copy of that summons with any adult person in the house constitutes what we call a personal service. Even though the man does not receive a summons, as long as it is left with an adult person in the house, he is considered to have received it.

When the case is slated for hearing, whether the defendant is there or not, the case goes on. If he is not there to defend himself he is invariably convicted and fined. From there on the process of collection, either body or money, is very simple. We can sell enough goods to pay the fine but we never do that. A distress warrant is issued as a matter of course, and then the warrant of commitment is issued and we grab Mr. Man and he either pays up or goes in.

FRANK L. DUGGAN (Chairman Better Traffic Committee, Pittsburgh, Pa.): How do they determine in Toronto whether the driver of a car is intoxicated?

INSPECTOR GREENWOOD: It has reached the point where we have classes in it now. I listened to the evidence of one of our men a few mornings ago. The magistrate said, "How do you know the man was intoxicated?" The officer replied, "His speech was affected, he staggered, he couldn't talk intelligently."

The man then spoke in his own defense, saying, "Didn't I intelligently tell you my name and address? And wasn't it such-and-such a time of day when I was arrested?"

That raised a reasonable doubt, in the magistrate's mind, and the charge was reduced to reckless driving. The offender was punished but not as severely as though convicted of the charge of driving while intoxicated. You have to have them helpless before you can get a conviction of drunkenness.

E. B. LEFFERTS (Mgr., Public Safety Dept., Southern California Automobile Club, Los Angeles, Cal.): Are intoxicated driving cases heard before a jury or before the magistrate.

INSPECTOR GREENWOOD: Every man who appears in any English or Canadian court of justice has the right to be tried before a magistrate or before a court of common jurisdiction, but most of them do not ask for a jury trial, they get it over as quickly as they can.

CHAIRMAN PARKER: The next speaker will be Dr. Miller McClintock, who has done very valuable service to the Commonwealth of Massachusetts which I represent, in establishing the system of uniform traffic regulations.

DR. MILLER MCCLINTOCK (Director, Erskine Bureau for Street Traffic Research, Harvard University, Cambridge, Mass.): When one hears what Inspector Greenwood is doing in Toronto it must enlarge the very deep respect all people interested in law enforcement have always had for the thoroughly effective and dignified way in which Canadian officials handle the matter. I believe that as Inspector Greenwood spoke you must also have thought that this very clear-cut, simple, direct and effective mechanism for law enforcement which the Inspector described marks a very rapid and complete development within the past ten years. Such a statement by a police official ten years ago would have been an impossibility; not that they did not know what needed to be done, but their hands were so tied with antiquated regulations

and legal powers that they were not in a position to act as they would like to have acted.

In the last analysis the enforcement of traffic rules and regulations and the protection of the public on the streets and highways lies in the hands of police departments and we must depend upon their efficiency, their courage, and their honesty to see that our job is done, but we cannot expect them to do it alone. We must not only back them with proper public opinion, but we must likewise make available for them and their cohorts, mechanisms and equipment which will relieve them of at least some of the more mechanical aspects of their duties.

That is why, to me, it is quite significant and proper that following the address of so prominent a police official as Inspector Greenwood we should turn our attention for a few minutes to a consideration and discussion of traffic equipment.

MR. PREWITT: Is it not becoming necessary now to use some kind of a reflector on all signs, because of the increase of night traffic? Down home the police say privately that if they had a serious case of violation of a stop sign at night they could probably get no conviction unless there was a light there or unless it was a reflector type.

DR. M. G. LLOYD (Chief, Sec. of Safety Standards, U. S. Bureau of Standards, Washington, D. C.): It does seem that if a sign is to be effective at night, that it must be illuminated in some way. In cities that may be sufficiently accomplished by the street illumination. Otherwise, it would seem necesary to have some supplementary illumination, either a luminous sign or a reflecting element. The report of the American Engineering Council Committee on the subject did call for illumination of signs.

DR. MCCLINTOCK: In driving lately I have been impressed by the efficiency attained in the reflector element. I recall that not so many years ago a reflector sign was a hazard as far as visibility was concerned.

ERNEST P. GOODRICH (Consulting Engineer, New York City): I would like to suggest to those of you who can do so that you take a trip over some of the county roads in and about Pittsburgh and see the new sort of sign which has been adopted. Not only is this sign low and close to the roadside so that the headlights of the automobile will expose the specific message which is carried on the sign, but also the distance and the direction signs to other places have been so placed that they are visible at night from the headlight reflection.

These signs are also large with large lettering, and they are black on white.

MR. LEFFERTS: Might I suggest to Mr. Prewitt that the standard shapes for warning signs, directional signs, and stop signs, were developed by the American Engineering Council with the thought that it is difficult to thoroughly illuminate every type of sign on a rural road.

The shape of the sign, it seems to me, carries a symbol in itself which ought to take care of the situation if set down low enough to come within the range of the headlights.

DR. MCCLINTOCK: What experience have you gentlemen had with stop signs in cities with respect to night operation? Have any of you had any difficulties in disobedience resulting in complaints that drivers were unable to see non-illuminated stop signs?

E. W. BROWN (Ass't Sup't of Police, Washington, D. C.): On some streets we have plain signs with the word, "Stop," "Boulevard," or "Through Traffic" on them, and in a great many cases where arrests have been made the motorists have claimed that signs were invisible at night. It is my opinion that all stop signs and warning signs should be of reflecting type or illuminated types.

CARL L. OLSEN (Traffic Commissioner, Youngstown, O.): Is there any standard distance at which stop signs should be placed back from the intersection. In Ohio

there is a state law which says they shall be placed back 100 feet. That is all right in the country, but not in the city.

DR. MCCLINTOCK: It is obvious that there is no type of regulation which, if disobeyed, creates greater hazard than does disobedience of the stop regulation because drivers going along the protected way assume that vehicles will enter at very low speed after having come to a full stop. Thus, repeated disobedience of stop regulations is very hazardous.

Furthermore, there is no action required of the motorist which causes more inconvenience than does the stop regulation, except that which is required by the stop and wait requirement of the traffic control signal. For that reason, it has always seemed to me that if a stop regulation is put into effect it should be done only after the most careful consideration of the elements involved, the amount of protection derived as balanced against the amount of inconvenience involved; and that if it were decided that the stop regulation were justifiable, then the mere matter of the expense in the installation, as between getting an ineffective one and one of maximum power, should be secondary consideration.

The octagonal sign, wherever seen means stop in the standard code. The colors adopted for the boulevard stop sign are a yellow background with red letters, a combination of the warning plus the hazard indication. The sign is to be mounted at or as close as possible to the point where the driver is expected to stop his vehicle in obedience to the regulation, which merely means at the nearest boundary line of the street being entered; and, of course, far enough back from the curb to insure the sign's not being invisible to the approaching driver nor overhanging the roadway so as to be destroyed by the vehicles.

If an intersection is irregular and necessitates the stopping of the vehicle other than at the near boundary of the protected street, then the sign should be augmented by a pavement marking or a secondary sign indicating the stop line for the obedience to the regulation.

With those basic principles followed out and with the new installations which have been developed, I believe we are putting our stop regulations on a much sounder basis than we have heretofore.

Now this specific question of illumination is one, I think, of considerable importance. It is true that the incorporation within the stop sign of an actual light source or of a flashing element is costly, but a failure to obey is also costly, and have we in the past, in our desire to put in as many stop regulations as we could, failed to give sufficiently serious consideration to the character of the device we should install to indicate that regulation? There are a number of cities in the United States, Chicago, Pittsburgh, San Francisco among them, that have now definitely adopted the standard of directly illuminated stop signs.

MR. HANRAHAN: In regard to the cost of signs, I might mention that at present there is a $2,000 verdict pending against the city because of an accident on account of insufficient light. You can buy these signs from various manufacturers and they are not so costly. We don't want to wait until we are faced with a $2,000 verdict before we pay $7.50 for a sign. We do the best we can and find the people respect it, and we have very little trouble with intersections where there is a demand for more expensive type of traffic light. I feel that the reflector serves our purpose and we have adopted it as standard.

CORNELIUS J. LYONS (Traffic Accident Analyst, Pittsburgh, Pa.): The city of Pittsburgh has six through traffic streets with 106 illuminated stop lights. Our engineers designed the signs in cooperation with the Gardner Sign Company. They cost about $120 each, and, I believe, they are worth it.

On minor cross streets leading onto the through streets we do not have the illuminated sign, but we have the reflector or cat's eye type.

MR. FILKINS: We have a number of through streets in our city, too many in fact,

and they are not posted with the illuminated stop signs. Three bad accidents occurred on them this year, and in two we took the cases to court to prosecute the people who went through the stop signs into the main artery and caused the wrecks, but we got badly beaten on both cases. The judge decided that a stop sign that was not illuminated was not the type of sign that would properly notify the driver that it was a stop street.

So far as possible we are trying to put in all illuminated signs or cat's eye signs. Of course, we are handicapped for money like any other municipality, and in the meantime we are putting in rubber signs many places. I don't know whether those are as efficient as lighted signs, but they are at least in the line of vision where a man can see them. They are in the middle of the street, about 15 feet back from the property line of the street you are coming onto. We are not putting up any more signs until we can have them illuminated.

DR. MCCLINTOCK: At the present time, when a traffic sign or signal is installed, where it is an important matter of public safety or convenience, the matter of cost ought to be out of the picture. In other words, it is better to delay frequently the attempt to put a regulation into effect if money is not available rather than to put it into effect and have a cheap and inadequate installation turn out to be exceedingly costly in the long run.

L. SEGOE (Consulting Engineer, Cincinnati, O.): Is it possible, in view of the lack of present day experience, to indicate to police officials the places where and the conditions under which the vehicle actuated traffic signal can find its application?

H. A. WILCOX, JR. (Engineer, Automatic Signal Company, New Haven, Conn.): We believe it is applicable in every case. The fundamental part of its operation is the distribution of the right of way according to actual traffic conditions, rather than on the average traffic conditions.

A great many men going out from a factory might mean an abnormal rush of traffic in one direction, but the traffic actuated signal would divide the period exactly according to the distribution of traffic under the instantaneous conditions.

If, for instance, a signal were timed for 20 seconds on one street and 40 seconds on the other, it is quite possible that during 30 per cent or almost all of the green period on one street, you could have had traffic using the intersection very efficiently, but it often happens in the last ten or fifteen seconds you hold the right of way on one street unnecessarily because the light is timed for average conditions, and the street that has waiting traffic could be used more efficiently. Therefore by cutting off five, ten or fifteen seconds that remain after the traffic is through you add another five, ten or fifteen seconds to the time of the other street which can use it efficiently. It is just a difference of having the intersection always used at its maximum efficiency.

I believe you all agree that after the intersection once becomes congested you are in a bad way because the very presence of all this traffic makes the movement very slow. The cars interfere with one another. By keeping it from becoming congested we can, in a great many cases, go right through the normal peak period of traffic without having any congestion apparent. The little bits of time that are saved really make the difference between a congested intersection and one where the traffic is kept moving.

DR. MCCLINTOCK: I believe that in the last three or four years there has been no more interesting development to be found anywhere in the traffic control field from the standpoint of mechanical apparatus than in the development of various forms of traffic-actuated signals. We say this with assurance that the traffic actuated signal has a very important part to play in traffic regulation in the future, and surely no public official can feel that he is adequately informed on the matter of traffic devices unless he knows the principles involved in traffic-actuated signals and in their actual application.

DAVID BRECROFT (N. Y. Mgr., Bendix Aviation Corp., N. Y. C.): We have had five traffic-actuated signals in operation for approximately three years.

I quite agree with what you say that any community ought to look into these matters. I am not in any sense interested in them, except merely as a citizen, but we find them exceedingly desirable.

QUESTION: What is the cost of one of these signals?

MR. WILCOX: That is a hard question to answer. At an intersection having five approaches where we use a three-period timer, the equipment alone would cost about $2,500.

M. W. TORKELSON (Wisconsin Highway Commission, Madison, Wis.): I was riding down town with a brilliant lawyer and we came to an old-fashioned stop and go signal set against us. We waited almost the full period for the signal to turn in our favor, without another vehicle in sight anywhere. And when we had started again this lawyer said, "Whenever I have to do that I always feel as though I had accomplished a futility."

That is the difference between traffic-actuated signals and other signals. The old-fashioned stop and go signal makes you stop when there is no reason why you should stop, and the traffic-actuated signal only makes you stop when you ought to stop, and, in my opinion, that is the greatest point in its favor.

DR. MCCLINTOCK: These devices were bought and paid for for the purpose of giving assistance. Public irritation against them is a bad situation. Happily, it can be mitigated somewhat.

I believe we have failed to give due credit to the manufacturers who have spent thousands of dollars in the design and development and construction of traffic devices.

Notwithstanding that research and development which has taken place on the part of the manufacturers there is no lessened responsibility on the part of engineers or public officials to see that only traffic devices are selected which are suitable for the conditions under which they are to be used, and I submit to you that that cannot be done on the basis of casual opinion. I think those among you who are most experienced in the installation and operation of traffic devices of one kind or another would be the first to support me in that statement, and to admit that they, themselves, notwithstanding their rich experience, are not in a position out of casual observation to determine the type or method of operation which should be used, particularly in connection with traffic control signals.

ADJOURNMENT

Traffic Engineering Problems

Thursday Afternoon, October 2, 1930

DEAN A. N. JOHNSON, Chairman
College of Engineering, University of Maryland

Dean A. N. Johnson of the College of Engineering, University of Maryland, presided.

CHAIRMAN JOHNSON: The meeting opens with a paper on "Coordination of Local and Through Routes in Cities," by Mr. Segoe, Consulting Engineer of Cincinnati.

Coordination of Local and Through Routes in Cities

By L. SEGOE
Consulting Engineer and City Planner, Cincinnati, O.

Entering the average city over a main highway, through traffic commonly experiences increasing congestion. On the street which carries the through route across the city, the volume of traffic increases anywhere from five to twenty times; movement is retarded by cross traffic, stopping street cars, and vehicles maneuvering into or out of parking positions; route markings become confused by commercial and parking signs. The results are slow progress, fatigue, extra mileage, considerable interference with city traffic, and even accidents.

Some of the difficulties of through traffic in cities are due to the same causes as those of local traffic, such as the inadequacy of the street system, some undoubtedly are caused by not quite satisfactory provisions for the handling of this type of traffic and some by the conflict between city and through traffic, arising from their different requirements and characteristics.

Accepting as a premise that signals, signs, markings and traffic regulations are but the means for the operation of the street system, the latter being the plant for the turning out of street transportation, that is, of passenger miles and ton miles, manifestly, improvements in the street system, that is, in the plant, have at least as great an effect on the free and safe handling of traffic, which is the output, as improvements in operating methods, that is in traffic regulations.

One of the main problems cities are facing today is the rehabilitation and amplification of their street system, by widenings, extensions, alignments and grade rectifications, and by the improvement or special treatment of street intersections. However, since these corrective measures represent collectively an enormous outlay of funds and therefore have to be carried out gradually, the making of best use of the existing street system by appropriate traffic regulations, signs, signals, and markings becomes the immediate problem of the municipal authorities and of the traffic engineer.

Inasmuch as the basic principles that should be followed in devising a practicable operating method for an inadequate street system to increase its traffic handling capacity (a part of which consists of the proper coordinating of through routes with local streets), are the same as those that should be employed in the initial design of the thoroughfare system of cities, or in the rehabilitation of an existing system, it appears to be appropriate to discuss some of these principles.

Opportunities for the coordination of through routes and local streets in the initial basic design of cities are of course extremely rare. Madrid, Leningrad, Washington, Salt Lake City, Savannah and the new capital of Australia, Canberra, are some

exceptions. However, on a smaller scale in the layout of garden cities and small industrial towns, not infrequently opportunities are presented for this coordination by correct initial design. Latchworth, Welwlyn, Port Sunlight, in England. Kingsport, Tenn., Marimont, O., Palos Verdes, Calif., and Radburn, N. J. in this country, are but a few examples. On the other hand, in the laying out of new subdivision developments, in the sectors formed by the through highways on the outskirts of cities, a very wide field is open for the application of certain features of design, which would greatly reduce the conflict between through and local traffic and would improve traffic and safety conditions in general.

In a plan for the arrangement of local and through arteries in a semi-circular city, located on one side of a river, belt lines or circumferentials must be provided for both through and local traffic. They function as bypasses and provide for the interchange of traffic between radials. They also act as general collectors and distributors. The belt line through the outskirts is provided for bypassing through traffic around the more intensively built-up sections of the city. The inner belt lines are intended for local traffic, the innermost for the purpose of keeping the traffic not originating in or destined to the central business district, out of such business district. The through routes should not extend directly into the densely built-up sections, and local thoroughfares should be forked towards the center of the city to provide increased street capacity for increased traffic.

In the actual street plan of the City of Cologne, Germany, the bypass belt line and the termination of some of the radial through highways at this belt line are conspicuous.

Szeged, Hungary, a city of about 150,000, situated on the bank of the River Theisz was largely destroyed by a flood about fifty years ago. The writer of this paper helped carry out the plan for the rebuilding of the city after the flood. In that plan are evident even more conspicuously than in that of Cologne the belt routes as well as the termination of the through routes at the inner belt.

In the Regional Highway Plan for the City of Lexington, Kentucky and Environs, recently prepared by the writer, a series of belt lines extend far into the country, and provide for the interchange of traffic between sixteen radial thoroughfares. At present all traffic is forced to penetrate the heart of the city in order to reach another radial through route. Lexington has an unusually inadequate street system, which made it necessary frequently to fork traffic arteries towards the center of the city, to distribute thereby the traffic entering the intensively built-up sections among as many of the narrow city streets as was found practicable.

In recent traffic studies, these principles have been freely applied in the selection of routes for through traffic, to establish over the existing streets, (by routing and traffic regulations) a system of traffic arteries which approximate the theoretical model first mentioned, endeavoring to make up in part for what has not been provided in the initial design.

The through street system of San Antonio, Tex., was prepared as a result of a study by the staff of the National Safety Council. In spite of a most unfavorable street layout, a simple loop and feeder arrangement has been developed, which will permit through traffic to bypass the business center and later, when the tentative outer loop, is provided, this through traffic will be able to bypass even the more intensively built up residential sections. Similar systems of through routes have been developed in a great many other cities of which Detroit may be mentioned as having a complete outer loop around even its semi-urban districts.

Needless to say, in the replanning of thoroughfare systems of cities and when establishing through routes by traffic regulations, the application of the principles and methods illustrated has to be reconciled with the established layout of streets and, consequently, compromises are often necessary.

In some instances, the location of a special link in the through highway route, such as a bridge or a tunnel makes it unavoidable for through traffic to cross intensively built up sections of the city. Under such conditions it becomes necessary to segregate through routes from local routes. Where the volumes of through or local traffic, or both, is very heavy, or where the routing of through traffic across a city district would seriously interfere with the normal life and development of such district, it may become necessary to carry through traffic on a separate level as in the case of the Jersey City approaches to the Holland Tubes. In less intensively developed city districts, the segregation of through and local traffic may be accomplished by providing, within the same right of way, separate roadways for through and for local traffic and, when such right of way is of restricted width, then within the same roadway, by an appropriate arrangement of traffic lanes.

For example, on a right of way 140 feet wide for the handling of through and local traffic on separate roadways, except for major thoroughfares, intersecting streets should not cross the center roadway which is to carry fast moving through traffic, but should enter over the roadways on the sides principally provided for local traffic. The advantages of such an arrangement from the standpoint of safety and of reducing intersection interference are too obvious to need explanation.

However, aside from the basic design of the street system or from the manner of the routing of through traffic, the handling of traffic at intersections has the greatest effect upon the movement of traffic and safety along through traffic arteries.

It is generally known that the intersection is the greatest single obstacle to the full utilization of the mid-block capacity of streets and that it is the location of maximum danger. Depending upon the amount of traffic on the cross street and on the proportion of turning movements, the capacity of the street at the intersection may be reduced to as little as 30 per cent of its mid-block capacity.

Of course, the most effective means for eliminating the intersection problem would be the elimination of the intersection itself by separation of grades. However, the wholesale application of this remedy is prohibitive financially and is probably impractical from other standpoints. Moreover, except in special locations, such as the intersection of two very heavily traveled traffic arteries, these highway grade separations would hardly be economically justifiable even in the outlying districts, while in the intensively built up districts, they would likely prove enormously costly. It is more than questionable whether the traffic handling capacity of even such intersections, and this, of course, is the primary object of a highway grade separation, could not be attained by the much more inexpensive method of widened street sections near the intersections, which arrangement would also obviate the need of costly ramps for the interchange of traffic. It is not intended to imply that there are not special instances and locations where grade separation may not be appropriately employed. Reference was already made to the Jersey City approaches to the Holland Tubes. Quite recently the grades were separated at the intersection of Routes 4 and 25 near Rahway, N. J. by a very complete arrangement. The Lincoln Park and South Park Commissioners in Chicago built several isolated grade separations as did the Westchester County Park Commission, although in the last named case topographic conditions rendered such grade separation particularly appropriate.

However, as far as the majority of intersections of through routes with local streets are concerned, the reduction of the intersection interference by the physical rearrangement of the intersection will require much less costly methods than highway grade separations.

At the intersection of a local secondary traffic artery with a through route, the width of the former may be greatly increased for a distance of about 150 feet back from the intersection for the purpose of providing a reservoir for cross traffic. This traffic would line up four or five abreast waiting for the signal light, and at the flash of the green light would quickly clear the intersection. The reduction of the time required

for the handling of this cross traffic across the intersection would correspondingly increase the traffic handling capacity of the through route.

In a local business center at the intersection of a through route with a city thoroughfare, divided roadways for through and local traffic and freedom from interference by minor street intersections are the means employed to reduce the conflict between through and local traffic and to minimize the accident hazard arising from such interference.

As may have been noted thus far this paper was confined principally to physical design and routing as a means for coordinating through routes and local streets in cities. The second major angle of the subject would involve the discussion of signs, markings, signals and regulations as regulatory means for bringing about such coordination. However, inasmuch as the network of through highways would usually be a part of the city's system of through streets, and inasmuch as a very comprehensive study was recently made by the staff of the Council of the planning of through streets, as well as of traffic regulations, of marking and signaling, in connection with such through streets, (which study is in print and has been widely distributed) the writer considers it superfluous to repeat here the conclusions of this study, with which he finds himself in complete agreement.

Accepting thus that the principles in the planning, regulation and signaling of city through streets are applicable to through highway routes crossing cities, it ought to be emphasized that the marking of the latter routes should receive a great deal more attention than is necessary in the case of city through streets, and infinitely more than can be evidenced at present in most cities. Indeed, in comparison with the guidance that is extended to the driver on the rural highway in the form of clearly visible and frequently placed route markings and direction signs, he must often feel, when reaching the intensively built up sections of the city, as if he had been led into a labyrinth and left to his own resources. It should be borne in mind that in the city it is often difficult to read route numbers, direction signs, etc., because of the confusing effect of the large number of other traffic, parking and commercial signs, and because of the overwhelming demand on the attention of the driver by the operation of the vehicle. The placing of the route numbers on the far corner of every intersection along the route should be a minimum requirement, not several blocks apart as at present. There can never be too many route markers on a busy city street if confusion and delays to both local and through traffic are to be minimized.

One difficulty that may arise from the frequent placing of route numbers on streets carrying several routes, may be the accumulation of a large number of route numbers and direction signs on the same post, which condition, considering the type of route and direction markers now in use, would result in complicated and confusing picture difficult to remember, even for the distance of one block.

The Canadians use a combined warning and directional sign in the form of a simple diagram of the roads just ahead. One glance at the diagram "tells the story" clearly and simply. Memorizing the diagram is easy, and a few seconds later the driver meets the same picture on the ground. There is no possibility of turning into the side road by mistake.

It is submitted that the use of diagrams for conveying directional information is superior in clarity, simplicity and ease of memorizing to our present method of marking and should be, therefore, freely used for this purpose.

In concluding it is desired to submit a minor suggestion for the improvement of our present method of route marking. It would be very desirable, at least in cities, to use route markers that in addition to the route number would designate the two directions of the route by principal compass points, for example U. S. 40 E. and U. S. 40 W. When entering the route at present the driver not familiar with the route needs to refer to the map or must ask for information, otherwise he may easily travel in the wrong direction for several miles before something makes him suspect his mistake. Because in cities even through routes often change directions, knowledge of and attention to geographical directions are of little assistance. The need for this additional information is particularly left at night or after one of the all too frequent and frequently not all too well marked city detours.

CHAIRMAN JOHNSON: We will defer discussion of the papers until they have all been presented.

Mr. Van Duzer will speak next. He is the President of the American Road Builders' Association.

Building Safety Into Highways

By W. A. VAN DUZER

Assistant Chief Engineer, Pennsylvania Department of Highways

Building safety into highways means avoiding or mitigating hazards. Accidents are almost invariably directly attributable to negligence or fault of driver rather than to condition of vehicle or road. In many cases, however, a road condition may be a contributing factor.

Sharp curves or crossings with short clear view distance, narrow bridges or culverts, and steep hills, are all places where momentary carelessness may lead to collision or overturning. Highway engineering aims to avoid, eliminate, or modify hazardous conditions, in so far as practical. In cases where hazardous conditions cannot be avoided, eliminated, or modified, the aim is to mark them clearly and distinctly for special driving caution.

Curves

An analysis of accident data of 1926 showed the ratio of curve hazard to be, tangent 1.00, light curve 1.05, sharp curve 8.75, 10 degrees being taken as the point of division between light curve and sharp curve. Present standards of the Pennsylvania Department of Highways establish 4 degrees as maximum curvature for roads of Classes 1 and 2, and 6 degrees as maximum curvature of roads of Class 3, although in some special cases greater curvature is unavoidable. (See accompanying chart.)

The significant features of a curve are clear view distance, skidding resistance, and overturning tendency. The desirable minimum clear view distance is 500 feet, 400 feet being established as requirement for roads of Classes 1 and 2, and 300 feet as requirement for roads of Class 3. In special cases side slopes are benched to increase clear view distance. The tendency to skid or overturn on a curve is offset by superelevation or banking, the Pennsylvania standard of superelevation being one-half inch to three-fourths inch per foot width of pavement on curves of degree exceeding 2 degrees 52 minutes.

Where curvature of degree greater than 9 degrees 32 minutes is unavoidable the pavement is widened by from two feet to six feet.

Three hundred feet in advance of point of curvature an advance warning roadside sign is placed. The standard sign now in use is one painted black on yellow and an improvement under consideration is the substituting of an emblem, a large arrow set with reflecting studs, for the lettered sign. From fifty feet in advance of point of curvature to fifty feet beyond the end of the curve traffic line is painted on the road surface, no crossing of the traffic line being permitted. Approximately at the point of curvature a hexagonal reflecting sign is used. At particularly hazardous curves the painted traffic line is supplemented by a paving marking including the word "Slow" in large letters.

Grades

The afore-mentioned analysis of 1926 accident data showed the ratio of hazard of grades to be, light grades 1.00, heavy grades 5.08, 6 per cent being the limit of light grades. The Pennsylvania standard is 7 per cent maximum grade for roads of Classes 1 and 2 and 8 per cent maximum for roads of Class 3. As gradient increases the tractive resistance of surface becomes more important. Sometimes surfaces that are quite satisfactory in dry weather become slippery when wet and it is important to avoid the use of such surfaces on heavy grades, or to improve their tractive resistance quality by tar surface treatment. The greatest hill hazard is produced by sleet or ice, regardless of type of surface. This condition can be remedied only by temporary covering. Cinders treated with calcium chloride prior to application have been found to be most economical and most effective. In connection with the covering of an icy surface special consideration is given to sections of road adjacent to railroad or highway crossing at common grade. The accompanying tabulation shows braking distances determined by test on dry surfaces for various speeds on various grades.

Three hundred feet in advance of a steep down grade an advance warning roadside sign is used. This sign carries one of two alternative inscriptions, "Dangerous Hill—Go Into Second Gear" or "Dangerous Hill—Trucks Go Into Second Gear" accordingly as the steepness of the hill requires, for safety, all vehicles or only trucks to change gear.

Traffic line is painted on all vertical curves where clear view distance cannot be obtained from a point 250 feet on one side of the summit to a point 250 feet on the other side, the traffic line, generally extending 250 feet on each side of the summit and as in the case of horizontal curve no crossing of the line being permitted.

The combination of vertical and horizontal curvature is especially dangerous and as far as possible is avoided in designing road improvements.

Width of Road

Width of road naturally varies somewhat with volume of traffic. Roads carrying an annual daily average of over 3,000 vehicles are built with three or four lanes. The three lane width being a compromise of expediency in case traffic is heavy periodically in one direction and too heavy for two lanes but not sufficient to warrant four lane construction. The width of shoulders varies from five to ten feet in accordance with class of road.

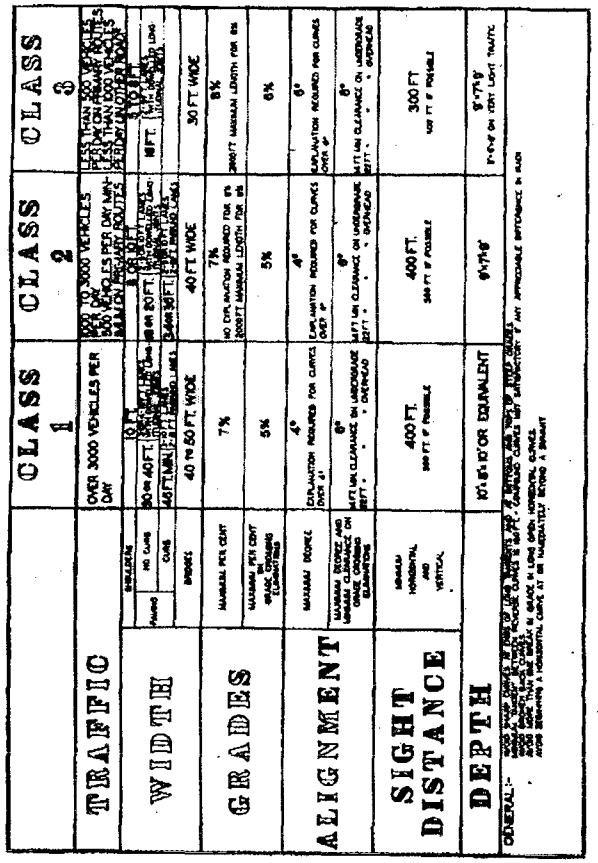
Structures

Bridges are built with sufficient clear width between wheel guards, so that maximum volume of traffic can be carried without congestion, and portals of bridges and underpasses are checkered conspicuously. Culverts are laid or built with end walls or parapets clearing shoulder line to furnish safe shoulder width.

Guard Fence

The Pennsylvania standard of guard fence has been developed by experiment and experience. It is a wire rope fence supported by wooden posts with offset metal fixtures, such that a vehicle can run along or graze the rope of the fence without having the hubs come in contact with the fence posts. Three-fourths inch rope is used in the upper and lower line except at especially dangerous locations where one-inch rope is used for the upper line.

General rules for locating guard fences, with reference to alignment, gradient, presence of pole line along slope, and height of fill, are as follows:



Commonwealth of Pennsylvania
Department of Highways

Braking Distance

M.P.H. Speed	Minus Per Cent Grade	Two-Wheel Brakes Braking Distance	Four-Wheel Brakes Braking Distance	Four-Wheel Brakes Braking Distance Plus 17 Feet
	0	10.0	6.0	23.0
	2	12.5	7.5	24.5
10	4	15.0	9.0	26.0
	6	17.5	10.5	27.5
	8	20.0	12.0	29.0
	0	22.50	13.5	30.5
	2	28.12	16.9	33.9
15	4	33.75	20.3	37.3
	6	39.37	23.6	40.6
	8	45.00	27.0	44.0
	0	40.0	24.0	41.0
	2	50.0	30.0	47.0
20	4	60.0	36.0	53.0
	6	70.0	42.0	59.0
	8	80.0	48.0	65.0
	0	62.5	37.5	54.5
	2	78.0	46.8	63.8
25	4	93.6	56.2	73.2
	6	109.2	65.5	82.5
	8	124.8	74.9	91.9
	0	90.0	54.0	71.0
	2	112.5	67.5	84.5
30	4	135.0	81.0	98.0
	6	157.5	94.5	111.5
	8	180.0	108.0	125.0
	0	122.5	73.5	90.5
	2	153.0	91.8	108.8
35	4	183.6	110.2	127.2
	6	214.2	128.5	145.5
	8	244.8	146.9	163.9
	0	160.0	96.0	113.0
	2	200.0	120.0	137.0
40	4	240.0	144.0	161.0
	6	280.0	168.0	185.0
	8	320.0	192.0	209.0

Tabulation of Requirements

Tangents Location	Fill	Curves Degree	Grade	Fill
Tangent, on pole line, Grade over 5%	10 ft.			
Tangent, no pole line, Grade over 5%	6 ft.	Up to 5°	Grade more than 5%	5 ft.
Approaching narrow bridges	2 ft.	Up to 10°	Grade less than 5%	5 ft.
Flooded sections	2 ft.	Up to 10°	Grade more than 5%	4 ft.
		Up to 20°	Grade less than 5%	4 ft.
		Up to 20°	Grade more than 5%	3 ft.
		Over 20°	———	3 ft.

Railroad Crossings

The intersection of railroad and highway at common grade is productive of many serious accidents. Such grade crossings are avoided as far as possible in locating highways, or are eliminated when practicable by grading.

Were railroad grade crossings are unavoidable great care is given to providing maximum clear view distance and marking. Three hundred feet in advance of the track an advance warning roadside sign is used, warning pavement marking is painted with traffic line, and no crossing of the traffic line is permitted. The pavement marking is very conspicuous.

There is an agreement between the railroads, the Public Service Commission and the Department of Highways in Pennsylvania, whereby the railroad companies and the Department of Highways cooperate in placing at grade crossings track circuited red flashing signals, and, where conditions are such that the track circuited signal cannot be seen for at least 500 feet on the approaching highway, a supplementary continuously flashing signal showing a yellow cross and in reflector letters "RR".

The agreement between railroad companies, the Public Service Commission and the Department of Highways, also provides for placing continuously flashing signals at dangerous approaches to separate grade crossings. These signals flash an amber square in diamond position and show the word "Slow" in reflecting letters.

Highway Crossings

The separation of grades at highway intersections is usually impracticable but the hazard of such intersections has been greatly reduced by through traffic route designating and marking. At highway intersections, as at railroad crossings, no definite rule as to clear sight distance can be established but in each case clear sight distance is made as great as possible and no avoidable obstructions are permitted.

There is ample marking at road crossings. Three hundred feet in advance of the intersection there is a roadside sign and at a distance of, according to local conditions, from one hundred to three hundred feet, in advance of the intersection a pavement marking is painted with the word "Slow". Traffic line is painted a corresponding distance on each side of the intersection, and no crossing of the traffic line is permitted. At the road intersection there is a hexagonal reflector sign.

That the effectiveness of built-in highway safety is limited is shown by the fact that the accident rate is not diminishing. Standards of highway construction and maintenance have been improved in recent years and the efficiency of motor vehicles, including braking equipment, has been greatly increased. There does not appear, however, to have been a corresponding improvement in driving and with the increased volume of traffic and higher speed of travel now prevalent any negligence or fault of driver is more likely to have serious consequences. There have been no changes in the natural laws, impact still increases with the square of velocity; there has been no increase in the capacity of the human skull to withstand impact without fracture;

and increased volume of traffic with increased speed of operation has been accompanied by increased toll of accident loss. Highway safety apparently requires more education and close co-ordination of highway construction, highway maintenance and traffic control.

CHAIRMAN JOHNSON: The next paper is to be presented by Mr. Maxwell Halsey, who is Traffic Engineer of the State Department of Public Works, Massachusetts. Mr. Halsey has the distinction of being the first state traffic engineer.

Rural Highway Traffic Problems

By MAXWELL HALSEY
Traffic Engineer for Massachusetts, Boston, Mass.

Rural highway traffic is that which is outside the business and residential areas of cities and towns.

In the past, traffic has been concentrated in the built up areas of large cities, beyond which the volume was so small that a problem seldom existed. The increase in cars and the increased use of each car, has expanded the congestion to the intercity routes and increased speed, has added to the problem. Consequently, there now exists a real rural highway traffic problem, and more and more attention is being attracted to it.

The greatest difference between urban and rural traffic is that of speed. Except upon parkways urban speeds are slow because of heavy volume, narrow streets, short blocks, pedestrians. Under these conditions a mistake in judgment by a motorist can usually be remedied by a quick stop. Upon the open highway, however, a similar error will be much more serious because higher speeds make quick stops hazardous and frequently impossible.

Another important difference is that of traffic. The rural fluctuations in traffic volumes are more frequent and severe than those found in urban districts.

When we frequently drive between cities, states, and even interstate regions it is impossible to learn a different system of control for each jurisdiction through which we pass. The problem of each community can no longer be segregated and handled independently without regard for the problem of adjacent communities.

The two methods usually employed in securing uniformity are: first, a law specifying standards; and second, that of placing a state department in charge, and requiring its approval of all forms of traffic control. The latter is preferable because of its flexibility. The best example of the latter type is to be found in Massachusetts.

In 1928 the Massachusetts legislature passed "An Act Providing for Uniform Traffic Signs, Lights, Markings, Signal Systems and Regulations." There are three main purposes of the Act: first, basic uniformity in signs, signals, control devices and regulations; second, the maximum safety and facility for through traffic on state highways where they pass through cities and towns, (a) by preventing unnecessary obstruction of such routes by improperly placed and operated control devices, (b) by protecting such through routes from dangerous interference from cross traffic by application, where necessary, of the "Through Traffic" or "Boulevard Stop" rule; and (c) the creation of a responsible traffic engineering agency in the Department of Public Works capable of cooperating with local officials in developing and administering safe and uniform methods of traffic control.

State uniformity, then, assists rural traffic control, and ties it up with urban traffic control, by acquainting motorists with a consistent method of traffic regulations.

Attacking the Rural Traffic Problem

It is particularly important that the rural traffic problem be accurately located and understood before any corrective attempts are started. I shall take as an example our experiences in Massachusetts.

The Traffic Volume Study. Since the State was primarily interested in rural traffic, all traffic counts were made outside of business and residential districts. A flow map was prepared which showed the exact volume on each numbered route.

Fluctuation of Rural Highway Traffic. Yearly fluctuation of rural highway traffic has been calculated since 1909 by triennial counts. In 1928, yearly counts were begun and will be continued.

The monthly fluctuation has been determined from the volume of gasoline sold. August is the peak month, almost 32% higher than the average. July 27% higher. January and February were the low months with 35% less than average. This spread of 67% during the year indicates the concentration of the problem during the summer months.

The daily variation showed Sunday to be the heaviest day, with 91% more traffic than the average week day. Saturday was next with 26% more. Tuesday is the lowest with 7% less than the average week day. These figures show the importance of week-end travel upon outlying highways.

The hourly variation for the week days (Monday through Friday) showed a fairly heavy morning peak between ten and eleven, and a heavy evening peak between five and six. The Saturday flow showed a peak condition between 2 and 5 P. M. The Sunday flow showed a slight morning peak at 12:30 P. M. and a heavy evening peak from 4:30 to 7:00 P. M.

The counts showed that of the total traffic only 9% was composed of commercial vehicles. This was further subdivided into heavy trucks 4%, light trucks 4%, and busses 1%.

Speed and Obstruction Studies. The next step was to determine what speed existed at different points along each route.

Delay Studies. Having found from speed and obstruction studies the points at which the delay occurs, the next step was to measure the amount of that delay. By determining the actual amount of delay for each intersection, their comparative importance was established, and the actual amount of delay served to indicate what type of control should be used and what type could be economically justified.

Accident Study. From the viewpoint of the traffic control engineer the most important fact regarding an accident is its location. Without this fact his efforts will be scattered over the entire highway. In the past the matter of location was often neglected. The name of the city or town was mentioned, and sometimes the name of the highway, but seldom the exact location. This provided the engineer with very little material. The accident form which is used, and the instructions concerning it should be such as to induce those reporting the accidents to locate them within at least 100 feet. In Massachusetts, before the introduction of a uniform accident reporting form, only 33% of the accident reports gave locations which were of any use. At the present time 90% have accurate locations.

To gather accident location reports and file them by names is of no benefit to the traffic engineer, they must be filed by location, and in such a manner that they can be easily compared, but the spot map is the most effective means of recording the location of accidents. One of the best examples of such a spot map is being kept by the Department of Public Works of the Commonwealth of Massachusetts. This map is nine feet high and eighteen feet long. The entire numbered route system is marked upon it and accidents are shown with tacks. The spot map shows at a glance the comparative hazard of each route. As soon as any particular route or intersection or curve begins to show upon the map, a study is made to determine the

causes of accidents, and, if they are the fault of the highway, steps are immediately taken to correct them.

Summary of the Survey. The above facts give us practically the whole picture. We have the volume of traffic using each important road, we have the speed at which that volume travels, we have the points at which the delay occurs, we have the amount of the delay wherever it is heavy enough to cause congestion, and we have the location of all the accidents that have occurred. All that remains now is to pick out the worst spots and improve them. The repetition of the aforementioned procedure at a later date will indicate just how effective the treatment of each individual problem has been.

Methods of Reducing Congestion and Accidents

Publicity. Without publicity the public will feel that nothing is being done, and will make no attempt to cooperate. Publicity may appear through newspaper releases or over the radio. It may be effectively used in the form of official bulletins. By way of example, I should like to call attention to two of the bulletins issued in Massachusetts to assist local communities in handling their traffic problems. Bulletin Number 1, "Recommendations and Requirements Relating to Through Ways", sets forth the proper application of the through way principle as well as its limitations. Bulletin Number 2, "A Standard Code for Traffic Control Signal Installation and Operation," covers all the more important aspects of the traffic control signal.

Rules and Regulations. The complaint seems to be that rules are complex and out of date.

Control Devices. Whenever it is possible the highway should be so constructed as to make control unnecessary.

Traffic control signals are sometimes installed where a decrease in speed would be adequate. Still another device is the flashing beacon, which has been so over used that it has lost much of its effectiveness. The use of signs and markings is being improved every day and is undoubtedly having a good effect. The use of rotary traffic circles and grade separations is in its infancy. They are both bound to become very popular within the next few years.

Enforcement. The problem of enforcement is a most difficult one. It needs improvement all the way from prevention of the fixing of cases to the expansion of the existing personnel. Without a certain measure of enforcement none of the devices will be effective.

Removing the Necessity for Control

It is fundamental that we should build our highways in such a way as to prevent and discourage accidents and congestion. We should not have to introduce control devices to correct what could have been prevented in the beginning. Attempts made in the past to lessen the need for control have been cutting down grades on hills, lessening curves and roughening the surface of our highways. More recently developed methods are as follows.

Medial Strips or Parkways. Failure of slow moving vehicles to take the right lane causes those passing to travel on the left. Failure to keep to the right of the center line is quite common, and frequently results in accidents and congestion. The introduction of a raised medial strip or parkway is a means of automatically forcing motorists to stay on the correct side of the road. The physical separation of the two center lanes with the resulting abolition of the head-on collision is a real factor in accident reduction. It has the further advantage of reducing headlight glare.

Improved Shoulders for Parking. Lanes intended for travel are frequently used for parking which creates a series of bottle-necks, and seriously reduces the capacity of the highway. By smoothing and levelling the shoulder and possibly treating it with oil or tar, it can be made to attract parking, and thus all the lanes of the highway can be made free for travel.

Clearance from Guard Rail. Another factor which frequently limits the use of the outer lane is the proximity of the guard-rail to the edge of the improved surface. Motorists will not travel close to fixed objects at high speeds, and if there is not room for them to move over they will slow down. The usual result of close guard rails is that motorists swing to the left and encroach upon the lane intended for passing. This either causes accidents or reduces the capacity of the highway. An additional two or three feet of clearance will do much to encourage motorists to use the outside lane.

Dual Type Highways. In the case of earlier roads with a high crown, truck operators tried to drive on top because to drive on the side meant hanging on to the old reversible type steering wheel with both hands to keep the vehicle out of the ditch. Passenger car operators were frequently a little afraid to drive on an angle, and hated to be too close to any ditch; and in wet weather both truck and passenger car operators drove on top for safety. Modern highways have so little crown, and non-reversible steering wheels require so little effort, that this reason is no longer effective. The second, and by far the most important reason, is that the surfaces of the right hand lanes are frequently not so smooth and attractive as that of the center lane or lanes. *An important principle of highway travel is that traffic will travel upon the most attractive surface to be found.* Motorists will frequently drive upon the left side of the road if it has the smoother surface. In the third place, center lanes are frequently repaired more consistently than right hand lanes. The result is that the outside lanes, are frequentiy less attractive in surface than the center.

Let us next consider a way to facilitate passing by keeping the slow moving traffic to the right. The most obvious method is to provide the necessary room, erect signs, paint lane lines, and then provide motorcycle officers to enforce. This would undoubtedly work, and is one of the benefits of motorized patrol, but traffic officers are expensive, and it is economically almost impossible to provide enough of them to develop such a driving habit unassisted. A great improvement to this method is to provide right hand lanes, which you expect to be used by the slowly moving traffic, with surfaces having attractive power not only equal to that of the center lanes but far superior to it. If this is done, traffic will follow the lines of least resistance, and seeking the best surface, will automatically keep to the right.

Several pieces of road designed for this purpose have been constructed throughout the country. Those in Massachusetts are called the "dual" type, and are constructed with the outside lanes of cement and the center lane or lanes of macadam. This provides a marked contrast between the inside and outside lanes. The cement, being smoother than the macadam, attracts all the traffic and the macadam is used only for passing. Driving upon the macadam gives a slight vibration and a rumble, caused to some extent, by the use of balloon tires. The lanes are clearly marked by the joints and by the contrast between the light color of the cement and the dark color of the macadam. Those in Massachusetts have been very successful.

There are a few obvious limitations upon the dual type highway. First, the three-lane dual type should not be used around sharp corners, because it would encourage passing where the vision is obscured. Second, the three or four-lane dual type should not be used where an unbalanced flow may be desired. Third, the cement might not be used economically in swampy ground, without expensive filling, although there is no reason why the same principle of a differentiation of smoothness and color could not be developed in other materials. Fourth, the joints of the dual type might prove an additional maintenance problem, although past experience has not indicated this to be the case.

Channelizing Islands. Another method of physically forcing motorists to drive properly is that of the use of traffic islands. These are particularly useful in prevent-

ing the cutting of corners by those making left turns. These islands when grassed over add an artistic touch to the highway itself.

Grade Separation. The limitations upon the capacity of a highway are to be found at the intersections, and that grade separations are admittedly the ultimate solution. Let me set forth a theory or principle which may lead to their increased use. It is a significant fact that a four-lane highway with grade separations at all important crossroads, has a greater capacity than a six-lane highway without grade separations. It is possible that a careful study of the cost factor would indicate that the former would cost less than the latter. It is my belief that rather than build highways wider than four lanes, the money should be expended upon grade separations in order to bring the capacity of the intersections up to that of the highway between intersections.

Traffic Control Signals

There have been many signals installed which have caused more harm than good. In part this was due to the wrong application of the signal. Let us consider the characteristics of rural intersections.

Character of Rural Intersections. There are certain characteristics which distinguish the rural from the urban intersections.

1. The high speed found upon the outlying highways requires additional safety factors. The signals themselves must be visible for a greater distance ahead. The signal should not turn too quickly in the face of oncoming traffic. A longer yellow period may be needed. Conflicting movements can never be permitted to run together at so high a speed.

2. The absence of pedestrians opens up many possibilities for the increased efficiency of motor vehicle operation.

3. The great distance between important intersections upon the open highway usually makes it unnecessary to coordinate signals at adjacent intersections.

4. The flow of traffic through rural intersections may be light during a good part of the time, but there may occur a sufficient number of peaks to make signals necessary during certain hours. This means that signals must be continually adapting themselves to changing conditions.

5. The proportion of traffic at rural intersections is frequently apt to be one-sided. The actual cross flow may be exceedingly light and yet the main flow so heavy at times that the cross street traffic cannot enter without the aid of signals. An uneven proportion under light traffic conditions represents a situation which makes the timing of a traffic signal very difficult.

Limitations on the Fixed Cycle Signal. One of the greatest difficulties of the fixed cycle is that it is absolutely arbitrary. At urban intersections where the traffic flow is fairly consistent, the fixed-cycle signal gets along fairly well because no matter to which street it turns there will always be vehicles waiting. But at rural intersections, particularly under light traffic conditions, the fixed cycle is inefficient and causes unnecessary delay.

Another limitation of the fixed-time signal is that it must be continually retimed to keep it in step with the actual flow. As the volume decreases the total cycle should be lengthened. Unless the signal is kept in step with traffic conditions it will operate very inefficiently and will cause unnecessary delay.

Another difficulty found in fixed-time cycle signals is that of dividing a short cycle, desirable under light traffic conditions, into a one sided proportion. You might wish to use a 50-second cycle, but if the proportion of traffic were 90-10 you could not because the 10% of 50 seconds is only 5 seconds, not sufficient to permit one vehicle to cross. The only alternatives are to increase the 10% to 20%, or to lengthen the total cycle.

The night stop and go operation of a fixed-time signal is not satisfactory. It is too much to expect the motorist to wait 30 or 40 seconds upon a red signal when there is no cross traffic. This can be remedied to some extent by changing the night operation to flashing yellow which is the best practice, but it lacks the effectiveness of stop and go operation to prevent accidents.

Advantages of the Vehicle Actuated Signal. There are many intersections, particularly in rural areas, which do not have sufficient traffic to warrant or permit efficient fixed cycle operation, and yet where high speed or other conditions have resulted in many accidents and make some sort of positive control necessary. The vehicle actuated signal, by its ability to automatically adjust its operation to existing traffic conditions is an excellent safety device even under light traffic conditions.

The actuated signal is being timed by the flow of traffic as it arrives and thus will automatically adjust its operation to different conditions. This feature is particularly valuable at rural intersections where fluctuations in volume and proportions are frequent.

By allotting time to each street only when vehicles are present and in proportion to the number which arrives, the vehicle actuated signal reduces to a minimum the unnecessary delay.

The detectors or treadles offer a safety feature where high speeds exist. For example, it is possible to place the pavement unit back from the intersection equal to the braking distance for the speeds usually encountered. If a high speed vehicle hits the treadle upon the green, he is guaranteed that it will remain green until after he has passed through the intersection.

Comparison of Delay Caused by Each Type of Signal. In order to determine the relative merits of the different types of control signals, the State of Massachusetts has started a series of delay studies. The following statistics give a rough idea of what may be learned by this method.

At intersection A, the flow was about 25,000 vehicles from 7 A.M. to 11 P.M. on Sunday, and 14,000 vehicles on a week day during the same hours. The actual flow during the study ranged about 500 to 700 vehicles per hour. The proportion of traffic was fairly equal. The delay obtained was the actual time lost by vehicles standing still while waiting for the signal to turn green. The losses due to deceleration and acceleration were not included since they were assumed to be equal for each type of control. The full vehicle actuated control, with detectors upon each entering road, showed a delay per car of 6.84 seconds. The semi-actuated control, with detectors only upon the minor street, indicated a delay per car of 8.52 seconds. The fixed cycle showed a delay per car of 9.60 seconds. Upon the basis of this delay, the full-actuated signal gave 29% less delay than the fixed cycle signal, and the semi actuated signal 13% less delay than the fixed cycle signal. The semi actuated signal did not show up so well at this particular intersection because it is primarily designed to control intersections where the cross traffic is much less than the main flow.

At intersection B, with less traffic and a greater proportion upon the main street, the delays were as follows. Full-actuated control 2.76 seconds per car, semi actuated control 3.42 seconds per car, and fixed cycle control 8.40 seconds per car. This showed the full actuated signal to be 67% more efficient and the semi actuated control 59% more efficient than the fixed cycle control.

Accident Reduction by Actuated Signals. The Commonwealth of Massachusetts has installed several actuated signals upon state highways. One of these has been in action for more than a year, and the rest for periods of from 3 to 5 months. The one which has been in for 13 months has reduced the accidents from an average of two a month to an average of one a month, a reduction of 50%. Of the accidents which have occurred at the nine intersections where signals have been installed, 52% were rear end collisions in which practically no damage was done, 22% were due to

cross movements, and 26% were due to unknown causes. The total of the accidents has been reduced as well as the severity of each accident.

Through Way Regulations

The purpose of a through way regulation is to protect consistently heavy high-speed flows upon main highways from the quick and unexpected entrance of vehicles from the less important cross streets. Since 35 to 40 miles per hour is the popular speed through intersections upon main arteries, it is easy to forecast the result of a car entering from the cross road at 20 miles per hour, particularly if the intersection is blind and the entrance is unexpected. The requirement that the motorist entering from the less important street must stop before entering will prevent many accidents.

The through way regulation is not usually as effective in the city as it is upon the open highway. In the city too many vehicles are apt to be entering from the cross street at the same time. This introduces the difficult problem as to whether each vehicle shall stop or whether a stop from the third position is satisfactory. When the flow from the cross street becomes a steady stream the through way regulation is apt to break down entirely.

The one-sided proportion of traffic found upon the main highway intersections is favorable to the through way regulation. The intermittent flow from the cross roads introduces no difficulties in the actual stopping at the intersection. The high speeds prevalent increase the value of stopping before entering.

It is anticipated that every main highway will eventually have the safety and facility of its flow increased by the through way regulation.

Flashing Beacons

Flashing beacons are simply illuminated signs. Their advantage over the ordinary sign lies in the greater attracting power of their flashing light. This same flash, however, if it is in the form of a round lens has one distinct disadvantage. When it is incorporated into a sign, the flash absolutely obscures the legend of the sign. Motorists traveling at the high speeds of today need not only a general warning but a specific warning of the actual hazard. A few seconds spent in debate as to whether the hazard is a cross road or a curve may result in an accident. For this reason I believe there will be a general tendency toward having flashing beacons give specific types of warning.

One of the most valuable uses of the flashing beacon is in connection with fixed objects in or adjacent to the roadway. The center span of a bridge or trestle, a sharp curve under an underpass, or a right angle turn represent dangerous conditions which can be greatly improved by the use of flashing beacons.

The conversion of an isolated traffic signal into a flashing beacon for night operation is another excellent use. The flashing yellow provides a cautionary indication, which, if obeyed, is better than a stop indication when the traffic flow has dropped to almost nothing.

Another valuable use of the flashing beacon is as a supplement to the stop sign found upon through ways. The flashing red is known almost everywhere as indicating the presence of a through way and as requiring a full stop before entering.

The introduction of reflecting buttons has served to replace some of the demand for beacons. The reflecting buttons are capable of actually illuminating the message and thus giving the motorist the fullest information. The Commonwealth of Massachusetts is undertaking to illuminate all its warning signs and numbered highway markers. The federal route markers and many of the warning signs have already been converted.

Traffic Signs

The greatest difference in the demand placed upon signs by rural and urban conditions is that of size and visibility. In the city 18-inch signs suffice; vehicle speeds are moderate, a large sign is somewhat difficult to mount, and, the sign can be mounted very close to the edge of the pavement. Rural highway conditions place much heavier demands upon a sign. High speeds require that the sign be more visible to provide warning a greater distance. The presence of shoulders and drainage ditches sometimes makes it difficult to place a sign close to the edge of the improved surface. The 24-inch sign may be adequate for the majority of locations, but there are many places where greater visibility is necessary. Sometimes an auxiliary sign may be used, at others the only satisfactory method is that of increasing the size of the sign. I have seen many signs which compared favorably with small billboards in their size and effectiveness.

There is a real demand for the illumination of highway signs at night. The travel at night is usually at high speeds, and dangerous curves and corners become still more hazardous. The general indications are that more motorists will travel at night to avoid the congestion of the day.

The demand for uniformity of signs is so obvious and the general movement toward it so well under way that nothing is needed but further encouragement.

There is one aspect of signs, however, which needs consideration, and that is the appearance of the signs. Signs which are kept clean and well painted are apt to be noticed and obeyed because they give the impression that the highway is being controlled. Signs which look delapidated give the impression that they have been put up and forgotten, and hence there is no fear that any enforcement is taking place.

The greatest need which signs have today is enforcement. One of the greatest reasons why traffic control signals are more effective than signs is because they are enforced. Motorists are apprehended, convicted and fined for a violation of signals, and it is rare that a motorist is apprehended for disobeying a sign. The motorist who drives through a blind intersection at 40 miles per hour deserves to be arrested just as much as the motorist who goes by a red traffic signal.

Street traffic markings are another type of sign. There are certain types of information which it is difficult or impossible to give the motorist by means of signs posted at the side of the road. Lines or words painted on the pavement, therefore, are used to provide information which cannot be given any other way. Thus, lanes, the center line of the road, and street car overhang can only be shown by painted lines.

There is a second important use of markings, and that is their use as a supplement to signs. Stop signs are frequently supplemented by a stop line indicating the exact point at which vehicles are to stop and by the word "stop" upon the pavement. Pavement markings are limited in their use because they are made more or less invisible by rain and snow.

The value of center and lane lines to assist in alignment of traffic and to serve as guides in darkness and fogs is very high. Their use will increase.

Rural Highway Traffic in the Future

The development of traffic control has advanced to a sufficient degree to provide safe and convenient travel if all the recent improvement could be concentrated upon one highway. The main highway traffic would be protected from the unimportant light cross traffic by the Through Way regulation. If the cross traffic should be enough to warrant signals, the vehicle actuated signal would guarantee that no traffic would be stopped unless cross traffic were actually there to use the time. If cross traffic were still heavier, a large rotary traffic system would permit continuous movement at a

fairly high rate of speed, and if the cross traffic movement approached or equalled that of the main highway, a grade separation would be provided. The highway would be of sufficient width to permit passing at all times, and the outside lanes would be attractive enough to induce the slow-moving vehicles to use them. Adequate center strips or parkways would be installed to reduce the head light glare, and to prevent head-on collisions between the two high speed lanes. The surface of the highway would be such as to prevent skidding. As a result of all these improvements the economic saving in accidents and delay would be tremendous.

All of the above devices covered in this picture have already been tried out and found to be successful. Each has its particular function, and it will soon be possible to determine from the factors of traffic volume, speed, and accidents just which one is needed for any particular spot.

It is important for time and energy to be spent upon experiments in order that we may progress. But it is even more important that we should employ those facilities already discussed. We have been backward in using the hundreds of improvements which have been tested and found successful.

CHAIRMAN JOHNSON: These three excellent papers are now before us for discussion.

NATHAN HARRIS (Engr., Board of Estimate & Taxation, Minneapolis): What experience have you had in Massachusetts with pedestrian actuated devices for crossing highways, especially rural highways, which must be crossed by school children.

MR. HALSEY: That is a controversial question. If the children are young I think the officer is needed because the little tots can hardly be expected to know exactly what to do. The older children could use a signal of that kind easily. There is a definite field for both. I don't believe you can concentrate on any one of these things: use all of them.

ED. J. BATH (Ohio Farm Bureau Federation, Columbus, O.): What study have you made or what relationship have you found between rural highway police and the effectiveness of rural highway safety?

MR. HALSEY: The Department of Public Safety in Massachusetts has a group of motorcycle officers whose sole duty is traffic. These officers are divided up, of course, all over the state. They patrol highways on the basis of the amount of volume and the number of accidents. They are provided each month with a statement as to which routes are having the accidents. Sometimes the same area patrolled by the state trooper is also patrolled by the local officer.

We haven't enough officers in Massachusetts at the present time to do the whole job ourselves. I don't even know that we should, but, I believe, it is very important, and I think the presence of the officer on the highway has as great an effect in reducing accidents as anything I can name.

The patrol should be expanded. Our police should be motorized or given some means of getting around. Light cars are going to be used as much as motorcycles, because you get only four months effective use with the motorcycles; the rest of the year the rain, snow, and so forth, make them practically useless.

MR. VAN DUZER: We have had a motor patrol for about six years. Among other duties the patrolman enforce the through-street stop regulation especially when we put the through traffic stops into effect; consequently we have very few people in Pennsylvania who come up to a through traffic stop and don't stop.

In the winter, we keep the snow off the roads and the motorcycle officers patrol day and night. The amount of patrol depends upon the amount of traffic.

DAVID S. BEYER (V. P. & Chief Engr., Liberty Mutual Insurance Co., Boston, Mass.): From the standpoint of one of the users of the highways, I want to say that traffic operated signals have been very effective when adapted to the requirements of the highways, but there might be some conditions where there would be a

little confusion due to drivers parking beyond the actuating device when traffic on the side street was light and signals recently installed.

MR. HALSEY: I think that the type of thing which Mr. Beyer mentions is temporary. We had some trouble with cyclists who liked to ride back and forth over the actuating device and watch the light change. It was a public nuisance for a month or so, and the condition is not serious. I believe we can overcome the trouble you mention by placing another device ahead so that when you pull up you will hit it.

Actuated devices are not an answer to all problems. They have their place as well as the progressive system and as well as the fixed-cycle system. It is something in addition to what we already have.

ALEX K. GAGE (Assistant Prosecuting Attorney, Detroit, Mich.): I had hoped that Mr. Halsey would say something about sidewalks or pathways at the side of rural highways to accomodate children going to and coming from school. I believe it is a very important matter, where nothing but the shoulder of the highway is provided for their safe passage unless they go on the roadway.

MR. HALSEY: You have a combination of the fact that the children need protection and the fact that you can't economically build an additional highway for them parallel to the one which you have. One of the things which helps them most is the improvement of the shoulder. If you can get an attractive shoulder the children will walk upon it. If not, the children will not walk upon the shoulder.

When you make cuts through hills provide enough room for them to walk beside the road. I have seen many highways where you couldn't get out of the road.

ERNEST P. GOODRICH (Consulting Engineer, New York City): I believe it takes a certain amount of regional planning. I am charged with the formulation of a plan covering 60 square miles including both traffic planning and the location of rural schools. School sites have been selected so that the children will not have to cross or proceed along the main highways. They go to school along sidewalks and rural pathways provided especially for them.

T. D. DUTCHER (Mgr., Standard Rwy. Fuse Corp., West Newton, Pa.): Has anyone present had any experience with the emergency signal lights carried by the state police and highway patrols in several states?

Our police inspector is very much in favor of it and has been recommending it all over, and he claims it is one of the biggest advances in safety that has come along lately. Of course, it is man-operated and each police car and each police motorcycle in New York is carrying two, I believe.

"My City's Activity in Accident Prevention"

CHAIRMAN JOHNSON: The last item on our program is "My City's Best Activity in Traffic Accident Prevention," to be a series of five-minute talks. Mr. Oscar Gunderson of Flint, Michigan, has offered to open this discussion.

OSCAR M. GUNDERSON (Traffic Engineer, Police Dept., Flint, Mich.): I think that the major traffic activity in which the Police Department has been interested has been that of the school-boy patrol.

Our Safety Division, consisting of a sergeant and two patrolmen, with the cooperation of the schools and the Automobile Club, direct the activities of the school-boy patrols.

We have nearly 800 boys interested, in a city which has a school population of over 30,000. They are equipped with belts, badges, raincoats, and hats, both as a distinctive marking and for utility.

The men in the Police Department have been quite successful in getting good results out of them. Among the devices which they use is the personal supervision of police officers themselves, occasional attendance at theater parties, and certain athletic

events or contests. Perhaps the best method of all is the organization of what is known as the Arrowhead Safety Club.

The benefits to be derived from school-boy patrols are reflected in an accident record which has been very favorable so far this year in Flint. We had a reduction of 36 per cent in accidents to child pedestrians in the first 8 months of this year, compared with the first 8 months of last year.

Among the other benefits are the reduction in the number of police officers for school traffic, teaching the boys a self-reliant attitude, bringing home to the motorists an attitude of becoming accident-conscious, and educating the parents.

CHAIRMAN JOHNSON: Mr. Harris of Minneapolis is the next.

MR. HARRIS: Our traffic accidents were primarily a pedestrian problem. Seventy-three per cent of the fatalities for the first eight months of 1929 involved pedestrians. Consequently every agency in the city of Minneapolis made an effort to contend with the pedestrian hazards. That applied not only to the enforcement agencies but also to the educational and engineering. As a result there was a 22-per-cent reduction in the pedestrian fatality rate, taken the first eight months of this year as compared to the first eight months of last year.

A good many of the activities are similar to those in other cities, but there is one which I would like to stress; namely, the establishment of an accident prevention squad. Needless to say we appreciate the help of Mr. Kreml of Evanston in planning this organization. One difference between the Minneapolis squad and the Evanston squad is that our squad is provided with 12 cars equipped with radio. That makes it possible for it not only continuously to patrol the streets for ordinary police and traffic duties, but also to be instantly available on call in case of accidents requiring investigation.

It took approximately six months to get the organization of this squad started. The principal objections that we had to contend with were that there weren't enough men in the department to take care of the thing, and that there weren't sufficient funds to purchase necessary apparatus and material. I mention that because it developed upon analysis of the personnel in the Minneapolis Police Department that there was a substantial waste of man-power. It was discovered, by checking very closely in the assignment and distribution of the personnel, that it was rather a simple matter to find at least eight positions in which there was a waste of man-power.

The result was that both the mayor of the city and the chief of the Department were fully convinced that as far as personnel was concerned the Department was not seriously handicapped, and the eight men were assigned to this work.

The matter of cost, was taken care of by similar analysis of the budget of the Police Department, and it was found that there was some misdirection of the expenditures, and that without material additions to the budget requirements of the Police Department sufficient funds were found to take care of the purchase of apparatus, equipment, and material required for this work.

DR. C. F. STODDARD (Department of Labor, Washington, D. C.): One of the gentlemen spoke of 70 per cent of their accidents involving pedestrians. He didn't say anything about approaching the problem from the most obvious standpoint, and I wonder why so many of our cities are shying at the question of pedestrian control.

I want to mention one instance which came to my personal attention and another one similar to it which affected myself. In Austin, Texas, I tried to cross the street and an officer waved at me. I didn't know what he was saying or what he meant. He whistled and finally got my attention and motioned me back. I decided to go back.

In Kansas City I was standing on a corner watching the signals operate and I saw two girls start across the crossing against the red light. The officer whistled but they didn't pay any attention. He whistled three times before he attracted their attention, and by that time they were over on the other curb. He stepped over to them and motioned them to retrace their steps across the street, and then return on the green light.

Now it has been said that pedestrian control can't be enforced, that if anybody wanted to take the matter to court they would get away with it. Well, we don't know. For that reason maybe the traffic officers are timid about it, but I have wondered a little about it. It can be done as a matter of education if not actual enforcement.

MR. CORNELIUS J. LYONS (Accident Analyst, Department of Traffic Planning, Pittsburgh, Pa.): Among the many activities in the city in which the Congress is convened, I will tell you first about the Better Traffic Committee.

It is appointed by the mayor and is divided into several sections: Accident prevention, engineering, educational, and traffic flow.

At the present time they are sponsoring an essay contest for school children in which approximately 70,000 pupils are participating. This is an annual program, carried out for the last three years, and is one of our major projects.

This city, I believe, has the first accident analyst. We have just finished copying 6,000 accident reports made by motorists. These are all spotted on the map, and they denote the dangerous intersections and dangerous thoroughfares throughout our city.

DR. B. L. CORBETT (Exec. Sec'y, Safety Commission, Milwaukee, Wis.): How many members has the Better Traffic Committee and how is it financed?

MR. LYONS: The Better Traffic Committee is composed of 50 members, who are civic leaders, appointed by the mayor. These men give of their time freely but the City Council provides a budget for educational purposes. It is a purely educational committee. Each sub-committee meets about once a week. They have one paid secretary, who takes care of all the detail work. His salary comes out of the Bureau of Traffic Planning budget.

J. M. RICE (Consulting Engineer, Pittsburgh, Pa.): I want to supplement Mr. Lyons' remarks as a member of the Better Traffic Committee. The question of pedestrian control has taken up much of our time, but, like most other cities, I presume that our problem has been growing more rapidly than the solutions have developed. The Council of our city is responsive to public opinion, and we have felt that it was betted to proceed slowly and stand our ground firmly rather than to go into a head-long program of making everybody behave and in that way creating a public sentiment against the things which it was most necessary to take care of first.

I believe that eventually Pittsburgh will have pedestrian control, but it will be largely because the people are ready to observe the rules and not because they are forced to do it.

MR. GAGE: In Detroit we have considered the question of pedestrian control and we thought that the suggestion of pedestrian protection rather than pedestrian control was a more euphonious method of presenting it to the people and perhaps would be more effective.

E. ROSS FARRA (Manager Grand Rapids Safety Council, Grand Rapids, Mich.): What success has been had with subways in front of school houses on rural highways leading to large cities. We have a number of trunk lines entering our city and on every one there is a school house. It is a great problem for the children to get across the highway. We have installed two subways recently. Will the children use them unless somebody stands there with a club and makes them go down to the subway?

MR. LYONS: In our city one of our hazardous locations has an underground passage, but the children will not use it unless the policeman makes them.

CHARLES GREENWOOD (Inspector, Police Department, Toronto, Ont.): I believe the outstanding traffic feature of the year in Toronto is that we concentrated on the education of traffic officers as a means of educating motorists. Each one of our traffic officers attends a meeting once a week and anything that comes up is freely discussed. He is given any new information that is available. His equipment con-

sists of everything that we can possibly give him that is portable, such as a brake testing device. But where we think we gain immediate value is through the personal contact we make with every motorist we meet.

Up to the present time this year the traffic squad has met over 100,000 motorists and in accomplishing that they have done something I don't think we could have done through the medium of the press or anything else. The press is very good to us and has given us space on the front page every day with regard to our activities, but the personal contact of the traffic officers with the motorists is more essential than anything I can think of.

ADJOURNMENT

Joint Session Electric Railway, Delivery, Taxicab and Bus, and Public Utilities Sections with Street and Highway Traffic Section

Friday Morning, October 3, 1930

T. G. BRABSTON, Chairman
Birmingham Electric Company, Birmingham, Ala.

The joint meeting of the Street and Highway Traffic, Electric Railway, Delivery, Taxicab and Bus, and Public Utilities Sections of the Nineteenth Annual Safety Congress was called to order by T. G. Brabston, superintendent of transportation, Birmingham Electric Company, Birmingham, Alabama, chairman.

CHAIRMAN BRABSTON: The American public resents anything that seems to impose restraint. Yet, for the good of all, I think we must admit that some sort of restraint should be applied to those drivers who are very definitely unfitted to operate motor vehicles on the street. Then again, with the rapid increase in the use of the automobile, legislation governing the operation of those vehicles has been built up on what seemed to be the needs of the particular community so that a man driving through several states is confronted with a variety of rules and regulations.

The title for our first paper, is "What Can We Do for the Pedestrian?".

Mr. Theodore M. Matson, Assistant Traffic Engineer, Philadelphia, will present the paper for Mr. Robinson. Mr. Matson was associated with Mr. Robinson in the San Francisco Traffic Survey.

What Can We Do For the Pedestrian?

By RALPH W. ROBINSON
Executive Secretary, San Francisco Traffic Survey Committee

Notwithstanding the many restrictions placed upon the operation of motor vehicles for the protection of pedestrians, about three in every four traffic fatalities are the result of vehicles coming into contact with pedestrians. The most pitiful aspect of this matter is the frequency of death or injury to young children and elderly people. These two groups are shown to be the victims in 68 per cent of the fatal accidents. The whole question is naturally one of the gravest concern to every conscientious citizen.

The difficulty lies in the fact that we have rapidly adopted a type of vehicular traffic which is so radically different from that in vogue during the development of our customs and our streets that we are now suffering from a condition of maladjustment. We have been unable thus far to change our habits, our roadways and our cities rapidly enough to keep pace with the growth of automobile use. After some efforts to meet the new conditions, there is a tendency for communities to become discouraged and to feel that these accidents are more or less inevitable. The difficulties presented by this problem, however, are not insuperable. It is a matter of adjustment to fit ourselves and our cities to the high speed automotive traffic system that we have adopted.

I will endeavor to point out some of the principal features of an adjustment program which if carried out will help to reduce pedestrian fatalities to a minimum. The measures mentioned are not mere experiments—they have proved successful

where applied and in some cases very marked decreases in fatalities and injuries have been brought about by their adoption.

Pedestrian accidents are caused primarily by the existence of areas where physical contacts between vehicles and pedestrians are possible. So long as these potential conflict areas exist we shall have accidents, but it is possible to relieve this condition by various means.

Traffic Safety Education

Among the most effective means of relief is public education in the rules and regulations and a presistent program of publicity warning the people constantly of the things they must do or avoid, to prevent accidents. The best proof of the efficacy of education is the fact that the safety educational activities carried on throughout the country among children of school age have actually reduced the death rate of children during a period of general national increase in traffic fatalities. There is every reason to believe from experience in various cities that education for the protection of adults will also prove effective. It is much more difficult to reach the adult, but thoroughgoing and successful educational programs have been worked out. Full information is available through the National Safety Council on how to organize and carry on a continuous program of traffic safety education and how to maintain public interest in such a program. Any community can cut its death rate by using this method. It means hard work, and self-sacrifice on the part of representative organizations and leaders in the community, but it can be done—and the results are eminently worth while.

Safe habits lie at the basis of the whole problem. No matter how carefully our laws are devised, how thoroughly regulatory devices are employed, unless the citizens themselves are instilled with the idea of carefulness little progress can be expected.

Sound Traffic Regulations

Habits are guided by legal requirements where intelligently enforced. Therefore, as a basis of proper educational work, it is necessary to have a firm application of legal provisions. These should be designed to eliminate or reduce the number and severity of conflict points between vehicles and pedestrians. The old common law rule that all users of the highway have equal and reciprocal rights and duties on public highways is not applicable to modern traffic conditions. No matter what the equities may be, we are confronted with a practical situation, and it is not safe for a pedestrian to assume an equality of rights. The mere mechanical operation of a motor vehicle at speeds ordinarily employed makes it suicidal for a pedestrian to attempt to exercise such rights. Modification of the centuries old common law rule is essential, in order to adjust street movements to a practical basis. The Model Municipal Traffic Ordinance requires pedestrians to yield the right of way to vehicles between intersections, and motorists are required to yield the right of way to pedestrians at intersection crosswalks or other established crosswalks. Motorists are nevertheless required to exercise due care for the protection of pedestrians in midblock. By this adjustment pedestrians are concentrated at points convenient to them and where motorists may expect to see them. Greater freedom of vehicular movement is thus given in midblock and greater safety is afforded the pedestrian while crossing roadways. The rule lays emphasis upon the fact that if a pedestrian crosses the roadway elsewhere than in a crosswalk he is doing so at his own risk. This is a reasonable adjustment to give greater safety and meet the practical needs of both motorists and pedestrians, and when understood by the public and properly enforced the provisions meet with general acceptance.

Pedestrian Control in Central Business District

In congested districts where traffic is controlled by stop and go signals or officers it is highly desirable for safety that pedestrians also be required to observe the traffic signal indications and be required to cross streets only in crosswalks, provided the regulation can be properly applied. Before attempting to introduce full pedestrian control in a city a careful adjustment should be made of all control mechanisms to see that the intervals of movement are as short as consistent with the handling of traffic volume. Numerous cities have failed completely in an attempt to establish pedestrian control because the signal apparatus required waits of unendurable length or pedestrians waiting under conditions when there is no crossing traffic. Cities should not contemplate success of this plan where the maximum waits under normal conditions will exceed 45 seconds, and it is better that the maximum intervals of waiting should not exceed 30 seconds. In other words, the ideal conditions for successful pedestrian control is to be found in control intervals of minimum length, and in continuity of traffic flow.

In starting the plan the public should be fully informed through the press and other media of publicity as to the provisions of the law, as to the day the innovation will be introduced, and the benefits that the public and especially the pedestrians will derive. Then it is necessary to place police officers at every controlled intersection and at many places in midblock. These officers should be fully instructed regarding their duties, and should understand that violators must be dealt with courteously, but firmly. No arrests should be made except in very rare cases of wilful and determined disobedience of the orders of an officer. If all details have been properly arranged and carried out, it will be found that the pedestrians will soon understand and accept the new regulation, because they have observed that it is a practical means of protection against danger to them. In a few days the extra detail of police officers may be removed, but always thereafter special attention must be given by police officers to pedestrian control to prevent the people lapsing back into their former bad habits. In San Francisco and in Los Angeles pedestrian control in the business districts was properly introduced, and has been in successful operation for several years, with a very good degree of observance, wherever police officers are normally or occasionally present. These officers are necessary in the congested district in any event for other traffic duties.

Enforcement by Police

Without careful, fair and firm enforcement of traffic regulations by the police, there is little hope of securing safety for either pedestrians or vehicles. Safety education based upon adequate legislation must be backed up by the police force. Police action becomes especially necessary at intersections where there are large numbers of turning movements, for these movements interfere with pedestrians proceeding on the "go" signal. Officers can do much to regularize these turns and to restrain over-anxious motorists from endangering the safety of pedestrians. There is a mistaken idea quite prevalent that police action is no longer needed after stop and go signals are installed. You will frequently see police officers standing by and doing nothing to help turning vehicles or to protect pedestrians. The signals should be regarded as a means of relieving the officer from mechanical routine, so that he may use his intelligence to keep traffic moving with greater safety.

Police Discipline Near Schools

Police discipline is essential in the vicinity of all public schools to give the pupils protection in crossing roadways. This protection can be afforded with a minimum of extra cost by assigning patrolmen regularly working in the districts where schools

are located, to duty at or near the schools during the time when pupils are entering or leaving. As a second measure, the use of the school boy traffic patrol plan will be found very effective, if well organized, supervised and backed up by the Police Department.

Physical Changes to Reduce Hazards

Widespread public education in traffic safety, based upon adequate legal requirements coupled with energetic and constant enforcement of traffic regulations will accomplish much toward accident reduction, but in many cases physical remedies must be brought to bear in order to completely eliminate or to reduce the severity of roadway hazards.

Wherever pedestrians find it necessary to stand in the roadway, as an incident to boarding or alighting from street cars, or in crossing exceptionally wide roadways carrying heavy traffic volume or where there are extra long crosswalks at irregularly shaped intersections, pedestrians should be physically protected from potential contact with vehicles. These "confusion areas" are especially hazardous and warrant careful engineering study and the construction of suitable barriers, both for the protection of pedestrians and for the better channelization of vehicular flow.

Street Car Safety Zones

The liberal provision of street car safety zones at all intersections and other places where passengers ordinarily are taken up or discharged, is a very important part of the pedestrian safety program. Paint-marked safety zones are of no utility as they are constantly violated by motorists when pedestrians are not standing in them, and frequently even when pedestrians are present motorists will cut through the zone. Such zones are really a menace because they tend to give pedestrians a sense of security when in fact there is no security provided.

A raised platform zone when properly constructed offers almost complete security for pedestrians, and at the same time it presents little danger to motorists. It must be adequately illuminated, so that motorists can readily see the location and nature of the obstruction in their path in time to avoid it; otherwise it will constitute a very serious hazard. Such zones should have a bulkhead at the end toward midblock, high enough and heavy enough to physically prevent a vehicle from striking a person standing in the zone, and so shaped as to cause the least damage to a vehicle that may collide with it. The curb should be carefully tapered at the ends to avoid unnecessary hazards to wheels of vehicles running close to the zone.

Raised zones constructed as above described cost about $750, and are therefore too expensive to be used at all points where street car passengers need protection. They are especially adapted to heavy loading points, or to unusually hazardous points, for example, the first safety zone location on a high speed artery entering a city. The most practical compromise which will afford a reasonable degree of protection to pedestrians and the least danger to motorists, is to install button marked safety zones. The buttons should be three or four inches high, preferably with a heavily fluted surface. The buttons at the midblock end of the zone should be set close together so that an automobile wheel cannot run between them, and the two corner buttons at the midblock end should be fitted with carefully designed reflectors with red lenses, to pick up the rays from automobile headlights and reflect them back to the driver while at least 300 feet from the zone. The corner button nearest the curb at the other end should also be fitted with a reflector.

While such button marked zones do not give complete pedestrian protection, and while they do present a certain hazard to the motorist, they work out well in practice and serve to substantially cut down deaths and injuries. In San Francisco about 350 of these zones are in service and since their installation practically no motorists have suffered accidents except reckless or drunken drivers, and pedestrians standing in these zones are comparatively safe. The number of deaths in safety zones has been radically reduced. Motorists soon find out that it is uncomfortable and somewhat dangerous to drive through button zones, and they readily learn to drive so as to avoid them. The prevalence of button zones at intersections throughout the city causes the motorists to drive either to the right or the left of normal street car loading spaces, and tends to protect passengers even at intersections where there are no safety zones. It is important that the buttons and reflectors be adequately maintained after installation.

Safety Islands in Wide Roadways

Where very wide roadways exist carrying fast moving traffic or a heavy volume of traffic, it is unsafe for pedestrians to cross without the traffic flow being interrupted by signals or officers, unless there is a point of refuge at the middle of the roadway. I refer to roadways of perhaps sixty feet in width or over. It may happen that such an artery is so located that there is very little cross vehicular traffic, and the installation of stop and go signals is therefore unwarranted.

A remedy for this difficulty will be found in the installation of small curb-height safety islands in the crosswalk area at the center of the main roadway. These islands must be protected at the midblock end with a bulkhead, suitably illuminated the same as described for raised street car safety zones. Curbs should be carefully tapered to a stream-line pattern. Ordinarily, about four feet would be a good width, and the length of the platform should be governed by the width of the crosswalk. Wider islands would reduce the number of lanes of vehicles that could be accommodated along the street. As these islands are quite expensive they would be warranted only at points where pedestrian movements are fairly frequent.

Safety islands correctly located opposite each other in the two crosswalks serve also to channelize turning movements of vehicles at an intersection, reducing the tendency of turning vehicles to cut corners, and they also eliminate the tendency of vehicles going straight through to encroach upon the left side of the main roadway when pedestrians are crossing on the right side. Both of these tendencies are extremely confusing and dangerous to pedestrians as well as hazardous for other vehicles. In very wide roadways safety islands as described are of great advantage even where the through traffic is interrupted by stop and go signals—this for the reason that without the islands long waiting intervals holding the main street traffic would be required, to permit pedestrians who have started across to reach the other side of the street. In wide roadways where street car tracks are located center safety islands cannot be used, but the street car loading zones serve as refuge points for pedestrians in crossing such streets.

Islands to Channelize Traffic Flow

At intersections of irregular shape, five or more point intersections, etc., there will frequently be found large areas of open pavement which permit automobiles to weave in and out of the natural channels of flow and to encroach upon pedestrian crossings. If the entering streets are wide, the crosswalks may be so long that a pedestrian cannot get from curb to curb in one signal interval; or if there is no stop and go control, the pedestrian will be unable to find gaps in the vehicular traffic of sufficient length to allow him to get safely across the intersection. In places of this sort a competent engineering survey will often reveal how the confusion areas may be completely eliminated by the installation of raised safety islands, so designed as to alter the shape of the intersection so that vehicular flow will be channelized and made to operate as smoothly as at any ordinary right angle intersection.

Market Street, in San Francisco, is probably the most complicated traffic street

in the United States. Safety islands installed on that street give many different examples of what can be done to simplify the most complex intersections and provide safety refuges for pedestrians. These islands also make it possible to successfully employ stop and go signal control at intersections which would otherwise be so wide as to cause very low efficiency of traffic movement, because of the excessively long clearance intervals that would be required. Also they make possible the installation of signals at certain points of good visibility for both vehicle operators and pedestrians, which otherwise would be difficult or impossible. Standard traffic bulkheads and adequate illumination are also essential for this type of safety island.

Sidewalks Along Outlying Highways

At certain points in rural or suburban territory heavy pedestrian movement may occur along highways which also carry fast vehicular traffic—for example, in the vicinity of outlying factories; and frequently no sidewalks are provided. It hardly seems necessary to point out that in all such places vehicular and pedestrian traffic should be physically separated by curbing or fences.

Tunnels and Bridges

Much has been written regarding innumerable schemes for carrying pedestrian traffic on a separate plane from vehicular traffic. This, or some other method which will provide for complete separation of the two classes of traffic, is, of course, the only means of completely and permanently solving the pedestrian accident problem. In most cases, however, it presents great difficulty of application, and involves excessive costs.

Pedestrian tunnels constructed principally for school children crossing major streets have been very successfully employed in Los Angeles. Tunnels under streets do not seem to work out well for adults in most cases, because unlike children adults are not under discipline, and they dislike the extra effort of going up and down steps or ramps. Experience has proven that pedestrian tunnels must be carefully policed, and kept well illuminated and clean. Otherwise, they are useless for pedestrians and become catch basins for dirt and serve as cover for crime or public nuisances. Provision should be made to lock tunnels at night or whenever not in regular use.

Pedestrian bridges have ordinarily proved effective only where there are differences in levels, where it is necessary to climb or descend in any event and it is easier to use the bridge than to cross a roadway on the surface. Bridges are used effectively in special cases in connection with transportation terminals.

Bridges or tunnels are frequently well adapted to connect buildings where there is a close inter-relation of business, and such passage-ways may well be used to avoid crossing a roadway on the surface.

There will come a time, if indeed it is not already here in some places, when downtown streets must either be widened or other means found to accommodate the great pressure of vehicles and pedestrians. Probably the cheapest and best thing that can be done to give more room and eliminate conflicting movements in a district would be to construct second story arcades for pedestrian use with bridges at intersections, and connecting buildings at points of greatest demand, leaving the entire ground level of streets between property lines for vehicles. This is a radical departure, perhaps, but compared to the cost and difficulty of cutting off the entire fronts of buildings to widen streets, it would be far easier and less costly. Great costs may well be warranted to prevent a high class business district from becoming decadent.

Summary

The principal items in a program of pedestrian safety includes (1) a sound framework of legal regulations, (2) widespread, intensive and continuous public education based upon such laws, (3) a highly co-ordinated system of traffic control mechanisms based upon a competent survey of local traffic requirements, (4) full pedestrian control in congested central business district, (5) fair and firm law enforcement, and facilitation of traffic movement by the police, (6) the use of safety zones, safety islands or other means of physically separating pedestrians from vehicles on the surface of roadways, and (7) final resort to methods of complete separation of pedestrians and vehicles by carrying the two classes of traffic on separate planes, as by tunnels or bridges. Aside from the last named method, this program of pedestrian safety can be carried out with comparatively little cost. The principal requirement is good organization of public, civic and private agencies, intelligent leadership and persistent, unselfish work for the benefit of the whole community. With these factors at work, a community may confidently expect a very substantial reduction of deaths and injuries within a reasonably short time.

E. B. LEFFERTS (Manager Public Safety Dept., Automobile Club of Southern California, Los Angeles, Cal.): In Los Angeles we have about 40 tunnels that have been built primarily for school-child protection, but we have not found it necessary to lock them although there is always the problem of keeping them clean.

With the tunnels and the safety-committee activities which we have carried on, we have been able to reduce by 29.4 per cent the fatalities to children of school age in Los Angeles, comparing the first eight months of this year, with the same period last year.

The majority of our street-car loading zones are of the reflector-button type, and I am sorry to say that the kind of driver we want primarily to control is not affected by those. When a pedestrian goes into an area set aside for his protection, he is entitled to that protection from the drunken driver, and a button zone does not afford it. It is the careless or drunken or reckless driver that is our problem, and it seems to me we should attempt to give the pedestrian the full protection to which he is entitled in safety zones.

I did not hear Mr. Robinson mention that without center safety zones it is necessary to give a longer yellow interval to take care of pedestrians. If we have the distance, by providing these center islands, we can cut down the yellow period and therefore use more effectively for vehicular movement the cycle interval that has been set aside for this particular intersection.

JOHN M. RICE (Consulting Engineer, Pittsburgh, Pa.): I have seen people fall by failing to step either on or off from the safety island. Is it desirable to raise them?

MR. MATSON: I have seen pedestrians get serious falls from a curb where a step down is ordinarily expected. It is the old question of deaths and injuries from falls, which is indeed a serious one.

MR. RICE: At the average crossing, after you leave the curb and walk on the level, there are no obstructions, whereas if you place a safety island there, you raise a projection. It seems to me that if there is enough protection against the vehicle that there is something to be said in keeping the safety zone at the level of the rest of the pavement. In Pittsburgh, they are generally raised, but I am not satisfied that that is the solution. I believe you are introducing an additional hazard when you raise them.

E. D. DOANE (Statistician, Dep't. of Street Railways, Detroit, Mich.): Possibly a part of the objection to raised islands would be overcome if the riser were painted with black and white stripes so that it would be discovered by the pedestrian.

MR. MATSON: There were several zones on Market Street where traffic was approaching from two or three different sides. Where you have vehicles approaching

from two directions you have to establish a curb. Sometimes it is possible to keep the safety zone at pavement level, without a change in grade, by using buttons, but turning vehicles must not be overlooked in designing a zone. The ideal thing is to have enough accident reports to find out whether accidents resulting from falls at such places were greater or less than those from vehicles cutting through zones of the level type.

CHAIRMAN BRADSTON: When the signal system was established in Birmingham, the boy scouts were enlisted for several days, and they held the pedestrians back at intersections where the red was against them. Since the inauguration of the signals there has been little effort on the part of pedestrians to violate them even when an officer doesn't happen to be present.

The next speaker, J. Rowland Bibbins, consulting engineer of Washington, D. C., has some theories to present on the work an adequate traffic signal system should perform.

The Work an Adequate Traffic Signal System Must Perform

By J. ROWLAND BIBBINS
Consulting Engineer

A truckdriver said to a teamster:
"What do you do with them asses?"
"O! they're cheaper to stop and start—giddap."

Here indeed is the que for a most profitable discussion of signal control and protection. There is too much stop. In fact the housewives along Third Avenue, New York, say they time their soft-boiled eggs by signals, "one Green, or two Reds; which will you have?"

The comprehensive program of this Congress lists some significant titles—"the value of analysis"—"what's wrong with enforcement"—"plain truths about safety" and "the importance and control of human motivation." I shall stress this last glimmer of light—psychology—against the unhappy background of 33,000 fatalities, for it seems to have been lost sight of in our feverish search for greater safety.

First and last, I want to emphasize that while all parties to the safety problem have been striving courageously for the great objective of lessening death, suffering and inconvenience of street movement, there has often been too little unity of effort and working at cross purposes among the numberless agencies, public and private, concerning themselves with traffic, transportation and safety. Before signals or traffic controls will ever accomplish their main object we must have more thorough understanding of the technical and economic as well as the legal questions involved. This object is "the greatest good for the greatest number", taking into account all people who use the public streets, in private or public vehicles or on foot. (They are one and the same.) It is this broader perspective that is so often lacking today.

For example, in Washington we have 12 public agencies (not to mention unofficial ones) from Congressional Committees down the line, dealing officially with traffic and transportation, including the Public Utilities Commission. Its job is to preserve some economic balance between adequate public service and its pocketbook. Yet local traffic agencies are often found instituting regulations and installing signals with disastrous economic results. It is not necessary in our pursuit of safety that a large majority of pedestrians should disobey the signals, nor to reduce the street speeds of great transit systems to 4 or 5 m.p.h. when they are capable of carrying people home twice as fast with equal safety.

It is not in a critical attitude that I raise certain questions before this great body of earnest workers but if possible to unearth some plain facts about safety and signals.

WHAT ARE SIGNALS FOR? To promote *order* and *safety*?—Yes, but why not *speed* also? It can be done.

To decrease pedestrian hazard? Yes, if so designed with cycles neither too long nor the crossing intervals too short, so that people will obey them.

To increase capacity and speed? Yes. Sometimes it is necessary to signal for traffic volume, other times for speed, occasionally for heavy pedestrian traffic primarily.

To replace policemen? Not primarily, but if well-designed, they can be coordinated more efficiently than a series of independent officers. At critical traffic points we may need both signals and also police to control pedestrian and turning movements.

2. WHEN ARE SIGNALS USEFUL? When intersecting traffic becomes

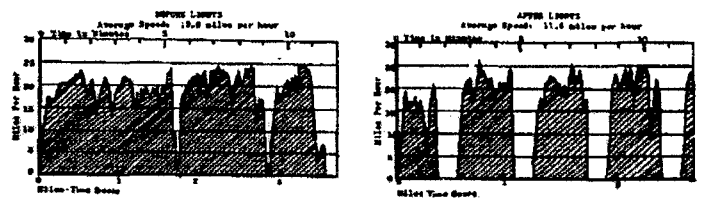


Figure 1

hazardous or gets tangled up by itself. This requires some kind of a standard to go by and much judgment (later discussed). On light traffic streets, or during light traffic hours, they may be more dangerous than useful, because drivers disobey them. If rush hour densities require signals, then fixed or flashing amber can be used non-rush for caution signals, especially at night.

Are signals justified because an accident may have happened there? No. Signals where not clearly needed every day will encourage violation and increase accidents.

3. DOES TRAFFIC OBEY SIGNALS? Speaking generally, yes; public service vehicles practically 100 per cent. But a considerable proportion of motorists jump the red-amber signals, which has given rise to the invisible two-color overlap period with the same clearance time. New York has educated motorists to stop at all streets between those signalled when the main street is open. So it can be done. The effectiveness of STOP signs has been questioned of late. But to me the main practical necessity is to secure a real slow down to safe control speeds. I find this broadly true. The SLOW sign seems rather ineffective. Signals themselves are also violated, which is much worse.

4. DO PEDESTRIANS OBEY THE SIGNAL AS WELL? Generally no, by no means. This is the great question today. In New York I found over two-thirds of the pedestrians violated the 2-minute Red signals. Pedestrians will not wait for long signals but will wait for short ones. On the 1-minute Red less than one-third violated the signal. With a 30-second Red the violation and hazard should be reduced to about 10 per cent.

5. WHAT ARE THE MOST IMPORTANT SAFETY FACTORS? 1st. The shortest possible length of cycle and Red interval, consistent with the traffic density, and a design that will produce maximum through movement without stop.

2nd. On very wide thoroughfares, suitable refuge zones mid-street protected by mushroom markers or otherwise, are necessary to safeguard slow walkers. The pedestrian interval is the key to signalling on wide streets. Otherwise we shall lose in lowered capacity and efficiency much of the money we have spent for these great wide arteries.

3rd. Lane markings at intersections for both pedestrians and traffic to prevent meandering. I find many traffic authorities painting pedestrian lanes on a long diagonal across a wide street. This may require one-half more time to cross. Pedestrian crossings should usually be guided across the narrowest point, i.e. at right angles.

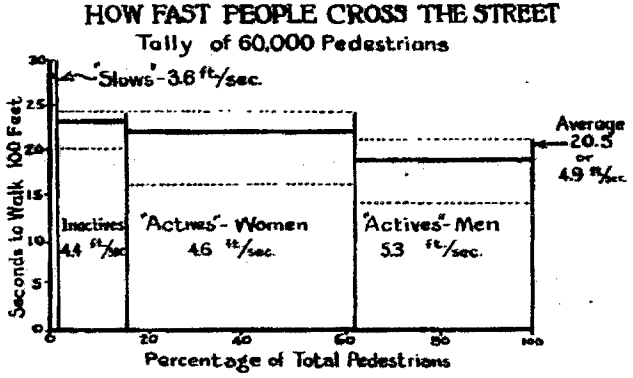


Figure 2

4th. Special pedestrian signals set low at eye-level vision, or else set low on signal posts, will probably be necessary, equipped with a positive indication of the end of safe crossing time. This requires 16 faces per crossing regardless of the traffic signals.

5th. Even so, police officers may be needed at many signalled crossings to protect pedestrians from themselves and handle traffic turns. There is no panacea for human nature, i.e. citizen independence, except the soothing syrup of normal psychology.

6. DO FIXED OR FLEXIBLE SIGNALS BEST SUIT MAXIMUM CONDITIONS? Sheer necessity has demonstrated the necessity of flexible timing. I am considering the larger problem now and the distress relieved by the flexible progressive system on a long run or by the automatic demand type at some difficult intersection. High density traffic and transportation requires the highest signal capacity and efficiency, and the best are none too good. If we can set up the highest standard and demonstrate its value, general progress will quickly follow.

On a long run of heavy traffic street, the flexible progressive is now the only one even moderately approaching these essential requirements. These must be centrally controlled to vary cycle (and speed) according to traffic and weather conditions, and

each intersection must be timed by itself so as to produce continuous non-stop progressive movement at a pre-determined speed and with least wastage of valuable street time for light cross movements. To install less efficient types under such conditions inevitably imposes an economic burden upon the community which may become disastrous to public transportation and disrupt established business and land values which require stability above all things for continued development.

The same principle is to be applied to a large traffic district of intersecting signal runs, known as the co-ordinated system, which simply means that all these separate signal runs are interlocked in time-step so that traffic moves all ways in definite platoons with much the same freedom as it moves along a signalled artery. The initial installation of this coordinated system was made in the Chicago Loop District resulting in immediate increase in transit speeds up to 50 per cent and traffic speeds still more. Pedestrian movement is very heavy there.

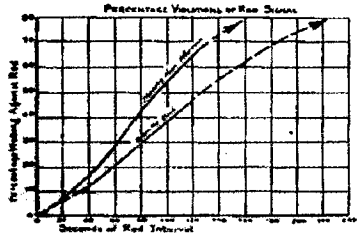


Figure 3

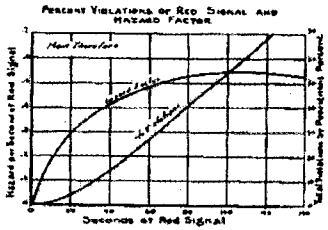


Figure 4

7. ARE THE SIMPLE ISOLATED OR SYNCHRONIZED SIGNALS JUSTIFIABLE? For a long heavy traffic thoroughfare, bitter experience says no. There are a few cases of equal block lengths ideally spaced, but generally this system is too inefficient. On a 2-minute cycle it means that all traffic stops every 2000 feet at 12 m.p.h. or 30 times an hour, and shorter cycles make matters still worse. This produces so-called "congestion" which is really not congestion at all, simply the expected result of inefficiency.

The demand signal of "robot" is ingenious, approaching nearest to human intelligence, especially at a complicated intersection. But a series of demand signals cannot produce true progressive movement in the full sense as they simply *follow* the traffic procession from pressure of demand. They cannot lead the procession like a flexible progressive. But their great flexibility has further possibilities not yet fully developed.

We are coming, I think, by necessity to signalled express speedways as the only escape from approaching stagnation and to speed up public service, especially coach and trolley bus. These streets may more appropriately be signalled for speed and safety rather than for maximum volume primarily (the two are different). In the meantime the best possible combination of the two can be used.

The additional cost of the flexible progressive feature is so minor above that of the fixed timing, i.e. synchronized, or the staggered or alternate systems that there should be no question between the two. A recent system of alternate signals cost

around $1,000 per crossing, 4-post signals. The flexible progressive feature could be added for $200 or $300 per crossing additional, less if first installed.

8. WHAT DETERMINES THE SUCCESS OF A SIGNAL SYSTEM? It depends entirely upon the design and timing. This is no place for "hit and miss" experimenting upon the public. The design should be worked out beforehand, based upon complete traffic analyses by a 5 and 15-minute period, rush hour and mid-day respectively, including all turning movements so that the timing down to seconds may be accurately set, and so that the signals will in fact pass the traffic without interruption or congestion. Each crossing must be studied separately and then co-ordinated with the others both for through and cross movements.

I have set up the following "bogey" as something to work toward. First, the minimum cycle length that will probably handle the traffic at the critical point or throat of a signal run and produce a reasonable speed along the street, which should vary for the central, intermediate and outer high speed zones. Second, the widest possible time band for through non-stop movement, which ought to be around 40 per cent of the cycle or 80 per cent of the GO time at the throat. Third, cross-town signal runs interlocked with the main runs to produce the same results for heavy cross-town streets. Fourth, all surplus cross time, not needed, to be thrown to the main street to accomodate delayed traffic, cars or buses, on the main streets and aid cut-in traffic from the side streets to get back into the procession without stopping. Fifth, all signal runs to be signed at the beginning of each speed section, e.g. "Speed 20 m.p.h." by a small sign hung under the signal; this speed being the weighted average speed between rush and day hours. Sixth, all main street signal intersections to be laned for maximum traffic capacity and parking to be rigidly excluded near-side and for some distance far-side, especially opposite a safety zone. Seventh, minimum pedestrian interval based on 4.5 feet per second walk, plus clearance period.

9. WILL CORNER PARKING AND LEFT-HAND TURNS INTERFERE? Both must be handled correctly to secure maximum signal efficiency. If a crossing is timed for 2-lane traffic each way, double parking and lax enforcement, especially near intersections, will obviously wreck an otherwise good design. Similarly the controversy over left-hand turns seems to have neglected entirely the fact that the outside turn, as still adhered to in Washington, not only blocks the cross-streets to right hand turns, but also takes 5 or 6 seconds out of the main street through time-band for the get-away. Many so-called "progressive" systems, especially with alternate synchronized signals produce a through time band of only 9 or 10 seconds so that this delay to through rolling traffic may take up half of the through time. When the center inside turns are used, this turning traffic is usually out of the way at the signal change.

Progressive designs hold the possibility of doubling or trebling the capacity of the street, doubling traffic speed, increasing transit speed, car/bus, up to 60 or 70 per cent and express bus speeds somewhere approximating traffic speeds. Conditions of course vary but analysis of Washington, New York and Chicago conditions alone show these possibilities.

10. DO ALL INTERSECTIONS ALONG A RUN NEED SIGNALLING? In heavy density districts more signals are of course necessary, but even then some minor street can be skipped. For long arterial runs, I think many can be skipped. For some odd-blocks signals place an unnecessary handicap on an otherwise good design. Light cross traffic, short cross streets, dead ends and offsets often need only caution controls. Uniform block lengths may or may not work out, depending upon their length. There are very few ideal block layouts and almost never uniformly balanced traffic. Therefore the ideal to which these simpler types might be equally well adapted is practically unattainable. Varying block lengths are universal and the best design overall may require some skip signals. I believe this is justified even if some rush hour police are required at skip points to control pedestrians.

It seems to me that our main object should be the best overall design, all factors considered, instead of adherence to some arbitrary rule applied to one part of the problem. The main factor in designing rests upon a definite ratio—distance (feet) divided by 1.47 m.p.h. equals seconds to run, i.e. block spacings 10 per mile at 20 m.p.h. speed, require 18 seconds between intersections. This is inescapable. Just as skip-stops are being used advantageously in transit to increase speed, so also skip-signals are equally valuable in adjusting all the complex signal design factors in a street system. With some flexibility in signal location these appropriate speeds can be generally obtained along with non-stop movement.

11. BY WHAT AGENCY DO MOST PEOPLE TRAVEL? The main transit systems of our country handle a billion people per month or 33,000,000 per day. Whether by street car, trolley bus or motor coach is unimportant. This is 50 per cent more than all the passenger business of the Class I railroads of the United States. The 1930 population of our 93 cities over 100,000 is about 36,000,000 people, and that of the main traction centers about 30,000,000 people. The tractions thus move our entire city population once a day.

I observe with concern that public transportation seems to be discussed by most traffic men and city planners as a nuisance rather than a great essential utility. This is simply biting off our nose to spite our face. While it is true that in some cities of lax parking enforcement private automobiles handle perhaps half of the rush hour travel, in other large cities the proportion drops to 15, 20 or 25 per cent and in the largest cities where necessity riding occurs, 5 or 10 per cent. This indicates what real parking enforcement means to the majority. It seems time to get a better perspective of our major social needs when we are confronted with traffic controls and signal systems that reduce transit speeds to 4 to 5 m.p.h. The attached Figure I is an illustration, recorded *just* before and after lights were turned on in Broadway in the morning. The dips in speed after lights are due to signal waits. Speed drop 19.6 to 11.55 on the main street. The cross streets fared worse with all traffic stopped two-thirds of the time.

12. WHAT TRAFFIC DENSITY REQUIRES SIGNALS? No absolute rule can possibly apply to all times and all conditions. But one can be applied with judgment and adjustment based upon the facts. I raise this mooted question as I have been misquoted in the following standard I used in the Washington survey:

For rush hours "signals will probably be required when the heaviest movement in the direction of main flow reaches a maximum rate of 500-1000 per 15-minute hour rate, two lanes, (i.e. 125 to 150 in 15 min.) giving due weight to cross traffic, turns, pedestrians and car-bus movements for the crossing as a whole".

For light hours. "When main traffic in any direction falls below about 100 for any of four consecutive 15-minute periods, signals may be shut down to advantage, except only in cases of unusual hazard. STOP signs or amber lights, steady or flashing, will provide protection".

Any standard requires detailed survey data by 15-minute intervals at least, better 5-minute intervals. For 15-minute traffic may be 20 to 30 per cent higher and 5-minute traffic 40 to 50 per cent higher than for the full hour. Each crossing to be signalled should be analyzed in the same way. Then and only then can the best design be found, to give best speed, least waste time, shortest cycle, least stoppage and maximum pedestrian protection. It is not as simple a task as many seem to think.

13. FINALLY, WHAT CAN WE DO FOR THE PEDESTRIAN? When we reflect that all but 5 to 15 per cent of pedestrians come to town in cars, buses or autos we cannot play favorites in traffic regulations. For the harrassment of being late to work by delayed cars and buses makes them take more chances on foot in violating signals. And when two-thirds of the persons crossing a heavy artery violate the signal, protection becomes a travesty. Here is a double opportunity for

the application of practical psychology. I hope that this Congress will give it intensive study. Detroit reports 45 per cent of Woodward Av. pedestrians violate red signals.

As a starter I lay before you exact information obtained from a study of 60,000 people crossing Upper Broadway, New York, and one of its main cross-town thoroughfares. Figure II shows the results: 1st, the proportion of "Actives", "Inactives" and "Slows", men and women; and 2nd, the time of crossing Broadway (100 feet curb to curb) and the walking speed. "Actives" represent 84 per cent of the total, "Inactives" 14 per cent, and "Slows" about 2 per cent of this representative group. The time required to cross averaged 20.5 seconds or 4.86 feet per second, (3.3 m.p.h.) walking speed; "Active" men walked 5.3 f.p.s. and women 4.6 f.p.s.; "Inactives' walked 4.4 f.p.s. (3.0 m.p.h.); "Slows" 3.6 f.p.s. (2.4 m.p.h.)

Here is a typical problem of wide streets. The average group interval of 20.5 seconds crossing time represents minimum cross interval regardless of other factors. This street has a 20-foot refuge strip down the middle, giving perfect pedestrian protection for all Slows and Inactives to use half-crossings instead of full crossings. But in spite of this the traffic authorities rejected any signal design that would not provide for full crossing of the slowest walker plus clearance time, i.e. at least 35 seconds at every cross street, light or heavy, regardless of the refuge zone. This is a walking speed of only 2.9 f.p.s. (or 1.95 m.p.h.). The interval is three-fourths greater than the average, and nearly one-half greater than the time required by "Inactives". As a result the best possible signal design based upon this crossing interval necessarily wasted an enormous amount of street time to no purpose whatever. It is clear that the basic walking speed of 4.5 f.p.s. would be quite reasonable here.

This is the heart of the problem. Should the signal system be designed for protecting the 97 per cent or for the 2 per cent who can always fall back to full protection in the refuge zone? If the majority is to control, using half crossings at some points for those who walk slowly, a very efficient signal design for Broadway can be produced on the non-stop flexible progressive plan yielding a large increase of street capacity, traffic-transportation, efficiency and greater safety, even with New York's short street spacing north and south. I leave to you the choice between the results of arbitrary rules and what I consider rational high-efficiency designs. City planners advocating wide thoroughfares should also be concerned more than ever before.

14. HOW CAN WE APPLY PSYCHOLOGY TO DECREASE VIOLATIONS? As one horn of the dilemma we have so-called human rights, at the other modern efficiency. Police regulation demands *stop;* traffic-transportation demands *movement.* I believe the two can be adjusted, for both have the same great objectives. This solution rests on the length of cycle and the signal timing. In New York at this time all main traffic was stopped one minute out of every three, or one-third of the time; cross streets were stopped two minutes or two-thirds of the time. In Chicago, Michigan Boulevard traffic North of the River stops every 100 seconds or 35 per cent of the time; South of the River about every 150 seconds or 40 per cent of the time, thus producing what I call a "cycle jam" or maximum congestion every 150 seconds. In Washington one important business street has five different cycles in seven blocks. (This can all be cured by the flexible progressive system. Usually with one Master*).

Fortunately, in New York, both long and short intervals were available for this study of psychology. The survey recorded in detail two groups of crossing pedestrians:

1. Those obeying the signals, i.e. crossing only on Green GO.

*Washington Signal-Survey 1929, made for Washington Traffic Council.

2. Those violating the Red STOP signal which traffic and transit has to obey for pedestrian protection.

The second reveals what I term the hazard Factor.

Figure III shows that in spite of this positive protection the great majority of pedestrians, two-thirds in fact, violated the Red STOP signal. The curves, "percentage violations" are based upon these two signal intervals. But as we know fairly well the zero point and the fact that with longer intervals most everybody would violate the Red, we are fairly certain of the curves within the limits shown.

Here is the important point—that as the RED interval is *shortened* the violations *decrease much faster* than the actual reduction in time. This is the psychological key to the signal safety situation, especially on all wide thoroughfares. In the upper curve for a heavy crosstown thoroughfare, more people violated the signals all day as the traffic density was less than in the lower curve, for a main high speed artery, where violation was more hazardous (rush hours). But both curves have the same characteristics. On a given street the percent violation appears to remain fairly constant a. m.-Noon-p. m. rush. But comparing one street intersection with another on another street is liable to give variable and obscure results because of differing traffic, street widths, transit movements, safety islands, business density, etc.

We may now find a measure of the hazard factor by the relative violations *per second of Red interval,* as shown in Figure IV. This hazard curve is derived from the other. As the cycle is shortened from 2 minutes to one minute and below, the hazard curve drops off rapidly to zero. While the precise results below 40 or 50 seconds should be studied more carefully, it appears that with a 20-second Red the total violations would be perhaps only half that for a 30 second Red and the latter only about one-third of that for a 60 second Red, etc. Here is evidently a major problem for research.

SUMMARIZING, I think we must liberalize our ideas as to real pedestrian protection, street design and length of cycle, also our perspective as between the various factors so affecting traffic and transportation. The economic burden of inefficient traffic control, particularly signals, has become too serious to longer ignore, in many cases devastating. American citizens are independent minded, but amenable to reason and cause. The impossibility of regulating them by authority alone is well demonstrated in New York's downtown clothing district and Grand Central regions. Where armies of policemen are relatively powerless, psychology and technical designing offer the only hope of remedy and at negligible cost. We spend tens of millions for widening thoroughfares and then kill them by inefficient signals. There are many examples of signals not needed at all installed in response to a whim or agitation. But even these can be perfected.

The twin roadway if signalled, as it probably will be, seems worthy of much greater study. Such major thoroughfares as Michigan Avenue, Chicago; Broadway, Fifth Avenue and Ocean Avenue, New York; Woodward Avenue, Detroit; Meridian and Washington Streets, Indianapolis; 16th Street, Connecticut, Rhode Island and Mass. Avenue, Washington, and Hudson Boulevard, Newark, should give ample opportunity for a study of the future standards of design, particularly Pennsylvania Avenue, Treasury to the Capitol, Washington, 160 feet wide, 107 feet paved curb to curb. Such twin roadways are already to be found—Broadway and Bronx Parkway, New York; Commonwealth Avenue, Boston; St. Charles Boulevard, New Orleans; University Parkway, Baltimore; and Pennsylvania Avenue, S. W., Washington.

And going further, triple roadways are already to be found on North Charles Street, Baltimore, and Lake Shore Boulevard, North Side, Chicago. This design has the immense advantage of side service streets, just wide enough for the building frontage, leaving the main central roadway free of parking for heavy traffic.

Perhaps I could emphasize in no better way the absolute necessity of flexible control in progressive signal systems and the variation of cycle lengths according to conditions by the results of observations by the Bureau of Standards. Putting it very generally the co-efficient of friction on good dry concrete or asphalt with 4-wheel brakes is around 75 to 80 per cent of the wheel loads. In ordinary rain this may drop to two-thirds, although a clean wet street may approximate a dry one. But a light rain and dirty street, or bad slippery conditions may reduce this friction to one-half or below, even one-third of the dry street. All this means that a 60-second cycle permitting 30 m.p.h. crest speed should probably be increased to 72 seconds or 25 m.p.h. for poor street conditions. This means an increase of 20 per cent time, but yielding a wider time-band.

Rush hour conditions alone usually require this spread, so that with central signal control the cycle and road speeds can always be adjusted in a few minutes to meet most any condition. If rush hour parking is cleared our regularly as it should be, at least on the flow side of the street, giving an extra lane capacity, there is of course less need for lengthening the cycle. The final test of it all is the average speed that can be maintained and the percentage of vehicles stopped by signals. Roughly, the cycles ought to be increased in inverse proportion to the square root of this average speed.

An amusing comment on London's first experimenting in traffic lights states that:

> "These lights at Ludgate Circus and Fleet Street recently caused the worst traffic jam ever witnessed at that busy crossing. Tens of thousands of pedestrians intent on observing the operation of the device crowded the sidewalks and overflowed into the roadways until congestion became almost desperate."

America has moved faster. Last December, my inquiry in some 20 large cities showed the following:

> Only three or four using the flexible progressive as a coordinated system, mostly in the central district; four cities had some fixed cycle progressive runs (no central control); eight had skip-signal progressive runs in use or contracted for; five others still used the old synchronous systems. The smaller cities generally had this or the alternate staggered system with equal time-split (Red and Green) regardless of the relative traffic each way. So we have at least made a good start. The pity is that the investment—$1,000,000 or more in large cities, cannot be put to the best use.

My last thought is my first: That we must encourage in our cities a broader perspective of relative necessities, the need for better facts, closer technical studies and closer coordination between the various local agencies involved, on the only tenable basis of a civilized community—the greatest good for the greatest number.

A. A. Oldfield (Director of Safety, Wisconsin Power & Light Company, Madison, Wis.): It is unfortunate that we have what Mr. Bibbins calls the "slows"; in other words, the infirm, the aged, and the injured. In places like Michigan Avenue and Broadway, it is possible to build safety islands for pedestrians, but as a general thing there wouldn't be room for them, and therefore the controlling factor would be the 2 per cent who travel 3.6 feet per second.

Mr. Bibbins: That involves the importance of the street and the density of pedestrian movement, but in New York I saw a little old lady, crippled unbelievably, walk across about as fast as the ordinary person. Whereas a nurse-maid with the little girl tagging along takes all the time she wants.

We must have a pedestrian interval, that gives us some idea of the end of the time. I can't see any reasonableness in keeping a street open up to the last second for anybody. We must move pedestrians as you "platoon" traffic.

Apparatus is being experimented with in Detroit and elsewhere, by which a moving finger shows the time when it is safe to walk at four and a half feet per second.

People violate it, of course. Another one has a series of little lights which go off one after another, showing the change period. Every second a light goes out.

Mr. Oldfield: The theories you have set forth may be applicable to Michigan Avenue, but on other streets there are grade crossings of railroads, where the obstruction might be anywhere from a few seconds to a few minutes. What are you going to do with your signal system then?

Mr. Bibbins: When you come to a grade crossing condition, the only thing to do is to superimpose upon the normal signal cycle a train-actuated device that will control when a train comes. I took it that you meant a series of railroad tracks in the city, around the switching yard.

Mr. Oldfield: How is speeding up traffic by shortening the cycle going to affect street car traffic which must stop, start, and get over the intersection?

Mr. Bibbins: The data I have indicates the minimum time beyond which we cannot go because people must cross the street.

I can say with reasonable accuracy that whatever benefits traffic will benefit transit. For example, in New York, they staggered the synchronous system of avenues alternately so as to get a sort of progressive east-west movement. That resulted, I am informed, in an immediate increase in scheduled speed, of 30 per cent. That shows definitely what progression will do to mass transportation.

Chairman Bramston: We were to have had a discussion of "Progress Toward Uniform Legislation," by Colonel Barber, but his appearance here today was impossible. However, he has sent a very able representative in the person of Mr. A. W. Koehler, Secretary of the National Conference on Street and Highway Safety.

A. W. Koehler (Washington D. C.): Colonel Barber had expected until yesterday morning to be here to address this session, and he was very keenly disappointed at not being able to keep the engagement.

You might be interested in knowing that the occasion which keeps Colonel Barber from you is an important meeting held in the office of the State Department in Washington, which is the culmination of an effort of about three years to provide uniformity in traffic among all of the countries of the Western Hemisphere. The Pan-American Traffic Conference is being held at this time and Colonel Barber was very earnestly requested to be present.

Progress Toward Uniform Legislation

By A. B. BARBER

Director, National Conference on Street and Highway Safety, Washington, D. C.

Gradually, uniformity in traffic laws and regulations is becoming a reality. State and municipal legislative bodies, encouraged by the business and citizen groups most affected, are coming to realize that in the main their traffic problems calling for rules and regulations are not unique and that the value of uniform laws and regulations, worked out from a nation-wide composite point of view reflecting the research and judgment of persons familiar with every aspect of the problem, exceeds the possible value of independent rules which may fit the local requirements admirably but which make all out-of-town visitors inadvertent lawbreakers and make their own citizens lawbreakers when they drive out of town—with the inevitable result of misunderstanding, chaos and accident.

This has been one of the off years for state legislatures; only nine have been in regular session. It is necessary, therefore, to go back to 1929 to get a true picture of the progress which has been made during the most recent cycle of legislative sessions.

In 1929, the state of Delaware set aside a group of laws passed at different times

which in the aggregate embraced a great deal of the uniform code, but in different sequence and manner of presentation, and substituted the four acts of the uniform code almost verbatim. Delaware was the third state to do this, Pennsylvania and Arizona having done so in 1927.

In 1929, New Mexico adopted all but the Uniform Operators' and Chauffeurs' License Act, as Virginia had done in 1926 and Idaho and North Dakota in 1927. South Dakota, following the steps taken by Michigan and Minnesota in 1927, adopted the fourth act, or that regulating traffic on highways. North Carolina had in 1927 adopted the fourth act and also the first or uniform registration act, and Louisiana did the same in 1928

The foregoing by no means reflects the extent of progress toward uniformity in state legislation. The entire block of North Atlantic states as far south as the Potomac River, with the exception of Maine and Delaware, together with the District of Columbia and California on the Pacific Coast, already had a drivers' license law with mandatory examination of new drivers at the time the uniform code was drafted in 1926, 14 states had an anti-theft act comparable with act two of the uniform code, while all states had some form of registration law. Furthermore, a number of states which have not adopted any of the acts of the code have made changes during the past four years toward conformity with the uniform vehicle code. For example, California, Maine, New Hampshire, New Jersey, Oregon, Washington and Wisconsin have made such changes in their laws within the scope of act four; Arkansas, Indiana, Nebraska, Tennessee and Wisconsin and South Carolina have done the same with respect to licensing operators, their action being the passage of legislation requiring that operators be licensed but without the compulsory examination; and Oregon has done this with respect to the scope of acts one and two.

In 1928 the New Jersey legislature made an interesting move toward uniformity by incorporating into state law a large part of the Model Municipal Traffic Ordinance completed for the conference last year. Wisconsin followed the same course in 1929 in its new traffic law, and New York did so this year. This procedure was endorsed by the Third National Conference on Street and Highway Safety last May when it approved the revised Act IV, into which had been written nearly all of the Model Municipal Traffic Ordinance, leaving out only certain provisions relating to the authority of the police and their relationship to the city council, local parking regulations and certain miscellaneous provisions deemed not to be of sufficiently widespread application to warrant incorporation in the state law.

Even though New York and South Carolina were the only two of the nine states whose legislatures met this year from which progress can be reported—New York in adopting these substantial parts of the Model Municipal Traffic Ordinance and South Carolina in making a start toward licensing of drivers by adopting the plan of registration without examination—evidence of progress toward uniformity in municipalities is constantly coming to the attention of the Conference office. I am unable to state just how many cities have adopted the Ordinance or ordinances patterned closely after it, for the reason that every now and then we learn of some community which adopted the ordinance months ago, and on the other hand in a few cases comparison of ordinances reported to have been based on the Model Ordinance shows such wide differences that the cities can hardly be classed as having the Ordinance.

It was never supposed that all city councils would adopt the Model Ordinance in its entirety. Some having conditions requiring it have done substantially this to their advantage while a few have gone the limit in an unreasoning fashion, as for example the small community which, having no street railway, has included the provision relating to street railways. A large number have omitted such provisions, added others, and written in various changes, whether to conform to state laws at variance with the Uniform Code, to meet unusual local conditions, to compromise with reactionary influences or for some other purpose.

Subject to these deviations of greater or less moment, we usually class as having ordinances substantially in keeping with the Model Ordinance among the larger cities: Boston, Providence, Indianapolis, Louisville, Chicago and San Francisco; and among the smaller cities, the list certainly not being complete, Quincy and Revere, Mass.; Hamilton, Elyria and Findlay, Ohio; Grand Rapids, Mich.; Alton, Ill.; Davenport, Fort Dodge, Iowa; Prague, Okla.; Great Falls, Mont.; Berkeley and San Jose, Calif.; Hinton, W. Va.; and Savannah, Ga. This list, of course, does not include any cities in New Jersey, New York or Wisconsin, all of which have the major part of the Model Ordinance as a state law. It also does not take into account the situation in Massachusetts, where the state department of public works has a wide authority over local ordinances and is requiring that in many respects they conform to the principles embodied in the Model Ordinance.

I have also not attempted to list the considerable and growing number of municipalities in which the traffic authorities have voluntarily adopted the Manual of Street Traffic Signs, Signals and Markings developed for the National Conference on Street and Highway Safety by the American Engineering Council and approved at the Third National Conference last May. Uniformity in this direction generally does not require legislative action.

Activity toward uniform legislation is under way or in prospect in many quarters. Taking some of the states alphabetically, without regard to the relative importance of the various activities, I may note that plans for a state-wide conference of public authorities are under way in Alabama and a large amount of conference literature has been supplied on request for distribution. In at least two cities in Colorado active effort to bring about the adoption of the Model Ordinance is reported. The Governor of Delaware, not satisfied to stand pat on its action in 1929 in adopting the Uniform Code in the face of the revision made by the third Conference, has authorized the calling of a meeting to compare the present state law with the Code as revised and recommended changes to the next legislature.

A communication from Boise, Idaho, under date of September 23rd advises that prospects for passage of the Drivers' License Law in that State in 1931 are favorable.

In Illinois there are prospects of a more determined effort than in previous years to bring about the adoption of an operators' license law with mandatory examination.

In Maryland there are evidences of a sentiment among public authorities as well as citizen groups to bring the present law into conformity with the Uniform Code.

A telegram from Lincoln, Nebraska, a few days ago requested copies of the uniform measures recommended by the Conference desired for an important prelegislative meeting.

It was unanimously voted by the New Hampshire Mayor's Clubs, at a recent meeting, to recommend to the several cities and towns the adoption of the Model Municipal Traffic Ordinance. At the request of Mayor Moreau of Manchester copies of the Model Ordinance and other Conference publications were sent to the Mayors and 223 Chairmen of the Selectmen in each town in the State of New Hampshire.

In Tennessee, steps have been taken toward a state-wide conference of municipal authorities to bring about the adoption of the Model Ordinance.

Cities in West Virginia, Ohio, Indiana, Montana, and Minnesota, report campaigns to bring about the adoption of the Ordinance. Within the past several days we have received word that the Common Council of the city of Fort Wayne has passed a new traffic ordinance in harmony with the Model Ordinance.

We learned approximately two weeks ago that a codified Municipal Traffic Ordinance practically identical with the Model Ordinance had been introduced in the City Council of Pittsburgh.

The national organizations cooperating with the Department of Commerce in organizing and financing the National Conference are probably more keenly alive today than ever before, as is the case with many other organizations affected by the traffic problem, to the need for cooperation, follow-up with their local organizations and

support to the utmost of their ability to every proper movement toward uniformity. Regional traffic and aviation conferences called by the Chamber of Commerce of the United States were held last week in Philadelphia and Boston to bring representatives of commercial organizations and other interested groups together for discussion of these problems. In each case representatives of such organizations, public officials and individuals informed on particular phases of the problem attended and participated in the discussion. Five more of these conferences will be held during November and December in Chicago, Minneapolis, Atlanta, Dallas, and Portland, Oregon.

The National Safety Council is giving particular attention to the drivers' license law, bringing up to date its earlier publication on the operation of the law and continuing research to develop facts not heretofore generally known. The American Automobile Association is stimulating its motor clubs, the American Electric Railway Association its members, the other national associations their respective local units. The spokesmen for these national organizations, sitting around the table at the recent meeting of the Executive Committee and Governing Board of the National Conference on Street and Highway Safety, are agreed that cooperation in stimulating movements for uniformity will be most likely to accomplish the desired result.

The National Association of Finance Companies is concentrating its energies on the anti-theft act. Bulletins to go to Finance Companies, individual dealers and legislators, to be followed by the mailing of a copy of Act II and a strong letter urging cooperation and passage.

If the local units live up to this plan—and I believe that in general they will—there will be opportunity for every person in this room and every person desirous of uniformity in traffic legislation to do real work toward bringing it about, and I am confident that 1931 will see the greatest progress yet made toward such uniformity.

CHAIRMAN BRABSTON: I believe that our legislative and governing bodies throughout the United States are coming to appreciate more fully and more seriously the necessity for some definite, specific, uniform legislation toward controlling a situation that has come like the locust and is about to engulf us.

A representative of the Birmingham City Commission is here. He has become intensely interested in the subject of uniform legislation, and as a member of the mayors' association of Alabama he has done some very constructive work looking toward the adoption of uniform legislation.

I take the liberty of asking him to express briefly the progress that has been made in Alabama.

JOHN H. TAYLOR (Commissioner of Public Safety, Birmingham, Ala.): In 1926, we started the Alabama movement to pass the Uniform Vehicle Code. With the assistance of the Birmingham Safety Council, the National Safety Council, and the Chamber of Commerce, we had a meeting in November, at which were present Sidney J. Williams, Director of the Public Safety Division, National Safety Council, and Colonel Barber. We also had a committee from the Alabama Mayors' Association. We adapted the Uniform Vehicle Code, to make it conform to the Alabama constitution but were not able to put it through the legislature. Since then we have put into the hands of various civic bodies the four laws comprising the Uniform Vehicle Code. We have had enrolled in the movement the Alabama Mayors' Association, the Alabama Association of Probate Judges and County Commissioners, the various Chambers of Commerce and civic bodies, and the State Junior Chamber of Commerce.

It is my plan to put a copy of the Uniform Vehicle Code into the hands of every state senator and every member of the lower house as soon after the November election as it is possible for me to ascertain his name and address. We are going to hold a meeting in Montgomery and get nationally known speakers. We want Colonel Barber, Mr. Williams, and two or three others. We are going to try to pass the law.

We realize that the time has come in this country when the Uniform Vehicle Code ought to be in effect. We are going to try to pass it in Alabama as nearly like the original as possible, with some slight changes to make it conform with our state constitution.

J. F. H. WYSE (General Manager, Canadian National Safety League, Toronto, Ont.): I would like to add that interest is spreading, not only in the United States in connection with uniform traffic control, but all over our governments in Canada, both federal and provincial.

MR. KOEHLER: When Mr. Wyse said that the uniform measures that have been recommended by the Conference have been spreading into Canada, he reminded me that the embassies and legations in Washington are showing much interest in this subject and are requesting copies of the Code to be transmitted to their governments. We have sent this Code into England, Holland, France, Australia, and just recently into Africa, so the thing is becoming not only a national movement but an international movement!

ADJOURNMENT

Personality and Public Accidents

Friday Afternoon, October 3, 1930

W. V. BINGHAM, Chairman
Personnel Research Federation, New York City

The open meeting of the National Safety Council Committee on Personality and Public Accidents, convened with Dr. W. V. Bingham of the Personnel Research Federation, New York City, presiding.

CHAIRMAN BINGHAM: This is the second open meeting which has been held by the Committee on Personality and Public Accidents. The committee was organized about three years ago because there was growing realization of the seriousness of the problem presented by the human factor as one of the causes of accidents. As long ago as 1926, when the second National conference on Street and Highway Safety was held, an analysis showed that from 70 per cent to 85 per cent of the accidents were primarily traceable to failure of the human factor rather than to weather conditions or the surface of the road or the design of the highway or the condition of the motor vehicle. Safety engineers have long carried on effective work for the improvement of these physical factors. It remains, nevertheless, that even on well designed highways, with adequate light, drivers operating cars in good condition sometimes have accidents.

The importance of the human factor hardly needed to be emphasized. Our ignorance about it, though, was so vast that even though we have been working on the problem for some time we still feel that we have hardly scratched the surface of a real understanding of all the complex conditions that enter into the problem. Sometimes I think we should change the name of our committee and instead of operating under a high-browed title like the one we now have, Personality and Public Accidents, we should use a short, direct term and say that this is the Committee on the Driver. It is a short title but a very broad subject.

It was known at the time the committee was organized that drivers are not all alike. They vary *tremendously in ability*, in health, in eyesight, in skill, in attitude toward other drivers, in respect for law and in many other regards. It was known from some few statistical studies that a relatively small proportion of the drivers have a relatively large proportion of the accidents. The circumstances there are very much the same as in industrial accidents. You know from the various studies that have been made of large groups of employes in industries, both here and in England, that a relatively small proportion of the employes are what we might call accident carriers or accident-prone workmen, who for one reason or another, have a relatively large proportion of the accidents.

Now that presents us with our major problem, at least with our first problem. How can we locate or identify the accident-prone operators? If we can find them, then we can study them and perhaps either cure them or eliminate them.

Our second major question, then, becomes: how can we diagnose the difficulties of these accident-prone men, find out in each particular case just what is wrong? The difficulty may be a lack of specific training on certain points in operation, it may be temperamental or emotional, a certain instability that leads the operator to lose his head and do the wrong thing in a sudden emergency, or the difficulty may be one of innate, low intelligence, or one of health. How can we diagnose these difficulties and put our finger on just what is wrong in each particular case?

And the third and most important of our three major problems is how, then, can these difficulties be removed and the operators helped to become competent, safe operators of motor vehicles?

These problems, all three of them, emerge not only in connection with the highway safety problem of the private driver, but also in connection with the industrial problem of the chauffeur, the truck driver, the bus operator, the delivery boy, the employe of any concern, whether it is a department store or an oil company or a transportation company, which maintains a fleet of trucks or busses or delivery cars.

There is a great difference between the practical aspects of the problem as it confronts the fleet owner and as it confronts the public administrator or the person concerned with safety on highways in general, because the fleet owner has immediate control and supervision over his men. He has it also within his power to select carefully those who shall operate his vehicles. But in the public accident field, in public vehicle administration, it is very difficult to get control over the drivers. It is not easy to decide just who shall be permitted to drive or to eliminate any large proportion of those who would like to drive.

Now I am not so sure that that is as sorry a situation as it might seem at first glance. My experience leads me to feel that a considerable proportion of the accident-prone drivers are capable of cure, through retraining, instruction, education, discipline, supervision, and bringing public sentiment and public disapproval to bear upon them.

I speak with modesty upon that point because I know there are people with broad industrial experience who disagree with me and whose experience seems to indicate that a large proportion of the accident-prone drivers are such because of inborn incapacity to drive, slow reaction time, emotional instability, poor eyesight, and other causes which are very difficult to change for the better; so much so, that their position is that about all we can do with these accident-prone people is to keep them from driving.

One major problem before our committee, then, is to get further light on that question, the question as to what proportion of the accident-prone operators are capable of improvement or cure, and how that improvement and cure can be brought about.

My reason for believing as I do, that a relatively large proportion of accident-prone men are capable of becoming competent, safe operators, is the experience which the Boston Elevated Railway has had in the past three years in undertaking to locate, diagnose, treat and cure the accident-prone men among their bus operators and street car motormen. I spoke before the first open meeting of this committee which was held in New York two years ago, on this subject and I mentioned at that time our first studies and efforts in the direction of helping these men to become more competent operators.

I mentioned at that time the fact that it seemed necessary to approach the problem in that particular way because there is a very low labor turnover in that company, and if we had concentrated our attention on the problem of initial selection (even though we had by some miraculous means been able to select only 100 per cent good operators) or the problem of initial training, it wouldn't have made very much of an effect upon their high accident costs. And that is the reason why we turned at once to this other line of attack: *namely, to locate the accident-prone experienced operators* and not to fire them but rather to see what could be done through specific retraining, better supervision, encouragement, discipline, cooperation with the medical department in improvement of health, and other ways to help these men to become safe operators.

Just in a word, the results to date have been that whereas during the years immediately preceding and including 1927, collision accidents in Boston had been running on an average of about 650 a month, during the present year, 1930, they are averaging 320 a month. That result has followed upon this particular line of attack with a very small number of men discharged or disqualified, a smaller number than had been the case in the previous years. That is why I believe that a larger proportion than I once thought are capable of cure. I have seen it done.

This committee has been operating through the activities of several of its individual members and of others associated with them in studying these different problems which I have outlined to you, in Cleveland, Columbus, Dayton, Evanston, Pittsburgh,

New York, Boston, and New Haven. We shall have a very informal discussion of what has been done, the problems which have been faced and the difficulties that are ahead of us. But first I want to describe three particular cases, illustrating different kinds of accident problems and how they must be met differently.

The first of these was the street car motorman whose record showed that he had more than his share of minor collisions, chiefly with vehicles on the left of the street car. By all means the most common kind of collision is with vehicles going the same direction on the right, but this man had avoided all that type of accidents.

Examination of his eyesight showed no defect in range of vision. A supervisor, however, riding the car with him and observing his behavior, discovered that the man was fond of racing automobiles on his right. When the motorman saw a driver trying to get ahead of his street car he would accelerate and beat him.

He was doing it often but he was careful while he was doing it. He had no collisions with the drivers that he would race in that particular way, but his attention being all over on the right, he didn't notice what was going on on his left and that was where the accidents happened.

In this case the problem was entirely cleared after we got our finger on the particular wrong thing he was doing, and then it was simply a matter of persuading him to change his habit of racing with the automobiles on his right, and keep his attention on the whole street.

The second case is one which illustrates the fact that sometimes you may get some good psychiatric treatment without resorting to a psychiatrist or psycho-analyst. The supervisor reported that he couldn't find any fault with the man's use of the brake or the way he notched up his power, or opened and closed the door before he started the car, or any of those other details that he had observed.

But there was one thing that he had noticed and that was this: whenever a pretty girl got on the car he would pull down his coat, straighten his tie, and roll his eyes toward her. He kept this up more or less all the while the pretty girl was on the car.

The supervisor tipped off the division superintendent, who called the motorman in and talked it over with him very frankly. The motorman couldn't see any connection between his perfectly natural interest in women and his susceptibility to accidents, and he told the other men what a fool the superintendent was to think there was any connection. Whereupon the motormen and conductors picked up the burden. They made life miserable for him for the next two weeks, and they cured him. He now keeps his eyes on the street and not on the passengers behind him.

The third case is one of a private driver who voluntarily came to an accident clinic, not because he had had any accidents, but because he had noticed three or four times that he had gotten into an awfully tight place rather unexpectedly and he was getting a little worried about himself.

He was put through a set of diagnostic tests which included, among other things, reaction time at the wheel and with the brake, certain visual tests, auditory tests, and so on. Mr. Carroll A. Whitmer of the Dept. of Psychology, Univ. of Pittsburgh, who was conducting the examination, found that the man had a slow reaction time with his right foot, sometimes even extending as long as six seconds between stimulus and response. He found also that there was a blind area of about 15 degrees in his right field of vision.

Mr. Whitmer recommended that he consult a neurologist who in turn found a slight partial paralysis of the right side, traceable, as they eventually discovered, to certain digestive difficulties which were readily cured and his paralysis cleared up.

Now isn't that a pretty clear case of the kind of service that an accident clinic can render to drivers generally, and isn't that a fine example of the attitude we all ought to take toward ourselves as drivers; namely, self observation, noticing if there is something wrong, going to specialists to find out just what it is that is wrong, following through to get that thing cured? I look forward, ladies and gentlemen, to the time in the remote future—when if we put on a Safe-a-Life campaign for required inspection of the motor vehicles, to be sure that the brakes are right, and the headlights properly adjusted, we shall also have a required examination of the driver to see whether his steering gear is operating right, to see whether his headlights are bright enough, to see whether his condition is such that he can put a sticker on the front of his automobile, "Automobile inspected and approved; driver inspected and approved."

Now I want to hear from some of those who are here. I wonder if we may have a report of the studies that have been made at Ohio State University and in Dayton by Dr. Weiss and his associate, Dr. Lauer. I understand neither of those gentlemen is here, but Mr. Shriver of Detroit and Mr. Doeller of Dayton are here and perhaps they can tell us something about this work and its results.

W. C. Shriver (Engineer Chrysler Corporation, Detroit, Mich.): A public utility in the southern part of Ohio has, for the past three years, been making very careful records of their accidents. During two of those years little was done of a corrective nature but the reports were available and accurate. They found that accidents were mounting.

The first thing was to inspect the records to determine whether the accidents were scattered through the entire list of drivers or whether they were concentrated in a relatively few. About 8 per cent of the drivers had, during those two years, contributed a little more than 50 per cent of the accidents. With that information, they were able to go ahead on a more comprehensive plane to see what could be done with these drivers.

The first thing was the establishment of a court of review, not a court of discipline. The court had no powers other than the requirement of the presence of the man who had the accident and a careful survey of the possible or probable causes, together with what suggestions they might offer to eliminate those accidents in the future. That was tried for about a year and the improvement in the number of accidents per hundred thousand miles was slight.

This improvement failed to satisfy. We then applied to Dr. Lauer and Dr. Weiss of Ohio State University for help. They carefully examined the drivers, giving us trouble, and a like number of the good drivers.

About a 90 per cent correct analysis of these men was realized from the laboratories. In other words, they would pick nine out of ten of the bad drivers, but whose records were unknown to them. They also picked out nine out of ten of the good drivers. They ran them through a test for intelligence, a test for emotional stability, for manual operation, reaction time, vision, particularly for so-called tunnel or telescopic vision, and also for depth of perception, and the prone-to-accident drivers were shown to be deficient in one or several of these features. A majority of these drivers were not deficient from a physical standpoint. The greater portion were deficient in emotional stability intelligence, and there seemed to be considerable correlation between the two. We unfortunately found drivers with an intelligence level placed somewhere in the neighborhood of eight years. Those men, on the average, seemed to be emotionally less stable and we were unable to improve them to any great extent.

Perhaps we were looking at the lowest end of the scale. They surely were the lowest end of the scale of some 400 drivers in this public utility. Disciplining them seemed to do little good. We have a record of those men who were laid off for a period of from eight to eighteen months, and a record of those who were laid off for another period ranging from two weeks to a month. We have yet to have a case in which those men did not come back and continue their accident record with practically the same frequency as before.

There has been a rather limited attempt to teach those men the proper habits of driving. For one thing, it seems to have been a little hard to get the individual driver to demonstrate those factors which probably caused his accidents when the supervisor was riding with him. Another thing, probably we didn't look for the cause of accidents. At any rate, we had little success in reforming bad drivers.

We found similarity of accidents in studying the record of one man, who had nine accidents in three years, and in each case it was another car striking the rear end of his car. Among the things which Dr. Lauer discovered about this man was a great deficiency in depth perception. He would come up to a corner where the light was against him, and at the time he applied his brakes he would have to apply them severely even though he had seen the light fifteen or twenty seconds before. Since he was driving a truck which, on account of its size, obscured to a certain extent the vision of the man driving the car following him, he did not have the opportunity to see the light as quickly and as easily as our driver. Evidently the driver was the cause of accidents which, on the face of them, were not his fault, for no one can have nine rear end collisions in three years and always be on the right side.

We had another man whose difficulty was the matter of tunnel vision. His accidents were due to being struck from the side. We didn't discover that until he went up to the laboratory. However, there seems to be a relatively small percentage of accidents caused by physical disabilities. Most of them seem to be caused by either a mental or emotional disability. A bad attitude, I believe, heads the list.

I first became interested in these accidents because we wished to determine whether improvements in what might be considered the safety factor of the automobile were reflected in fewer accidents for the automobile. Unfortunately, we did not find that. A man who had started during the first year of the three years by operating a car which was probably two years old at the time, with two-wheel brakes, poor steering apparatus, high pressure tires, and so forth, was expected to show a drop in his accident record when put on an up-to-date car with four-wheel brakes, better steering apparatus, and better vision afforded by the newer construction of the cab. What seems to have happened is that he merely moved his driving factor of safety up to compensate for the factors of safety which had been built into the car, and we could see no difference between this man's operation of the old car and his operation of the new car.

CHAIRMAN BINGHAM: What did you do to cut down accidents?

MR. SHRIVER: We released some 14 men. The decrease in accident frequency during the past six months has been a little better than 40 per cent and that seems to have been accomplished by the removal from driving of 14 men. We didn't merely discharge them but placed them in another occupation in the company which did not require driving. Those who could be benefited by that example most certainly were, because these were not promotions from driving to non-driving jobs. Some of them had to go to work instead of doing a more or less white-collared job.

E. P. GOODRICH (Consulting Engineer, New York City): Have you found that too quick reaction time has been the cause of accidents?

MR. SHRIVER: I am not competent to answer that, but I can give you Dr. Lauer's stand on it. He says that too quick reaction time is worse than too slow. Too often a man reacts quickly but does the wrong thing, and the man who does the right thing slowly is better off than the man who does the wrong thing quickly.

We have a man who would probably be classed as one of the best if not the best driver in the organization of 400, whose reaction time is particularly slow. He is the supervisor of transportation. He has no accidents. Some of these boys that are in the class having 8, 9, and 10 accidents in three years have a fast reaction time but they don't know what to do about it. In fact, they have often reacted so fast that they didn't reach any decision whatever. It should be automatic, but with boys with an intelligence level around the eight year mark, what they do automatically is not of very great value.

DR. D. L. HEDBERG (Dir., Municipal Psychopathic Laboratory, Evanston, Ill.): Did you say that most of those of low intelligence had a quick reaction time?

MR. SHRIVER: I didn't say most; I said too many. We have had no case where the cause of the accident was laid to slow reaction time.

CHAIRMAN BINGHAM: In other cases, the tests of reaction time in comparison with tests of intelligence have shown more often than not that people of low intelligence also have a slow reaction time, but there are marked exceptions.

There is one other point that bears more directly on the first question. Information comes from the the Techno-Psychological Laboratory of the Paris Tramsways, where they have been carrying on investigations for many years, to the effect that irregularity of reaction is more serious as an indicator of accident proneness than either excess slowness or quickness. If a person is consistent in his reactions, that is a much better sign than if he is sometimes quick and sometimes slow.

MR. GOODRICH: Is this variation in reaction time ever due to temporary physical disability, such as digestive upsets, or is it inherent?

CHAIRMAN BINGHAM: It is inherent, or it may also be affected sometimes by these temporary physical conditions.

F. C. LYNCH (Manager Kansas City Safety Council, Kansas City, Mo.): Is there any relationship between fatigue and reaction time; that is, is the reaction time of the man who is fatigued slower than when he just started to work?

CHAIRMAN BINGHAM: Whether fatigue affects the reaction time or not, it certainly does seriously affect the total coordination of response so that the fatigued person is more apt to do the wrong thing. As to the relationship between fatigue and speed, I am not so certain.

MR. LYNCH: In Kansas City in eight years we found that in the first seven months of the year the average was 4.5 public accidents per month, with no month going above or below the line, and for the last five it was 8.5, indicating that at the end of July the accidents went suddenly up. There is nothing that has happened consistently in that community over that eight-year period except the change in climate.

In other cities like San Francisco where they have no change of climate I found their average is the same throughout the year. I took the average of northern cities that have variations in climate as we do, and I found their averages run similar to ours, running the same the first seven months, when they shoot up and stay up until cold weather.

I know when hot weather comes the industrial accidents increase 400 per cent. That is the average of 45 concerns. They ran along the same level throughout the first few months, then jumped up 400 per cent and came right back down, indicating, we thought, that perhaps the management had spoken to the foremen and reestablished the alertness of the workmen, notwithstanding the hot weather.

Then we took a big fleet of commercial vehicles and found the accidents there went up along with the industries, but they didn't come back down as did the industrial accidents. This indicated, we thought, that supervision did have a tendency to reestablish alertness.

Then we studied the effect of a couple of inches in the newspapers relating to enforcement, trying to find out some relationship between the alertness of the driver and the accidents. We found a definite correlation between accidents and the amount of publicity which the press had given to enforcement. Then we plotted our general educational campaign publicity against the accidents curve and we found there was no correlation at all between telling a man how to drive, his responsibility while driving, or radio campaigns about being careful, and the number of accidents.

And so we have almost reached the conclusion that the most important factor in every accident is not skill, not judgment, not reaction time, but alertness.

F. M. KREML (Director, Accident Prevention Bureau, Evanston, Ill.): Weather has a very direct bearing upon accidents. Its relationship, however, is frequently inverse and bad weather brings a lessening of accidents. This is highly indicative of the very great factor entering into accidents; namely, the frame of mind of the driver, whether or not he is alert. Bad weather naturally makes him alert. Every driver realizes that in a bad snow storm, when vision is obstructed, he must be careful if he is going to avoid injury to himself and to others.

MR. SHRIVER: In that connection, we seem to find that the fellows who are having the accidents, when the weather conditions are such that they should compensate with fewer accidents, still head our accident list. I have been looking over January and February lists and I can pick out from those two lists approximately 50 per cent of the men who made up the 14 whom we had to do something about. The man who is markedly deficient doesn't compensate during bad weather. It is my contention that you can't do anything with him.

I am rather in sympathy with an analysis of the supervisor of transportation in Dayton who, when asked the cause of a particularly bad accident, said, "Two fools met." That covers the situation in a great many cases.

MR. LYNCH: The consensus of opinion at the Street Railway Section yesterday was that accidents are less liable to happen at the peak than at the off-peak period, indicating that when the men were not faced with the certain enormous responsibility of getting through traffic they became less alert, ran at higher speed, and paid less attention to their operation.

MR. SHRIVER: That doesn't seem to have been the case here.

All of the prone-to-accident drivers, at some time during the past three years, had two accidents in a given thirty-day period; some of them as high as three. That is a striking thing when you consider that the average for the entire group of drivers is one accident in over three years. That is one way in which we are trying to pick them out before they get too bad. If a man has an accident this week and another one next week, and that is his third accident, that is a definite indication, as near as we can find out, that there is something wrong with the man.

MR. R. M. MCKINNIS (Supervisor of Training, Philadelphia Company, Pittsburgh, Pa.): Have you found a difference in the reaction time between men and women drivers?

MR. SHRIVER: The reaction time of women is considerably faster than of men, age for age.

CHAIRMAN BINGHAM: There was published in the Personnel Journal an article by Dr. Viteles of the University of Pennsylvania, comparing men and women taxicab drivers there, that was extremely significant because these drivers were all employed by the same company, driving the same equipment which was maintained in the same sort of condition by the same garage repairmen, and they were facing the same hazards of traffic. The women had a very much larger proportion of accidents than the men. That is the one clear-cut study that I know about which compares men and women drivers under comparable conditions.

The women didn't have as many serious accidents. In other words, it was an indication that the women were more cautious and less competent.

G. A. DOELLER (Dir. of Accid. Prev., Columbia Engineering & Management Corp., Dayton, O.): I would like to know what suggestion I can take back to our executives, to salvage these fellows who are prone to accidents.

CHAIRMAN BINGHAM: You will also find some excellent suggestions in the practice and experience of the Milwaukee Electric Railway and Light Company. In the October number of the Personnel Journal there is an article describing what they call their accident clinic. It is similar in many regards to your traffic court. It is a group made up of representatives of the employment department, the training department, the safety department, the medical department, the transportation department, all of them coming together and studying the particular case of accident proneness, deciding what ought to be done about the particular case, working out the plans for retraining or discipline or whatever is needed, and then seeing to it that the recommendations are carried into effect.

QUESTION: Do they have men within the company who are competent to make psychiatric tests or do they have that done by people outside the company?

CHAIRMAN BINGHAM: Both. They maintain within the company a staff of specialists and they have one or two that they can call on from the outside also.

H. J. SPOERER (Pres. Evanston Safety Council, Evanston, Ill.): I would like to ask Mr. Shriver if those 400 drivers on whom they carried out this test were given a physical examination before they were employed or after the test was made, and if it was after the test, what was the most common defect that you found?

MR. SHRIVER: There was a physical examination before employment, but it was not a thorough examination by any means, especially from the standpoint of eyesight. The defects of eyesight which cause accidents are not the ordinary defects of eyesight. We found cases of telescopic vision. One man saw only 45 degrees when he should see 180. That isn't something that is ordinarily tested. The ordinary physical examination also doesn't give any consideration to depth of perception or the ability to determine the distance between two objects in a given field, and we found one man whose depth perception was exceptionally bad.

We found another type of eye deficiency. You take an object moving at a given rate of speed, and pass it back of a screen. You have a button and a light on the screen and attempt with the button to stop the object on the line. We found some men who never stopped the thing at all. They couldn't gauge the speed of the vehicle after it was out of their line of vision. For instance, I look to the right and see a man coming. I look to the left, the way is clear, and I go on. While I am looking to the left I have no idea of how close this man on the right has come, even if he has not changed his speed. The fellow with this type of visual defect, when he comes to a crowded corner, is sunk. He doesn't know where the other fellows are. He can look in only one direction at a time.

MR. SPOERER: Did these 14 high-accident men have physical defects?

MR. SHRIVER: Two of them had visual defects. None had ordinary physical defects. Of course, we have men driving with one arm. I know of a man who is driving satisfactorily without the use of his right leg. The only physical defects that were found to be correlated with accidents were defects of vision, and then they were not common defects. A man who is near-sighted or far-sighted is not affected. The best driver we have showed a variation from normal eyesight equal to the worst.

MR. SPOERER: In addition to the physical examination, do you have an examination to test his ability to drive?

MR. SHRIVER: The man is taken out with the supervisor or foreman of the transportation department and he drives for probably a half to three-quarters of an hour. I don't know how comprehensive a test that is. It hasn't acted as a very good screen. Only men who pass this examination can get into the driving class, but we still get a percentage of these prone-to-accident men who have passed the test on a knowledge of the laws and ability to manipulate a car.

We found that the manipulative ability of the men who learned to drive late in life was very low, some of them having to learn as late as age 60. We still have those men in the organization but not driving.

CHAIRMAN BINGHAM: I will say that the experience of other companies has, to my mind, clearly demonstrated the value of an annual physical examination, particularly of the old men. In one study which we made in connection with the motormen and bus drivers of the Boston Elevated Railway, we found that roughly a third of the accident-prone men had some sort of physical defect. The most startling one was three cases of hernia, all of them in the high accident group, none in the low accident group. Now what has hernia got to do with the competence of a street car motorman? I don't know. I only know that it points to the importance of general health as a contributing factor to competence.

Nearly all of the cases showing a circulatory condition such as high blood pressure were found to be in the high accident rather than in the low accident group. In general, about one-third of those in the high accident group turned out to have some sort of physical defect that had cropped up in the annual medical examination. Roughly, another third showed defects of personality which cropped up in such ways as finding on their records evidences of insubordination—perhaps they had "sassed" a foreman

or frankly disobeyed an order. And in the other third, the major factor in the situation seemed to be some lack of driving ability.

So there are three great classes or causes of accident-proneness: the condition of the physiological organism, that is health; the native aptitude for doing that particular sort of work; and the temperament or emotional condition. Those three big major considerations certainly ought to come into any program of individual study in relation to accident-proneness.

We would like very much to hear from our friends from Evanston with reference to the work that is in progress there in connection with the traffic court. Judge Porter, will you tell us something about that?

JUDGE HARRY PORTER (Police Magistrate, Evanston, Ill.): We followed the suggestion of Chicago in establishing a laboratory in Evanston for the examination of criminals, chiefly felony cases, and found it progressed very well. Then at the suggestion of Mr. Reeder of the National Safety Council, a resident of our city, we decided to enlarge the scope of the laboratory to include habitual traffic offenders.

One suggestion I would like to make to the Committee is this: In our work out there I feel that we have a rather unusual opportunity, in a city of its size at least, for a survey of this thing because we are trying on an average of 1,000 traffic violation cases a month. In those 1,000 traffic violation cases during the period of a month we will find maybe 20 or 25 cases which will be worthy of special note, and which I feel from time to time ought to be the subject of one of these examinations.

I have referred those cases to Dr. Hedberg who is with us today. He has conducted some of the tests alone. Some of the tests he has conducted with Dr. Meyer Solomon of the Municipal Psychopathic Laboratory and others in conjunction with Dr. J. J. B. Morgan of the Department of Psychology of Northwestern University.

The function of a law court does not include the right to require these tests. Legalization is necessary in order to give us the right to require them. In most cases we can induce the defendant to submit to the test, but I feel that as the tests become more frequent we are going to have trouble and legislation is going to be necessary to give us the right to compel them.

CHAIRMAN BINGHAM: After conviction and before sentence, don't you as judge have the right to secure all the information you can in order to help you decide just what sort of a sentence to impose?

JUDGE PORTER: If that question is confined to our state alone, I can answer it. The courts of Illinois have no right, after the verdict of a jury has been entered, to inquire into any circumstances whatsoever that might mitigate or aggravate the punishment. The juries in Illinois are judges in fact and they fix the verdict.

DR. HEDBERG: We have been carrying on this experiment through the good will of Mr. Kreml, Judge Porter, and several other Safety Council men, and we have tried to see if we can't do something for these cases.

In a very small percentage of the traffic violators will you find that there is a real mental deficiency, but you would be surprised to see the number of 19, 20, 25 year old individuals who have the mind of an 8 or 9 year old boy.

Now we are up against a real mountain in trying to buck this thing for the simple reason that, as Dr. Bingham said, it is not an easy task to tell the public that John or Mary cannot drive a car. Recently the son of a very influential official of our town was brought in. I went through the test, and in order to get a double check I had another psychiatrist go through it, and we agreed very closely on the verdict of the mentality of that individual. They said, "Oh, you can't do that. That would never go. That is Mr. So-and so's son."

We decided that the only way to stop that boy's driving was this: I said, "Would you let your girl or boy who has a mentality of eight and a half years go down the street at 35 miles an hour?"

"Why of course I wouldn't."

"Well," I said, "That is exactly what happens every time Jimmy drives."

I recall other cases. I might cite the case of a doctor friend of mine, a fine eye, ear, nose and throat specialist, a highly educated man but an impossibility when it came to driving a car. He hired a little boy fifteen years old and this boy went with him for three months, driving the car. Then he thought he could drive it himself. Now any ordinary individual should know how to drive a Ford at the end of three months. But the doctor got into the car and the first thing he knew he had gone up four steps into a meat market and through the window. He broke several headlights on other cars in the garage, so I spoke to the mechanic one day and said, "That looks very serious for the doctor. Can't we stop that some way. He is going to kill himself," and the garageman replied, "Doctor, he will kill himself before the summer is over if he drives that car."

On the Fourth of July he was driving toward a railroad crossing and a train was coming. The engineer knew the doctor well. He was coming his ordinary speed but couldn't see the car because the road was slightly hidden from his view, but you could see the tracks from the road. The doctor knew the train was coming and he was going down the hill at approximately 12 miles an hour and he had at least 500 yards in which to stop. That is the story. He deliberately drove in front of the train and four people were killed.

He was a brilliant man but he could not drive a car. The sooner we find out that a certain class of people cannot drive a car, the better it will be for our percentage of accidents.

CHAIRMAN BINGHAM: Mr. Baker of the National Safety Council staff, working with this Committee, has been turning his attention lately to the actual practice of those states which are giving licenses for driving based on examination, and has himself gone from state to state and taken their examinations.

J. S. BAKER (Assistant Traffic Engineer, National Safety Council, Chicago): We undertook the study of drivers' license examinations to be able to answer the questions of people in states which do not now license drivers.

The details of the licensing procedures are tabulated in Public Safety Memo No. 43, and No. 44 gives the method of examination for each state visited. These documents may be had from the council.

We also prepared, from the best practices found in actual use, a "model" examination which will be published in full in the *National Safety News* probably before the transactions of this congress appear in print.

It is my recommendation that the examiner, at the conclusion of the examination, should not merely tell the applicant that he has failed; he should let him know why, and in what he should practice to pass. I found only one state where the examiner attempted to guide the further training of the applicant.

We must think of two things which tests do. The first is to keep off the streets undesirable and incompetent operators. It is the most commonly recognized aspect of the driver's examination, but I do not believe that it is necessarily the most important. The second object of the tests is to serve as an educational experience. Drivers who come up for it know that they must meet a certain standard, and they consciously prepare to do it.

The people who are actually refused a license by the state, people who are told, "You can't come back for another examination," or "You can't have a license because you are deficient," number fewer than one in a hundred examined, but the number who become convinced by the examination that they cannot drive safely is very much greater, perhaps ten times as great.

As an educational experience, being examined is extremely beneficial. Everyone to whom I have talked agrees that it made him study up on the laws and really practice driving.

Hence, in designing an examination, we should think not only of keeping certain people off the road but of educating those who are permitted on it.

CHAIRMAN BINGHAM: The state of Connecticut has perhaps taken this subject of the examination of drivers more seriously than any other, and they are facing the possibility of very considerable improvement of their already good practices through further research on that subject.

MISS ETHEL USHER (Statistician Department of Motor Vehicles, Connecticut): For some years Connecticut has had a requirement for examination of all applicants for motor vehicle licenses. This has been handled in very much the same manner that it started several years ago. At the same time, there has been carried on a rather extensive piece of research in connection with accidents and their causation, as to the type of operation that cause the accidents, that is the actual driving act that immediately preceded the crash, and various other of the more or less standard studies as to the repeater and that sort of thing.

Some years ago we began to realize that while the engineers were doing a splendid piece of work in building cars better each year, and highway engineers were making the highways safer, the selection of the drivers was not keeping pace with the progress.

During the past year the State Department of Motor Vehicles and the Institute of Human Relations, of Yale University, have been cooperating on an experiment. It is not developed sufficiently for me to give you any definite results. We have given some experimental examinations to several hundred people. Several hundred more are now being taken. We are trying to make that group of several hundred people a cross section of the operators in the state, such as taxicab drivers, truck drivers, men, women, repeaters in accidents, new applicants, insurance executives, sub-executives, clerks, and all the various other types of operators.

When those are in we hope to pool the answers and arrive at some questions that will tell us the type of person that is having the accidents. We incidentally have to tie up to a cumulative record of all operators who have been licensed in Connecticut who have performed any misdeed in their operation that has come to the attention of the Department since 1918, a Rogue's Gallery of operators, so to speak, and when we have that to measure along side those records on the experimental examination we hope that we will be able to pick the question that tells us something.

The experiment has progressed to the point where we feel we are on the right track.

ADJOURNMENT

Traffic School

Tuesday Morning Session
September 30, 1930

ERNEST P. GOODRICH, Chairman
Consulting Engineer, New York City

CHAIRMAN GOODRICH: The speaker this morning is a man very appropriately selected because of both teaching experience and professional traffic experience. He was a professor of civil engineering before he was a traffic engineer. He is located in Pittsburgh.

Regulation of Parking

By LEWIS W. McINTYRE
Traffic Engineer, City of Pittsburgh

In discussing Parking Regulation, we must recognize that our streets and highways serve two purposes:

1. They are used by the general public as lines of communication for pedestrains, and for the transportation of persons and merchandise, and
2. They provide a terminal facility or station for the disembarking and unloading of such persons and merchandise.

All attempts to regulate parking represents an endeavor to set up an economical balance between these two street uses.

Since the need for a terminal facility is dependent upon the volume of moving traffic, and since it is possible to provide "off-street" terminal facilities, but not nearly so logical to provide "off-street" facilities for moving traffic and use present streets as terminals, it should be set up, as a fundamental premise, that streets are intended primarily for moving traffic, and only secondarily as providing places to park.

The restriction of parking can be divided into two broad classes, those restrictions which are primarily safety measures, and those restrictions which have as their prime object the relief of congestion or the facilitating of traffic movement.

In approaching the question of parking restrictions, public officials should consider these classes of restriction in the order named. It is generally recognized that the following conclusions are sound with respect to the first type of restriction:

1. The safety of pedestrians and vehicles requires a clear view of traffic approaching from various directions at street intersections, and obstructions of view by vehicles stopped or parked at such points should be prohibited.

2. To be effective, street car safety zones must be used exclusively by pedestrians. This requires that the lanes of traffic between such zones and adjacent curbs be kept clear of standing or parked vehicles.
3. Fire protection is a public responsibility, and vehicles should not be permitted to park where they will interfere with free access to fire hydrants and exits from fire stations.
4. Double parking and the stopping of vehicles outside street areas set aside for the purpose often force overtaking vehicles into the street car tracks or into the paths of other vehicles. This practice is unsafe and inefficient and should be prohibited.

These and similar restrictions are expressed in the Hoover Model Municipal Traffic Ordinance as follows:

It shall be unlawful for the driver of a vehicle to stop, stand or park such vehicles in any of the following places:

1. Within an intersection.
2. On a cross-walk.
3. Between a safety zone and the adjacent curb, or within 30 feet of points on the curb immediately opposite the ends of a safety zone.
4. Within 25 feet from the intersection of curb lines, or if none, then within 15 feet of the intersection of property lines.
5. Within 30 feet upon the approach to any flashing beacon, stop sign or traffic control signal located at the side of the roadway.
6. Within 15 feet of the driveway entrance to any fire station.
7. Within 15 feet of a fire hydrant.
8. In front of a private driveway.
9. On a sidewalk.
10. Alongside or opposite any street excavation or obstruction when such stopping, standing or parking would obstruct traffic.
11. On the roadway side of any vehicle stopped or parked at the edge or curb of a street.

One of the principle objections to parking restrictions is the difficulty of their enforcement. Strict enforcement of the above regulations will give public officials an opportunity of measuring the effectiveness of their enforcement machinery and an opportunity of improving it through the set up of machinery and methods which will eliminate or minimize "tag fixing". This will be found to be much easier at this stage of the development of parking restrictions because there will be a little public opposition to the enforcement of such reasonable measures as above outlined.

Shortly, however, the need for additional traffic lanes to accommodate moving traffic will become evident through the increase of a tendency toward double parking. Double parking is a positive evidence that the demand for curb parking and unloading space is greater than the supply. If angle parking exists, an additional traffic lane for moving traffic may be provided by changing the angle parking to parallel parking, or possibly at first, by changing the angle of parking. A large car parked at an angle of 45 degrees may extend as much as 16 feet into the street, measured at right angles to the curb. A car parallel to and one foot from the curb extends a maximum of seven feet into the street. The difference of nine feet represents a saving of one complete lane for moving traffic at the expense of a reduction in the number of cars that can be parked.

As double parking again becomes evident, the next attack should be made on the long-time parker (the man who is parking his car from the time he arrives in the morning until he leaves at night). One of the earliest methods of increasing the rate of parking turn-over and therefore providing an increase in available parking or terminal space was to limit the total time that a vehicle might be parked continuously in one block. Parking limits of from 30 minutes to one hour are now common. Reducing 2-hour parking to 1-hour parking increases the parking capacity 30 per cent, and to one-half hour parking 71½ per cent. These figures are based upon averages of a number of traffic surveys which show the average time vehicles are parked under various restrictions to be as follows:

2 hours—32.9 minutes
1½ " —28.5 "
1 " —25.1 "
½ " —19 "

Changes from one and one-half hour parking to one hour parking would similarly produce an increase in capacity of 15.5 per cent, and to one-half hour parking of 52.2 per cent, and a change from one hour parking to one-half hour parking would produce an increase of 32 per cent capacity.

These percentage changes assume complete obedience to the existing parking restriction and the same for the restriction to which a change is proposed. Unfortunately, no American city has yet developed an enforcement technique which produces strict and complete obedience to limited time parking regulations. In spite of this, however, it is the concensus of opinion that limited time parking of the proper duration is beneficial to merchants and is favored both by them and by those who use automobiles.

The following represent answers to two questionnaires submitted (1) to downtown merchants of the City of Pittsburgh, and (2) to members of the Pittsburgh Motor Club. The first represents the merchant view point and the second that of the automobile driver.

Downtown Merchant Parking Questionnaire

1. In your opinion, what per cent of your business VOLUME comes from persons who come downtown by:
   Street car, 28.42 Auto, 60.32 Bus, 2.72 Taxi, 3.32 Walk, 5.32
2. Do you think that the number of persons who shop with you has been reduced because of traffic difficulties downtown?
   Yes, 67 per cent No, 33 per cent
3. Place in the order of their importance, a number after each of the following reasons why you think persons may be prevented from doing business with you:
   (a) Congestion or delay in moving through downtown streets (partially caused by excessive parking).
   Placed third by merchants.
   (b) Difficulty in finding empty space at curb near your store to get out of car on account of curb being blocked by parked cars.
   Placed first by merchants.
   (c) Insufficient accessible "off-street" parking space.
   Placed second by merchants.
   (d) Present parking laws too strict.
   Placed fourth by merchants.
4. Do you favor for the downtown district (or a major part of it):
   Present conditions 10 per cent; present parking laws rigidly enforced 25.7 per cent; unlimited parking permitted 15.7 per cent; no parking 48.6 per cent.
5. Do you think elimination of parking downtown would make walking safer?
   Yes, 39.5 per cent No, 60.5 per cent.

Automobile User Parking Questionnaire

1. Do you usually come downtown by:
   Trolley, 24.6 per cent; Auto, 63.5 per cent; Bus, 4.12 per cent; Taxi, 0.32 per cent; Walk, 6.42 per cent; Train, 1.72 per cent.

2. Do you use your auto to come downtown to:
   Work, 47.6 per cent; Shop, 52.4 per cent; Frequently, 50 per cent; Rarely, 50 per cent.
3. Have you reduced your shopping downtown because of traffic conditions there?
   Yes, 65.6 per cent; No, 34.4 per cent; Large stores, 61.3 per cent; Small stores, 38.7 per cent.
4. Are your difficulties in shopping downtown at present mostly on account of difficulty of finding empty space at curb to get out of your car on account of other parked cars?
   Insufficient "off street" parking space 37.1 per cent.
   Congestion or delay in moving through streets 25.8 per cent.
5. If street parking (stopping for unloading permitted) were eliminated downtown, would you shop there?
   More, 52.3 per cent; Less, 37.7 per cent; At large stores, 17.6 per cent; At small stores, 1.9 per cent; Both, 70.9 per cent.
6. Do you think elimination of street parking downtown would make walking safer?
   Yes, 52.5 per cent; No, 47.5 per cent.
7. Do you favor for the downtown district:
   Present conditions, 5.1 per cent; One-hour parking rigidly enforced 51.4 per cent. Unlimited parking 9.7 per cent; No parking, 33.8 per cent.

It is important, however, that the time limitation be made as the result of a careful study of the needs of the district in question. A report of the Domestic Commerce Division of the United States Department of Commerce, based on expressions of opinion of 1426 merchants in 841 cities and towns, shows an overwhelming opinion that the average shopping time is 1 hour or less, and a majority of opinion that the shopping time is less than one-half hour. The shorter shopping periods are found to increase as the towns decrease in size. The longer shopping periods of 1 hour or more are found to occur in the largest cities and are almost negligible in cities of less than 50,000 in population.

The number of customers shopping by automobile is apt to be over-estimated by merchants, and a factual study must be made for its accurate determination. In Chicago, only 8 per cent of the total number of persons arriving at a large number of loop stores, office buildings, etc., came by automobile. Of these, only 1 per cent utilized curb parking. A survey in Pittsburgh made in 1927 shows that only 2.8 per cent of the patrons of 48 typical stores parked their cars at the curb. It is true, however, that the volume of business per person secured from automobile passengers is likely to be higher than that secured from persons using some other medium of transportation in order to shop.

The layman is apt to magnify the importance of parking space and minimize the importance of facilities for free traffic flow. Congestion is, however, caused by inability of traffic to move on streets of insufficient capacity. What the layman does not realize is that the passenger automobile carries a relatively small per cent of the persons entering congested districts. In 1927, passenger automobiles coming into the downtown district of Pittsburgh constituted 87.1 per cent of the passenger carrying, street using vehicles but carried only 29.2 per cent of the street passengers. In downtown Pittsburgh, a street car carries an average of 32 passengers per car while the average passenger automobile carries an average of only 1.89 per cent passengers per car. These and similar figures indicate that business interests, and indeed, a great majority of our citizens, are best served by providing for freer, faster movement of the mass transportation agencies even at the expense of terminal facilities or parking for passenger automobiles. These considerations lead inevitably to the elimination of all parking during the morning and evening peak hours as the next step necessary to facilitate traffic flow. With this restriction, as well as the limited time restriction, enforcement machinery breaks down to a very large extent and becomes very expensive in officer personnel to be reasonably effective. Of the two restrictions, that of "no parking at all" is much more easily enforced than any "limited time" restriction, and is much more effective in producing fluidity of traffic movement. It should be clearly understood that "no parking" does not mean "no loading". As commonly interpreted, even where the no parking restriction is in effect, time for the expeditious loading and unloading of passengers and merchants is granted. Common interpretations limit passenger loading and unloading from two to five minutes and loading and unloading of merchandise to from 20 minutes to a half hour.

One of the common criticisms of "limited time parking," or of "totally restricted parking" comes from the individual who has violated the law by just a few minutes in the case of "restricted time parking," or who has parked his passenger automobile for only 10 to 15 minutes while making a purchase in the case of "totally restricted parking." Those who voice these objections lose sight of the fact that had it not been for the restriction, they would not have found it possible to park their car at the curb at all because the curb space would have been filled up by the all-day parker in the limited time zones, or by the limited time parker in the no parking zones. It is only because a large number of the citizens obey the parking restriction that sufficient curb space is made available for the objector to get near the curb at all. He is taking advantage of the law abiding tendencies of the great majority of our citizens. A measure, which to some degree, bridges the gap between limited time parking and no parking is the use of loading zones and of passenger zones. There may be established, preferably at the end of the block, where, say one hour parking rules are otherwise in effect, short stretches where passenger automobiles may stop for a much shorter time, let us say 10 minutes. This provides a stopping place for unloading and a place wherein the really short time shopper may be accommodated. Similarly, merchandise loading zones may be provided which keep out the parker but permit unloading of merchandise. It should be clearly borne in mind that these loading and passenger zones do not grant special privileges for the property owner in front of whose place of business they happen to be located. They are for the use of all and should not exceed 50 per cent of the curb space in the block. If the need for loading space is greater than this, no parking rules should be adopted.

To boil my talk down to three things, I should say the first and most important thing is the necessity of having facts instead of opinions. I base that on the thought as indicated in the questionnaires, both of the users and of the merchants, that they felt a large proportion of their business was coming from automobile traffic while our actual factual studies have shown almost universally that the contrary is the case, the larger proportion coming from mass transportation rather than the automobile.

The second thing I would like to call your attention to is the fact that the objection to strict parking regulations usually comes from those who are benefited most by those very regulations. In other words, the man who has a place of business on a "no parking" street objects very strenuously when a car is tagged because it stands in front of his door ten or fifteen minutes while the owner of the car is doing business in his store. He fails to realize that the only reason that car can get into the curb is because of the regulation which has driven the law-abiding driver away, and if the regulation is abandoned or made less rigid he may not have the opportunity of serving that person at all.

The third thing is that our questionnaire has shown that the merchant and the driver want a place to pull up to the curb and unload, rather than a place to park. They do not have off-street loading facilities. There is a need for greater use of passenger zones, cleared spaces in each block where unloading can be accomplished.

CHAIRMAN GOODRICH: Have you ever tried in Pittsburgh the elimination of all parking from seven to nine and four to seven, for example, and leaving the rest of the day without restriction.

MR. MCINTYRE: We have a number of streets on which parking is totally restricted during peak hours, and limited-time parking is permitted during the rest of the day. We have pending in Council an ordinance providing for the total restriction of parking during the peaks and unlimited parking during the rest of the day to break up parking in certain industrial areas where much all-day parking is done to the detriment of the surrounding neighborhoods.

ALDERMAN O. A. PEARSON (Minneapolis, Minn.): We have been using the triplicate tag system for a year and a half and following through on it to the owner of the car if someone doesn't appear in court within 48 hours of the time the car is tagged.

CHAIRMAN GOODRICH: What percentage of follow-ups do you find necessary?

ALDERMAN PEARSON: Less than 25 per cent.

R. W. MEADE (V. Pres., The Peoples Motorbus Co. of St. Louis, St. Louis, Mo.): Is there any city in the United States where you could tag the automobile rather than the driver, and hold the owner responsible?

ALEXANDER K. GAGE (Assistant Prosecuting Attorney of Wayne County, Detroit, Mich.): Many states, I believe, have laws by which the owner of the car can be held responsible in the case of damages. I think the difficulty is that we haven't a means by which we can hold the owner of the car liable for the derelictions of the driver in matters other than financial responsibility.

CARL L. OLSON (Traffic Commissioner, Youngstown, Ohio): We have used the traffic court ticket system and have never found any difficulty with the summons. If they do not appear with the ticket in 24 hours, we issue a summons to the owner and let him produce the driver.

A. F. FILKINS (Traffic Lieutenant, Peoria, Ill.): We have had a tag system for a number of years. Our judges have been able to bring owners in and to fine them in the traffic court. There are only about 20 per cent of the tags that we don't get any return on, and they are from out of the city.

CAPTAIN JOHN L. MALONEY (Traffic Bureau Police Department, Springfield, Mass.): We leave the tag on the car. The chiefs of police in Massachusetts have a working agreement with the Registrar of Motor Vehicles and if the man whose car is tagged doesn't appear in court, we notify the registrar. If the man claims he wasn't driving the car, we ask him who was. If he says he doesn't know, we tell him to report to the registrar. We don't have any trouble with tags. We put them out and they come in.

H. O. ROUNDS (Dir. Safety & Traffic, Detroit Automobile Club, Detroit, Mich.): Many police departments are getting away with "murder." The question is, are they doing it legally or because they have the power to do it?

MR. GAGE: I have been thinking, as I listened to this discussion, that you can do anything if nobody fights it out with you.

MR. MCINTYRE: I wonder if we might have an expression as to the per cent of the police force that is working on traffic law enforcement as compared to other police duties.

CAPTAIN MALONEY: The traffic law enforcement today takes practically one-half of the time of every police department.

MR. BEN R. MARSHALL (Ass't. Supt. of Police, Pittsburgh): We have about 290 men in the traffic squad that covers this city, both on corners, on motorcycles, and on horseback. The trouble here was that we were loafing too long on the parking proposition before we started to clean it up.

ADJOURNMENT

Wednesday Morning Session
October 1, 1930

ERNEST P. GOODRICH, Chairman
Consulting Engineer, New York City

CHAIRMAN GOODRICH: We have as our speaker this morning Mr. Burton W. Marsh.

Traffic Signals, When and Where?

By BURTON W. MARSH
Traffic Engineer, Philadelphia, Pa.

The warranted applications for traffic control signals might be classified as follows:

1. To relieve congestion and confusion, involving vehicles only or involving vehicles and pedestrians.
2. To provide continuous movement on main arteries at controlled speed and to group vehicles so as to permit both pedestrian and vehicular cross traffic to enter and cross with a signal. Some arteries warrant signals at every intersection and some arteries only at certain intersections.
3. To reduce *certain types* of accidents.
4. To minimize delays which might be caused by the lack of officer co-ordination in a whole district such as the Chicago "Loop".

Those are the warranted applications of traffic control signals, and I wish to discuss each in turn to indicate when it is correct to apply signals.

The traffic volume criterion is much used but no definitely accepted standard has been evolved. However, Chicago uses a thousand vehicles an hour for a ten-hour period, but on the other hand the state of Massachusetts has adopted a standard of 500 vehicles as an absolute minimum for which a signal will be considered.

It would probably surprise you to know that 1,000 vehicles per hour is 13 per minute on the main street and 4 on the cross street. That is obviously not a high standard and doesn't represent tremendous traffic.

If you are going to install signals on the basis of volume, seventeen vehicles a minute is a rather small number, especially when they are divided up, going in opposite directions and therefore using the same right of way at a given time.

I shall turn next to accidents as a measure for the need of a signal because the vast percentage of requests which we receive come from the people who think they will reduce hazards. Often the request arises from the hysteria of some elderly lady who can't enjoy her front porch because of screeching of brakes and near-accidents. That is the major problem municipalities face in squaring away to the problem of the use of signals.

I wish to point out that blind application of signals as accident reduction media often results in increased accidents.

For example, a signal is put in a community where it should not be. Then the driver thinks: I used to go down Main Street, but now, since that blankety-blank signal has been installed, I have found a new route. He proceeds to tell his friends and they all follow the new route to avoid the signal. Then the authorities look at their accident records, claim there is a reduction of 7 per cent at that intersection and think they are doing fine. They fail to realize that maybe three children have been killed on the alternate route. They may have increased the accidents in another neighborhood by 100 per cent, but the apparent result is a reduction. That is ex-

tremely important and is something to talk about when you are fighting against signals which should not go in.

Another objection to a signal which is improperly placed is that it represents an economic waste. To the individual who favors intelligent traffic engineering and the police department which is emphasizing traffic work, it represents a robbing of the pocketbook, because where there should be intelligent planning there is a forced scattering of money in an inefficient way.

Unwarranted signals create violations. Although there may be relatively few of them, when they do occur they are apt to be very serious.

To emphasize that improper placing of signals may lead to accidents, let me quote figures developed by the National Safety Council. In 40 per cent of 341 cases studied, accidents increased at intersections following signal installation. In one case the increase was over 400 per cent.

The types of accidents which signals will not correct warrant careful consideration. In other words, when people say that accidents are the reason for requesting a signal, you must analyze the accidents at that location and find out if they *are* the reason, and that means you must find out the types of accidents that have occurred there.

Obviously, an accident in which some one drives into a parked car near the intersection will never be averted by a traffic signal. You often find upon investigation that fatal accidents occurred 70 or 80 feet from the intersection, involving some child or pedestrian who was jay walking. Such a hazard may even be increased by a signal because of a tendency to race for the green light.

The next question is how to determine a better method of accident reduction than placing a signal at the intersection. You must be in a position to offer something else, and I believe that one of the great weaknesses of traffic supervision is that we haven't enough else to offer that seems logical and sufficiently meritorious to warrant trying out.

I want to mention several alternatives.

1. The through traffic stop provision which involves no wait. It has certain advantages but it must be carefully safeguarded against over-using and, at least in cities, the safety stop signal must be effective day and night, which means it must be illuminated.

2. Flashing warnings, I believe, will return to favor in five or ten years. They have been very much misused and overused, but they are practical.

3. Marking of lanes to organize movement as it approaches the intersection, and give more orderly movement.

4. Marking crosswalks and establishing safety zones.

5. Eliminating or regulating turns. In some places the turns are found to be a very important element in accidents.

6. The eliminating of parking, especially in the vicinity of intersections, will often help very materially to reduce the hazard and improve conditions.

7. One-way regulations for simplifying movement and reducing accidents.

In addition, there are innumerable physical changes, some of which I will mention briefly.

1. Throat widening may be undertaken to give the proper number of lanes, so that left-turning vehicles are in a specific lane and right-turning in another.

2. Cutting back the curb increases the turning radius so that you don't make the vehicle go out into the middle of the opposing street when it makes a right turn.

3. The cutting down of shrubbery, fences and walls.

4. Grade flattening.

5. Curve straightening.

6. Street lighting also is very important.

7. Street-car stop changes may often be used to improve conditions tremendously at intersections, especially with the introduction of safety zones. Skip stops for street cars can be introduced to advantage to decrease congestion.

8. Taxicabs and bus stop locations can often be changed to advantage.

9. In many cases the use of police is the proper answer, and, in some locations, for school child protection, the junior safety patrols are proper.

10. We also have speed control by motorcycle men which, if properly carried out, often reduces accidents and gives a facility of movement which will make the artery attractive without the need of expensive regulation.

Whatever remedy is applied at an intersection there should be a check-up later to find out what it has accomplished. If the remedy was applied to reduce accidents, there should be a comparison of the record for say 12 months before the remedy was applied, with the record for the 12-month period after application of the remedy to find out whether the accidents have been reduced.

Let us say that somebody goes back there from this meeting with the thought that a more intelligent application of signals should be made, and they want to do something about it. What could they do? What would be the steps in going about this?

One of the first things to be done is to win back to the main arteries the traffic which they should be carrying and which they can carry if you do those things which make them attractive to that traffic. Among those things are the co-ordination of signals to get the greatest possible free movement at a controlled and predetermined speed, the institution of certain pavement markings, and the installation of safety zones.

I am very much opposed to both the pendant type and the high mounted mast-arm type. They may be all right for special conditions such as moving a left-turning lane separately, but in general the eye-level signal on the right-hand corner is the type to be preferred.

One of the most important things to be done is to institute a study method instead of a "by-guess" method. Even if there is no traffic engineer, even if there is no city engineer who can give any time to it, there are available methods of making counts and of intelligently securing data so that the chief of police himself or his lieutenant or even a patrolman can tackle this problem with facts and not with guesses.

Next I want to talk about flexible progressive signal systems. If you do not buy a flexible progressive system, you are going to pay for it anyhow so why not buy it and get the value out of it? That may sound paradoxical but it is not. Other systems are going to cost us much more than the cost of the better ones, both in delays and in the bad attitude which they create.

The conflict of pedestrian and vehicle is very serious and significant. We have intersections which are to be subjected to pedestrian use and vehicle use. If we are going to continue both we are going to have certain conflicts which, however, we may avoid to a degree or totally by certain measures.

We can get rid of the trouble by segregation. I believe we will see certain points where escalator-served under-passes, or similar methods are justified. If you do that, it might be fair to put up a fence on the sidewalk so pedestrians could not cross in any other way than by the under-pass.

We can also segregate the pedestrians by time; that is, give one part of the cycle of time in signal operation to the pedestrian only. That may be desirable at some points, but with the modern trend toward short cycles, other things are involved. In the first place, if you give the pedestrian time to start across the street, you must (to play square with him) also give him time to finish crossing the street. In other words, if you tell me to start when a blue light shows it is unfair to me as a pedestrian to let me get a third of the way across and then permit cross traffic to start at heavily-traveled intersections, the provision of a reasonably long exclusive pedes-

trian starting interval plus a reasonable pedestrian clearance interval would require so great a percentage of the cycle that serious vehicular congestions would result; hence this time-segregation method may be found impractical.

Some people believe we should allow the pedestrian to scurry across the best he can with the normal signal cycle, in which the green light is followed with a short yellow light, the purpose of which must be, from the length of time we give it, to allow the vehicles which have entered or practically entered on the green light, a chance to get across. That is two or three seconds. What does that do to the pedestrian? Instead of reaching the opposite side he finds himself part way across the street when cross traffic starts.

The fair procedure, if pedestrians have started during an interval in which they are permitted to proceed, is to provide at the end of this interval; a reasonable time for pedestrians to reach a place of safety. This brings up the cycle which, without providing an exclusive pedestrian interval, informs the pedestrian when, during the "GO" interval, there is no longer time to start to cross.

If it takes ten seconds to reach the opposite curb, warn the pedestrian, ten seconds before cross traffic is to start, that there is no longer time to get across. That may be done in several ways. Pittsburgh does this: the green light comes on for a certain length of time and then the green and yellow combination shows. It is a warning to pedestrians that from then on they have not time to complete the journey across the intersection, and the length of the green-yellow, plus the yellow that follows, is sufficient for the pedestrian to complete the crossing if he started on the green light.

Turning vehicles are another big trouble, and that, to my mind, may be attacked in one of two or three ways. First, you can eliminate the turn. Second, you may very properly have an officer at a heavy turning point to alternate turning vehicle movements and pedestrian crossings.

There has been much talk about the hours of operation of signals. It depends very much upon the district, the traffic requirements, the kind of signal operating, and so on. A traffic actuated signal should operate continuously if properly set up. The only reason you turn a signal off is because it involves unnecessary delays, and if you get the control without the delays, why turn it off?

It is not desirable to operate signal systems with fixed cycle lengths all the time. In downtown districts there would seem to be nothing to warrant their operating after the theatre traffic had gone home. However, if you are going to turn off the stop and go signals at isolated intersections, it is very well to use a flashing operation to tell the person that this is a corner which is more than usually busy or dangerous or both. I hope we shall see legislative enactments that will enable us to use flashing red on the cross street to mean a safety stop with the same legislative significance as the through-traffic stop regulation you may have at adjacent intersections along the artery. Then you would use the flashing red to signify the same thing as the stop sign and it would be so understood.

To pick out three points which I should think most helpful I would select these:

1. Unintelligent application of traffic signals often increases accidents.
2. Never install a traffic signal without securing full data as to traffic volume, speeds, accident analyses, physical lay-out, (including parking) visibility, stops, and so forth; base what you do upon intelligently analyzed facts and not upon even your own opinion.
3. Using minimum standards, worst-accident-intersection lists, and other expedients, so that you are pushing a coordinated, intelligent plan for the use of signals and allied equipment, rather than being forced to use all of your energy in answering the haphazard requests for signals at scores of relatively unimportant intersections.

CHAIRMAN GOODRICH: How many years of accident experience do you think it is necessary to have to decide whether or not a signal is warranted?

MR. MARSH: It would be desirable to have two or three years' accident experience, but certainly one year is of some help. It turns out frequently that the distribution of accidents in any one year gives an entirely wrong impression.

CHAIRMAN GOODRICH: If you were called into a community to decide where 15 or 20 signals should be installed, and you determined that all they needed was some stop signs but certain members of the council wanted to install the signals anyway, what would you do?

MR. MARSH: I should appeal to the intelligence of the group and show them the reason back of my decision. I would use some statistical data and I wouldn't be afraid to use other cities as examples, showing that bad results would occur if they did install signals that shouldn't be installed, and if I had to go to some of the leading citizens and point out the facts to them, I would do so.

If I were finally forced into the position of having to put them in, I would insist that they consider most seriously the vehicle-actuated types.

ADJOURNMENT

Thursday Morning Session
October 2, 1930

ERNEST P. GOODRICH, Chairman
Consulting Engineer, New York City

CHAIRMAN GOODRICH: This morning we are to discuss a real safety subject, "What Shall We Do About Accident Records?" The presentation will be by a man who has done some very interesting things in developing the analyses of accident records, and he will tell us something about direct applications of those things that were discussed in the Street and Highway Section on Tuesday. Mr. Simpson, Research Engineer for the American Electric Railway Association, New York City was previously in Detroit as traffic engineer, and he has also been traffic engineer for Essex County, New Jersey.

What Shall We Do About Accident Records?

By HAWLEY S. SIMPSON
Research Engineer, American Electric Railway Association, New York City

I am sure there is no need to stress the seriousness of the accident phase of the traffic situation in this discussion. Neither should there be any attempt to minimize it. The loss of more than 31,000 lives in our streets last year is in the nature of a major national calamity. There was a time, at the end of 1926, when it might have been possible to view the situation with some little feeling of equanimity. Although automobile fatalities and the fatality rate were steadily rising, the number of deaths in proportion to motor vehicle registrations was decreasing. But this latter condition has reversed and for three consecutive years, traffic deaths in relation to both population and automobile registration have been higher than in the preceding year.

To meet these conditions, there has been a general attempt by almost every police department to obtain basic accident facts through the use of some system of accident reporting. That designed by the National Safety Council and approved by the National Conference on Street and Highway Safety and the International Association of Chiefs of Police is the best known and most widely used. It is called the Standard Accident Reporting System. However, activities of the kind which we are to discuss are not limited to this particular type of reporting.

I suppose accident records were first kept so that police department officials might have the information necessary to institute punitive proceedings if a violation of the traffic rules had been committed. This application of traffic accident records is becoming increasingly an important and effective tool in the hands of the traffic executive, and was referred to by Mr. Goodrich in the Tuesday morning session as "Personnel" work.

The data necessary to this activity are comparatively limited and do not enable the police official to comprehend the whole situation. Accordingly, more detailed information regarding the conditions surrounding the occurrence of the accident is required. When this is tabulated and analyzed it becomes possible to compile the general accident summary or report for the whole community. This activity has been of great value in promoting "Education" of street users, also mentioned by Mr. Goodrich.

These are the more common uses to which accident records are put, but experience has demonstrated that neither the fear of punishment nor the knowledge of dangerous practices has been sufficient. Another angle of attack then comes to mind. Perhaps

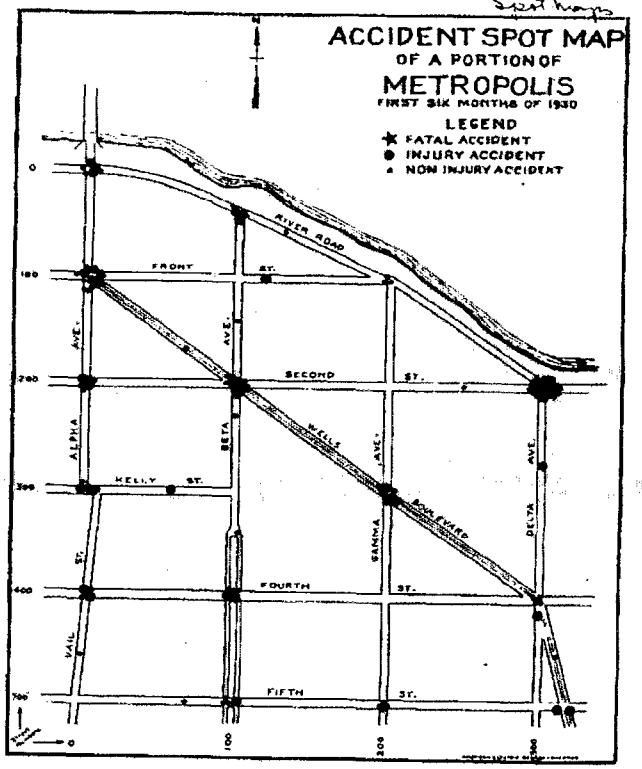


Fig. 1—Spot map of accidents in a section of a hypothetical city showing various types of intersections which must be considered in filing according to locations.

neither the persons nor the vehicles involved were entirely at fault, but rather, external conditions over which the motorist and/or pedestrian had no control may have been instrumental in causing the accidents. The investigation of these factors and the suggestion of remedies has been called "Preventive Planning" by Mr. Goodrich. Of them all, this last has been least explored and though still in its formative stage, it has already proved valuable to the traffic man.

Some of the items which fall within the purview of this activity and which may be

profitably investigated follow. They may be roughly divided into two classes. Those having to do with the physical charactor of the city are called "City Planning", while those which deal primarily with the control and regulation of the traffic are termed "Traffic Planning".

Preventive Planning

CITY PLANNING	TRAFFIC PLANNING
Street Design	Traffic Signals
Pavement Design	Traffic Signs
Intersection Design	Traffic Markings
Obstructions to Vision	General Traffic Regulations
a. Removable	Traffic Officer Assignment
b. Permanent	Stop Street Plan
Topography	Pedestrian Safety Zones
	Parking Practices

Before proceeding further, the fundamental difference in the character of the three activities ought to be noted. Personnel deals with individuals. Education deals with groups of persons. But Preventive Planning deals with inanimate things; pavements, regulations and signals. We cannot reason with them as we can with persons. Neither is much to be learned by collecting mass data for large areas as is done in preparing educational programs. The information needed for our purpose must be detailed and specific. It must refer to individual intersections, small groups of intersections, isolated points between intersections or single streets. Each of these locations is analogous to a doctor's patient. The accident cards for any one point are comparable to a doctor's record of a person's ailments. A physician's diagnosis is largely influenced by the patient's past record and susceptibility to certain diseases. Similarly, the accident analyst's recommendation for improvement is based upon full information as to what has gone before at the point in question.

To promote a better understanding of the practical work leading up to Preventive Planning we are about to set up an accident recording system for a small portion of an imaginary city called Metropolis, shown on the map before us. 131 accidents have been reported in this section of the city in the first six months of 1930 and have been recorded on the standard accident cards of the National Safety Council. They are here before us and we are to file them so that they will be of the most value. The National Safety Council has investigated the generally used systems of filing and has decided that the method known as "Filing by Location" be recommended. Accident cards filed in this manner are always ready for use in analysis and are equally available for other purposes.

Only a filing cabinet to take 4x6 inch cards and a supply of index cards in two colors, perhaps buff and salmon, are required. The buff cards with left-hand tabs are called "primary index cards". Those with right-hand tabs are called "secondary index cards". The salmon-colored cards (always right-hand tabs) are "warning cards". In beginning the file, index cards should be made up as needed and since accidents have occurred at only fifteen of the twenty intersections in the section of our city under study, we need only to prepare index and warning cards for these locations. The index cards are placed in the file in alphabetical order and the first street, alphabetically, of those at which the accident occurs, becomes the primary street and the other the secondary street. If an accident occurs at the intersection of two or more streets, the first two street names alphabetically are used for filing and a warning card is inserted for the other street or streets on the secondary side of the file in those locations where it might be possible to mis-file a card. To facilitate the preparation of the index cards, we have listed the intersections alphabetically in accordance with this method, indicating the required primary, secondary and warning cards.

Index Cards Required for Filing Intersection Accidents by Locations in City of Metropolis

Primary Card	*Secondary Card*	*Warning Card*
ALPHA AVE.	Front St. & Wells Bl. Kelly St. River Rd. Second St.	
		Wells Bl. (See Front St.)
BETA AVE.	Fifth St. Fourth St. River Rd. Second St. & Wells Bl.	
		Wells Bl. (See Second St.)
DELTA AVE.	Fourth St. & Wells Bl. River Rd. & Second St.	
		Second St. (See River Rd.) Wells Bl. (See Fourth St.)
FIFTH ST.	Gamma Ave. Wells Bl.	
FOURTH ST.	Vail St.	
		Wells Bl. (See DELTA AVE.)
FRONT ST.	Gamma Ave. & River Rd.	
		River Rd. (See Gamma Ave.) Wells Bl. (See ALPHA AVE.)
GAMMA AVE.	Wells Bl.	River Rd. (See FRONT ST.)
KELLY ST.		Vail St. (See ALPHA AVE.)
RIVER RD.		Second St. (See DELTA AVE.)
SECOND ST.		Wells Bl. (See BETA AVE.)

In order that the reference notes on the warning card may be easily understood, the legend on the primary card is always in capitals, while that on the secondary is in lower case. For example, an accident may occur at the intersection of Alpha Avenue, Front Street and Wells Boulevard. It is reported as having occurred at Alpha Avenue and Wells Boulevard. Alpha is of course the primary street and Wells Boulevard apparently the secondary street, but when attempting to file the card, the clerk notes warning card marked "Wells Bl." (See Front Street) and proceeds to file the card properly under ALPHA—Front. The same accident might have been reported from Front Street and Wells Boulevard. These are apparently the primary and secondary streets respectively, but in filing, a warning card appears reading "Wells Bl. (See ALPHA ST.)". The card is then properly filed under ALPHA—Front.

Reports of accidents occurring between intersections can profitably be kept in another file with a primary index card for each street on which an accident has occurred, alphabetically arranged. Secondary index cards to indicate house numbers such as 100, 200, 500 or 1,000 may be used if the number of between-intersection accidents warrants.

Perhaps the best way in which to begin to use the information on the cards is to prepare an accident "spot map". Spot maps may be of many kinds, simple or elaborate, but every department should have at least one map showing the location of all fatal, injury and non-injury accidents. For each accident reported, a pin of distinctive color, indicative of the severity of the accident is inserted in the

approximate location at which it occurs. Thus it is possible to pick out the danger points which the department may wish to subject to its investigation.

The spot map before us has been prepared from the accident cards in the file. One fatal, 32 injury, and 98 non-injury accidents have been reported in the first six months of 1930. They are fairly well scattered over the map, although two of the intersections show exceptionally bad accident records. That of Wells Boulevard, Front Street, and Alpha Avenue has experienced 15 accidents, while the intersection of River Road with Delta Avenue and Second Street shows 22 accidents. More than a quarter of all the accidents reported occurred at these two intersections, although there are ten times as many other places where accidents could happen. It is typical to find a large portion of the accidents concentrated in a relatively few locations. Here, then, is a phenomenon which interests us and here is where we ought to begin our analysis, which should lead to recommendations designed to relieve these situations. This is the work which has been designated "Preventive Planning."

While our time is too limited to discuss all the investigations which it is possible to make at even these two intersections, we shall describe the preparation of a "collision diagram". This is the easiest way in which the complicated information contained on the accident cards can be boiled down to show a composite picture of everything that has occurred at an intersection.

The collision diagram is merely a line drawing which shows graphically the more important incidents connected with the individual accidents, grouped together for easy visual examination. Not all the information which may be essential to the preparation of a collision diagram is obtained from the cards. In addition, we must have a complete knowledge of all the physical facts about the intersection. These include:

1. Location of traffic signals.
2. Location of stop street and other warning signs.
3. Parking regulations.
4. Street and pavement widths.
5. Curb radii.
6. Location of trees, shrubs, hedges and other obstructions to vision.
7. Location of nearby buildings.
8. Vehicle and pedestrian traffic flow.
9. General topography of the intersection.

When the diagram has been prepared showing these features, the essential data from the accident cards are superimposed. The chart should show the direction of movement of the vehicles and pedestrians involved, the approximate location at which the collision took place, the severity of the accident, the time and date on which it occurred and often other information such as vehicle speeds, condition of pavement, light conditions, and similar matters.

This has been done for the accident at the intersection of River Road, Delta Avenue and Second Street. It is assumed that River Road is the heavier traffic street and it will be noted that the majority of the accidents involved vehicles moving southeasterly on River Road. The angle at which this traffic meets that bound west on Second Street, produces a dangerous condition. If this traffic could be diverted to meet Second Street at or near a right angle and compelled to stop before entering Second Street, this source of hazard should be almost entirely eliminated. This can be done by the erection of a stop street sign on River Road north of Second Street and probably also on Delta Avenue, south of Second Street together with the installation of a safety island such as is shown on the chart marked "A". A second potential hazard exists for pedestrians moving north across River Road east of the intersection. Two pedestrian accidents have occurred here, doubtless chargeable to the fact that traffic is approaching from two directions. This hazard will partially be eliminated by the construction of the safety zone "A", although if the pedestrian travel across the intersection is heavy, a second safety zone shown on the diagram marked "B" would be desirable.

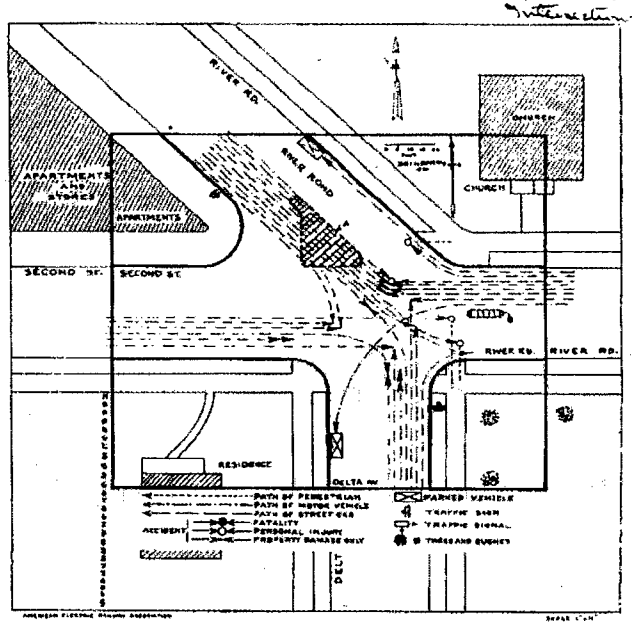


Fig. 2—Collision diagram of intersection in hypothetical city showing location of safety zones recommended to alleviate accident situation.

The ordinary two period traffic signal would not be expected to effect much of an improvement, if any. Vehicles moving southeasterly on River Road and north of Delta Avenue would receive the "Go" signal simultaneously and their paths would intersect within the intersection, so that the possibilities of collision would not be much if any less than before the signal was installed.

If we assume that the improvement of the character mentioned above has been made, there should be some method of determining whether the results are satisfactory. It is of no value to prepare an analysis and recommend and make changes unless it is possible to discover their effect upon the accident record. Unfortunately this is a trial and error method and we must wait months, at times, to discover if any improvement has been produced. This means that a second and similar analysis must be made after the change has been in effect for some time. Often this will furnish a clue to the final touch which will as nearly solve the problem as possible; often it will show that the remedy has not been found, and other studies must be made; while in still other cases, the improvement will be so satisfactory that nothing else need be done.

Probably the best way to keep informed as to the exact situation at all times is to keep a continuing record of the physical and other changes which have been made as the result of recommendations of the department as well as other changes in the character of the intersection which are not the outcome of any particular study. These include changes in:

1. Traffic signals.
2. General traffic regulation.
3. Parking regulation.
4. Pavement width and/or character.
5. Curb radii.
6. Obstructions to vision.
7. Nearby buildings.

The easiest way in which this information can be recorded is upon the face of the secondary index cards. These should be prepared with two columns, one for the date and one for remarks. Under "Date" is placed the date upon which any of these changes is made with a description under the column entitled "Remarks".

These, then, are tools of the traffic analyst, only briefly described here. It has of course been impossible to exhaust all the possibilites of the subject, but as one becomes more familiar with the work, the routine detail will become simpler and many other uses of accident data will be found. Some typical examples follow.

A study of school child accidents in each public school or playground district will often be productive of good results. It may lead to the assignment of traffic officers to key intersections during certain hours, to concentration of educational activities in areas where the accident record is unfavorable, or it may even be used as a basis for recommendations as to the relocation of existing, or the establishment of new playgrounds.

A accident analysis should always precede traffic signal installation to determine whether the signals can be expected to reduce accidents or not. Often it will be found that the collisions are of a type that might not be prevented but rather encouraged by the use of signals, as mentioned in our discussion of the collision diagram.

A study of accidents along a single heavy traffic street will often furnish valuable evidence as to whether the "through street" regulation would be effective in reducing accidents. An analysis should always be made of the results accomplished after the establishment of a "through street".*

The same line of reasoning applies to the despatching of motorcycle officers and the accident spot map will show those streets on which patrols ought to operate. If this plan is followed, much energy may be saved as motorcycle men can be concentrated on the more hazardous streets rather than routed indiscriminately.

Accident records are of value in determining obstructions to view which increase the accident toll. Peculiarly, not all obstructions seem to have this effect. An analysis of the accident record where there are apparent obstructions will assist in correcting the worst of the conditions, either by removal if possible, or through the installation of indicatory signs, warning of an extra hazard if the obstruction is of a permanent character.

Parking regulations, the establishment of pedestrian safety zones, changes in pavement design, surfacing and widths, adjustments of curb radii and other related activities are all within the field of Preventive Planning and subject to the scrutiny of the accident analyst.

Those departments which broaden their scope to include this field will undoubtedly find it to be a valuable adjunct to their other activities. The surface has only been scratched. A whole new profession and the technique is being opened up. The man who specializes in it ought to find that his services will become exceedingly valuable to the community and to himself.

*Through Seventy-National Safety Council, Public Safety Series No. 23.

R. W. MEADE (V. Pres., The Peoples Motorbus Co., St. Louis, Mo.): By putting in a safety island on River Road isn't he affecting the traffic that will continue south in Delta Avenue?

MR. SIMPSON: Yes, absolutely, but the effect would be to decrease the speed of the vehicle as it crosses rather than giving it the opportunity of crossing at a high rate of speed.

E. H. BARSE (Chief of Police, Duluth, Minn.): Do you have a warning sign?

MR. HAWLEY SIMPSON: Yes, the safety zone is lighted. Lights do better than signs.

CHAIRMAN GOODRICH: Have you ever deliberately installed a rough pavement to prevent accidents?

MR. SIMPSON: I never have and am never going to. In one of the southern states they tried to reduce accidents by making a man follow a circuitous path approaching a grade crossing. They found that more people were killed upon the area which they were supposed to go around than were formerly killed at the grade crossing.

H. F. ILGNER (Engineer, Milwaukee Safety Commission, Milwaukee, Wis.): Was that island actually installed?

MR. SIMPSON: This is a hypothetical case, but it is based on the experience I had at Holden Avenue and West Grand Boulevard in Detroit. The island there wasn't of this type. This way would have been better.

MR. ILGNER: It seems to me that traffic signals are very much more desirable than putting reverse curves into streets.

MR. SIMPSON: In this case I believe that the reverse curve is the only solution because drivers are required to reduce the speed of the intersecting vehicle. I think the cause of accidents is high speed plus the acute angle of incident, resulting in a large collision area. It is a question, of course, but I am confident that if you have the accident records which show you must have a reduction of speed, something of this sort will be more acceptable than a traffic signal. A traffic signal installed at this point would have to be a three-period timer, and the traffic on each of the three streets would have to move on a different cycle in order to avoid conflict.

CHAIRMAN GOODRICH: That is true. I am just thinking that a change in the city plan at this point would obviate the whole thing. It shows the fundamental connection between city planning and traffic planning. You may detour the vehicles off the other street before they get to the intersection.

MR. GAGE: Why not place a circle there?

MR. SIMPSON: I will agree with you, and I will even go a little further and say that I think a grade separation would be still better. I did not put a circle in because the street is 40 feet in width, not large enough for a traffic circle, and consequently we would have to obtain property to build a circle.

CHAIRMAN GOODRICH: May I amplify the point about the planning of the community, something which can at least be introduced into the outlying sections. Each diagonal should be located so it goes between the right angle intersections, so that not more than two streets cross at any point. Just shift the diagonal thoroughfare so it goes through the center of the block. That is a very obvious and easy solution of the problem. It cannot be done where there is a built up area, but advantage should be taken of that idea wherever you have an opportunity to replan or to lay down new plans.

D. M. MCNEIL (Assistant Traffic Engineer, Pittsburgh, Pa.): Since a number of pedestrian accidents are perhaps from the diagonal street turning left into the street toward the driver, wouldn't it be better to turn the pedestrians over to the other street and then let them cross?

MR. SIMPSON: I agree with you, Mr. McNeil. The reason I didn't suggest that is because I am not very confident that you can do a great deal with the pedestrian.

ADJOURNMENT

Friday Morning Session
October 3, 1930

ERNEST P. GOODRICH, Chairman
Consulting Engineer, New York City

CHAIRMAN GOODRICH: We have had sessions given to the discussion of parking, traffic signals, and accident records, but they would be of very little value unless it were possible to sell those things from the advertising point of view to the community. Arousing and maintaining public interest in traffic is the way to do that. I present Dr. Miller McClintock and he needs no further words from me.

Arousing and Maintaining Public Interest in Traffic

By DR. MILLER McCLINTOCK
Director, Erskine Bureau for Street Traffic Research, Harvard University

The public official who is charged with traffic improvement has one important support. That support is both an advantage and a disadvantage. I speak of the intense interest which the public has in all matters pertaining to street traffic. It is not an artificial interest. It was not stimulated by publicity or propaganda of any kind.

In the first place, traffic is dynamic. It is something that is growing rapidly. People are interested in things that move. In the second place, every traffic accident and every traffic death is a human dramatic incident in itself. Thus there is constant agitation of the public mind on matters of traffic, which makes them want activity on the part of public officials, and instead of finding themselves in the position of stimulating interest and attention on the part of your public, most public officials are embarrassed by rather too much interest and attention.

Along with the interest and attention which you find in traffic matters, you also find a feeling on the part of many citizens that they are technically qualified to offer a solution for any or at least many of the problems which are involved in safety and the proper use of the streets and highways. So the public official who would carry out his duties properly has of necessity to protect himself, as it were, from a too intense, disorganized and self-opinionated public support.

Thus the problem of gaining proper support for public action in traffic relief is a matter of organizing public opinion rather than stimulating it. How can this be done best and most effectively? I believe that it is quite impossible nowadays for any public official to make substantial progress in assuming leadership for improvement in traffic matters unless he knows what he is talking about.

The official today must have a distinctly scientific attitude, because the public has become more informed about traffic matters. If one of your prominent merchants takes a trip to New York City, you may be assured that when he returns he will inevitably tell you how traffic is regulated in New York City. Indeed, if he goes to any other community, he is likely to interview traffic officials there and come back with a long story for the home press.

This interest on the part of citizens necessitates that the public official, to maintain leadership in traffic matters, must himself be informed by traffic studies and surveys which would be justifiable even though the conclusions were obvious before the studies were undertaken. I say the studies would still be justifiable because, by factual data properly presented to back up your conclusions, you can get public support which you cannot get when there is merely a clash of opinions.

I want to emphasize this point particularly because ideas are often diametrically opposed as to what is the best solution for any particular traffic problem. Any public official who talks on a problem, where his opinion is opposed to that of the people to whom he is talking, and has nothing more to say than, "I know it will work," is in a very difficult position. Just as soon as you can throw into that discussion the slightest amount of sound, factual information, then you have neutralized the bitterness in the argument and you have given an objective basis rather than a personal basis for making the decision. So I should say the first job any official has in organizing support is to get it on a factual basis.

In every community there are certain citizens who, because of their prominence, are natural civic leaders. These leaders vary according to the phase of municipal administration considered. Thus, for example, groups of leaders to deal with public education, child welfare, public recreation, parks, or with matters of traffic, would in each case be a somewhat different group of persons, but in every city there are men who are the natural leaders in the community in connection with traffic matters.

It is highly desirable that the public official carefully analyze his public and know who these men are. He ought to have them know him in order that they may be assured that he has honesty and intelligence.

Furthermore, it may be desirable, that these leaders be formally organized. An excellent example of that is in the Better Traffic Committee of Pittsburgh, which is organized on the principle of bringing together in a formal group, officially appointed, the principal leaders.

I want to issue a warning to any public official who has in mind the formation of a supporting traffic committee or commission. There seems to be a tendency among public officials and others to eliminate from such commissions those persons who have so-called selfish interests. I have no use whatsoever for any individual who does not have selfish interests, because such a person is a fit subject for retirement in the rocking chair in the back parlor. It is only men who have selfish interests who have enough vigor and dynamic force to be of any value in giving support to public officials or anyone else to carry out any program demanding energy and ability.

In other words, don't get a lot of benign, retired capitalists as members of a traffic committee if you are forming one. Get rather the hard-boiled operating heads of the business concerns in the city who are vitally affected by traffic changes. Get twenty or twenty-five of them, ready to fight with one another or with the rest of the world if necessary at the slightest opportunity. Throw into that group of men some factual information that is sound and properly analyzed, with conclusions that are clear, and with the implications upon business obvious, and you are going to get just as hard fighting support for an intelligent program of traffic relief as you would get hard fighting opposition if your program were not proper.

It is unnecessary for me to speak in detail of the media for public education which the public official has at his command. You are more familiar with those in many instances than I am, but it is necessary that the man who is dealing with traffic matters shirk no opportunity to make known his ideas, his plans, and his reasons to the public.

Never decline any honest invitation to make a public speech. Whether it be somebody's Sunday School class or the Rotary Club or whatever the occasion may be. In that way you are expressing your ideas, and if you are honest and can impress people that you are, you will find that you are making a great many friends, which is one of the joys of the job, and furthermore that you are understood and getting support which otherwise would be quite impossible.

Next to direct public speaking and appearances of the kind I have mentioned, there is the radio which has come to be so valuable an agency in reaching the public.

Again, as in public speaking the public official should lose no opportunity to give cordial statements to the press, and particularly if he is starting upon any new and important task, to call the representatives of the press into his office, and sit down and talk with them.

The field of traffic is a new one. It demands in many ways a new technique. It certainly has placed upon the shoulders of public officials very heavy responsibilities which have, in many cases, brought them into a peculiarly intimate contact with the public. Successful traffic administration is one-tenth technique and nine-tenths sound public relations. (Applause)

CHAIRMAN GOODRICH: I want to supplement what Dr. McClintock said with reference to our relations with the press. The bringing in of the reporters long before you are ready to let something break, giving them an idea of what it is and why you are doing it and the intricacies of the scheme, and talking to them about the problem which their chief has perhaps put up to them to get an answer to that day, is one of the best ways of protecting yourself against adverse criticism which I have been able to discover. With the exception of one case, in twenty years of traffic experience I have never been deceived. They have always promised, on my request, to respect my decision as to when the news could be published, and in many instances we have been able to reverse the preconceived opinions of the newspapers. Often through misunderstanding or absolute ignorance of the subject at hand on the part of the editors, adverse criticisms may appear in their papers, whereas if they are kept constantly informed I believe that will prove to be one of the big things in carrying along this work.

REYBURN P. HOFFMAN (Manager, St. Louis Safety Council, St. Louis, Mo.): For instance, some months ago we got an inkling through a reporter for a particular paper that an editorial was coming out against something which we had in the back of our heads and which had gotten out as quite the reverse of what we proposed to do. So I went over to the editorial writer and just sat down and without mentioning what we had already found out, proceeded to give him a little sketch of what this thing was. When the edition came out, instead of having an adverse editorial, it was quite a bouquet. It just shows that if these men have the facts and understand the purpose, that often it will redound to the benefit of those trying to promote the work.

LEONARD ORMEROD (Ass't. to V. Pres. & Gen'l. Mgr., Bell Telephone Co. of Penn., Philadelphia): We have organized a traffic committee in Philadelphia. It is just beginning to get under way. I happen to be chairman of the Educational Committee of that Commission.

I also worked some seventeen or eighteen years as a newspaper man and I want to endorse what Dr. McClintock has said, from the standpoint of one who has had experience in Chicago, Washington and elsewhere.

There is another suggestion I might give you. The man who will come into your office is the newspaper man who is covering that beat, and he is probably covering all of city hall or certain offices in it, and it is his job to drift around and pick up, not only the front page news, but anything that is worth writing an interesting paragraph about. I have always found as a reporter some official who has a nose for news, so that when things were slack and I didn't have much to write, I could drop in to see him, say, "Give me a little yarn," and he would have some interesting fact to tell me, maybe some statistical fact that could be humanized and given life.

Since I have been out of the newspaper business I have been with a large public utility corporation, handling publicity, and I have always found it fruitful to have some little thing on tap to tell the reporters when they dropped in.

J. C. VINCENT (Elec. Engr., City Engineering Dep't., Minneapolis, Minn.): We have one newspaper in our town which consistently misquotes any information that we give them. How would you handle that situation?

DR. MCCLINTOCK: I think very often it is principally a matter of carelessness, but sometimes it is malice, which is even more difficult.

The best way to give yourself the fullest possible protection under those circumstances is to prepare in definite form the article that you have for release. The written story has an advantage in all matters of importance. Make not only as many copies as there are members of the press, but be careful to keep a file copy for yourself, particularly if a matter of important policy is being dealt with, so that you have an actual record.

J. G. VAN ZANDT (Consulting Engineer, United States Engineer's Office, Los Angeles, Cal.): It was my observation that the citizens committee was in dire lack of facts. I was very much impressed by what the speakers said this morning in regard to the necessity of setting scientific facts before this committee and letting factual information be a basis for their operations. It seems to me that this National Council could very well prepare some kind of a pamphlet for citizens committees, which they would look upon as authority. We have the Hoover Conference, of course. We have a lot of various information which it is somewhat difficult to bring together, and it seems to me that a small pamphlet of some kind, issued authoritatively from this Congress, would be a very valuable thing for these committees.

CHAIRMAN GOODRICH: How many members are there on your committee in Los Angeles?

MR. VAN ZANDT: About 110 altogether. It is divided up into sections and there are about 30 members in the section I belong to.

R. C. DEMAROFF (Dir., Safety Division, Police Dep't., Flint, Mich.): I would like to add one word about my experience with the traffic committee. The key man to the organization is the secretary. Get the right fellow on that job and you will have a successful committee. If you ask business men to devote more time than they feel they can spare from their business, you are not going to make a success of it.

I have also discovered that if you work close enough with reporters you will find certain days that you will get a lot further with your publicity. I wouldn't think of giving them a story when the World's Series is going on if I expected very much space.

E. W. BROWN (Ass't. Sup't. of Police, Washington, D. C.): We have just started a traffic survey in Washington. On the committee we have representatives of the traffic department, police department, schools, and the trade and civic organizations. 17 persons in all. We feel that a committee larger than that wouldn't function properly.

We decided the best thing to do was to organize certain members of the Committee who would release facts to the press as we went along in our investigation, and I think that is the best policy any community could pursue.

We also get certain help from the radio. I feel that publicity is a great factor in our work and it goes a long way toward the education of the public.

CHAIRMAN GOODRICH: In New York City they have a regular period during which police news of all kinds, generally very uninteresting, however, is broadcast. The suggestion made by Mr. Brown from Washington is an excellent one, to have a well equipped man, from an oratorical point of view, do this work and give the interesting features as well as the strayed persons and dogs.

BURTON W. MARSH (Traffic Engineer, Philadelphia, Pa.): We have six subcommittees; one on accidents, one on education, one on engineering, one on legislation and enforcement, one on street use (which includes parking, loading, and all of those uses of the street which right now are taking so much of the attention of those engaged in traffic work), and one on off-street terminal facilities, which is perhaps a complementary committee to the one dealing with improvement of efficiency of street use, although it has other important functions.

I was very much interested to learn from Mr. Lloyd A. Blanchard, Executive Secretary of the Governor's Committee on Street and Highway Safety of Boston, Massachusetts, that in Massachusetts a bill has been enacted by the state Legislature enabling cities and towns to appropriate funds for traffic education work, this being

a specific acknowledgment by the state legislators that this is a very much needed field of endeavor.

The city of Pittsburgh has, I believe, been unusually successful in its educational work and has jumped up the funds appropriated by the city for properly informing the public from I believe $5,000 at the start to about $20,000 now, and I believe Mr. McIntyre expects to get more this year. That is rather significant.

ADJOURNMENT

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Tuesday Afternoon Session

September 30, 1930

DR. LOUIS I. DUBLIN, Chairman
Metropolitan Life Insurance Company, New York City

The first session of the Statistics Section of the Nineteenth Annual Safety Congress convened with Dr. Louis I. Dublin, Metropolitan Life Insurance Company, New York City, presiding.

Chairman Dublin: It was believed by the committee arranging the program that we were ripe for a discussion on costs. In no other way could the enormity, the grossness of the accident problem be brought home to the country than by

counting the costs in life and costs in dollars and other costs involved in this motor vehicle accident situation. So, we brought together a group of speakers each particularly well informed on one of the aspects of cost.

The first of the discussions will be by Mr. Shippen Lewis on the "Direct Costs of Motor Vehicle Accidents."

Direct Costs of Motor Vehicle Accidents

By SHIPPEN LEWIS

Director of Committee to Study Compensation for Automobile Accidents, Philadelphia, Pa.

The data which I am about to give you have been gathered by the Committee to Study Compensation for Automobile Accidents. This committee is a voluntary association of 16 men, all but two of whom are lawyers or judges. It is working with the Council for Research in the Social Sciences of Columbia University and with the Yale School of Law, to learn the facts with respect to compensation for motor vehicle accidents and to suggest remedies for such evils as present systems may be found to contain.

In various states commissions have studied this subject and have reported as to the effects of different systems on the number of accidents and on the amounts of insurance premiums. But so far as I know, no serious attempt has been made to ascertain how injured persons have fared with respect to compensation, under any system, except for a limited study of fatal accidents made by the Commonwealth Club of San Francisco a few years ago. Our committee believes that the problem cannot be properly solved unless such facts are obtained. Accordingly we have had personally investigated about 8,000 cases of motor vehicle injuries in nine different

TABLE 1

Compensation Status: Philadelphia

	Paid	Unpaid	Pending
All cases except "No Injury"	48%	41%	11%
Fatals	42	40	18

TABLE 2

Loss Groups vs Compensation: Philadelphia Compensated Temporaries

Wage plus Medical Loss Group	Number of Cases	Amt. of wage, medical and property loss	Amount of Compensation	% of Losses Covered
$ 0	50	$ 1,035	$ 3,529	341%
1—39	241	5,512	14,903	270
40—99	107	8,482	13,956	164
100—199	47	8,197	9,401	115
200—299	26	6,720	5,061	75
300—749	22	10,745	9,386	87
750 and over	5	9,907	3,239	32
	498	$50,598	$59,475	116%
Pending, unpaid & unknown as to compensation	552	61,225		

TABLE 3

Loss Coverage Groups: Muncie Cases: Not Fatal or Permanent

	% of Cases	% of Losses	% of Compensation Received	% of Losses Covered by Compensation actually Received
Loss fully covered	18%	13%	61%	140%
Loss partly covered	20	23	39	52
Loss not compensated at all	62	64		
	100%	100%	100%	

localities. One of these localities is San Francisco and the neighboring country, where the work has been done for us by the Commonwealth Club. In each case the investigator has tried to learn from the injured person or from a responsible member of his family, how badly he was hurt, how long he was laid up, what compensation he got, who paid him, and how soon he got it, together with a good deal of other information which is germane to our general subject. In each locality the cases were selected from public and institutional records in such a way as to form a fair sample of all cases of personal injury.

You will realize of course that the information so obtained cannot be entirely accurate, but I believe that in general it can be relied on, because in a large number of cases the overstatements and the understatements will tend to balance each other. Even granting some inaccuracy the results yield data which cannot be obtained otherwise and offer a reasonably sound basis for judgment.

You will also realize that such an investigation cannot attack the problem of negligence. In few cases would it be possible to fix the blame for the accident. Hence the figures which I am going to give you do not reflect what injured persons should have got, but simply what their losses were and what they did get.

From our Philadelphia study which covers 2,000 cases, of which over 1,600 are of some seriousness, we have derived certain statistics which will interest you. I shall not give you many figures, because no man can enjoy or understand a mass of figures orally presented by another. In speaking I shall use round figures. In the printed proceedings of the meeting tables with more exact figures will be inserted.

Voluntary Insurance

First of all we ask, "How often do injured persons receive compensation?" Taking all the injury cases together, we find that from six months to a year after the respective accidents there were out of every ten cases, five paid, four unpaid and one pending. In 200 fatal cases the ratios were four, four, and two. (Table 1).

But a more important question is not how many are compensated, but how far are injured persons compensated for all losses—wages, medical expense and property loss. There are 500 cases of temporary disability in which this comparison can be made. In these cases the losses have been divided into groups according to amounts, and for each group we have the total loss and the total compensation. This shows that the losses up to $200 are overpaid, while those above $200 are underpaid. If the money were divided according to losses, all cases now paid would be fully paid and something would be left over. This of course does not deal with the 50 per

TABLE 4

Status of Compensation: Philadelphia and Boston, All Cases Except No Injury

	Number of Cases	% Not Paid	% Pending or Unknown as to Compensation	% Paid
Philadelphia—All Cases	1,637	41%	11%	48%
Boston—All Cases	1,004	25	23	52
Philadelphia—Insured Cases	745	12	13	75

cent of temporary cases in which there has been no compensation or in which compensation is pending, which cases carry just about their share of the losses. (Table 2).

From a study made in Muncie, Indiana, we have figured this matter of loss coverage in another way. We took all the cases except the fatal and permanent injury cases, and found that the total compensation was one-fourth of the total loss—wage, medical and property. Out of every ten cases, two were fully paid (in fact overpaid), two were partly paid, and six received nothing. The total losses were divided among the unpaid, pending and paid cases in about the same proportions. (Table 3).

When we come to fatal cases, the wage loss cannot be exactly calculated. But we have taken a group of 23 Philadelphia employed men who were killed and who left dependent widows or children, and have calculated what they would have got under the New York workmen's compensation law. We find that they actually received something less than 8 per cent of what workmen's compensation would have given them. This is not the total group of such persons studied, but it is the total group with respect to which the comparison can be made.

Voluntary and Compulsory Insurance Compared

Now turn to a comparison between Philadelphia, where voluntary insurance exists, and Boston, where compulsory insurance is in effect. The first thing that strikes us is that the proportions of paid cases are about the same—half of the cases in each city. But Boston shows a smaller proportion of unpaid cases and a larger proportion of pending cases, which may be due to a different attitude of the insurance companies, or to a difference in the way the investigators decided on the status of the cases. Table 4 also affords a comparison of Boston, where all cars are presumably insured, with insured cases only in Philadelphia, and shows the chance of receiving compensation in these selected Philadelphia cases to be one-half again as good as in Boston. Whether compulsion or some other factor is responsible for the Boston results cannot be determined at this time.

But when we take the cases of temporary disability and compare the coverage of losses in Philadelphia with the coverage in Boston, we find a very great difference. Taking both paid and unpaid cases together, we find that in Philadelphia only the small loss groups are overpaid, while in Boston all groups of losses are overpaid, except the highest group of $750 and over, for which there are not enough cases to give a good sample. In fact, in Boston the total compensation paid in cases of temporary disability would, if distributed according to losses, pay all losses and a half as much again. (Table 5).

It is surprising to find that losses in Boston for 500 cases are almost equal to losses in Philadelphia for 1,000 cases; and that durations of disability run much

TABLE 5

Coverage of Losses According to Loss Groups: Philadelphia and Boston Compensated and Uncompensated Temporaries

Comparable Cases—Philadelphia	950
Comparable Cases—Boston	543
Total Losses—Philadelphia	$ 92,807
Total Compensation—Philadelphia	59,475
Total Losses—Boston	88,928
Total Compensation—Boston	127,764

Wage plus Medical Loss Groups	*Philadelphia* Number of Cases	*Philadelphia* % of All Losses Covered	*Boston* Number of Cases	*Boston* % of All Losses Covered
$ 0	157	128%	39	740%
1—39	419	141	169	314
40—99	184	81	130	191
100—199	98	51	97	150
200—299	46	41	40	131
300—749	38	49	50	124
750 and over	8	26	18	79
	950	64%	543	144%

higher in Boston than in Philadelphia. Perhaps the victims of accidents in Boston stay in bed until the insurance company doctors push them out, while in Philadelphia they have less reason and inclination for illness; or perhaps there is some other reason not yet plain to me.

"Compulsory Compensation"

You have heard discussions as to the feasibility of a plan for motor vehicle accidents analogous to workmen's compensation. Such a plan is usually spoken of as compulsory compensation. We have made some calculations to see how compensation based on such a scheme would compare with what injured persons now get, using the New York workmen's compensation law as a basis.

Taking only the temporary disability cases and dividing them into groups according to amounts of loss, we find that for every loss group above $100 compulsory compensation would give the injured more than the Philadelphia system, but that for every group it would not give as much as the Massachusetts system. In Boston those who are lucky enough to be paid are paid far more than their actual losses. (Table 6). Indeed the overpayment is so great that if the money were spread over all the claims, both those who now get paid and those who now get nothing would be paid in full with plenty to spare. Of course this extra money is paid for pain and suffering and to avoid the doubtful issues of litigation. In a compulsory compensation plan, part of this extra money would go to pay those who now get nothing.

I have already mentioned the comparison in fatal cases of compensation received with compulsory compensation. It shows for 23 Philadelphia cases of employed

TABLE 6
Loss Coverage Now and Under Compulsory Compensation: Boston and Philadelphia Compensated and Uncompensated Temporaries

Wage plus Medical Loss Groups	*Philadelphia*		*Boston*	
	% of All Losses covered by Compensation Awards	% of All Losses covered by Compensation Awards	% of All Losses covered by Compensation Awards	% of All Losses covered by Compensation Awards
$ 0—39	82%	141%	187%	314%
40—99	65	81	95	191
100—199	67	51	83	150
200—299	71	41	81	131
300—749	69	49	71	124
750 and over	47	26	48	79

men leaving widows and children, that the compensation now received is less than 8 per cent of what would be paid on a workmen's compensation basis.

Permanent Injuries

In dealing with temporary injuries, the money loss can be fixed by adding together wage loss, medical loss and property loss. Even in fatal cases some standard of loss can be adopted by analogy to the workmen's compensation laws. This could also be done in cases of permanent total injury, but the number of these investigated is so small that no figures can be given for them.

In considering the coverage of loss by compensation, permanent partial injuries present a serious problem, because it is often difficult to distinguish a permanent partial injury from a temporary injury, and because it is even more difficult to fix the amount of loss for such a permanent injury. I am not prepared to make any statement with respect to these, except that our data make it seem probable that the compensation in such cases is not sufficient in Boston, Philadelphia or Muncie, to pay the actual immediate wage loss plus medical loss, without including any future losses because of impaired ability.

If anyone is tempted to draw conclusions from these figures, let him remember that they are very far from complete. The majority of our committee's studies, which are both rural and city, are still to be heard from, and there will be many changes and additions to the figures before they can be accepted as the basis of conclusions.

CHAIRMAN DUBLIN: Mr. Lewis in his discussion of the fatal cases said that there was no ready method of evaluating the loss in such instances, and said further that his Committee arbitrarily hit upon the scheme of considering three years wages as a rough measure of the loss sustained in such cases. This group of fatal cases and the losses involved in them have received a good deal of attention in the laboratory in which Dr. Lotka is engaged. He has for a good many years concerned himself with this problem of evaluating the loss in cases where the accident resulted in a fatality. I know that you will be very much interested in hearing him tell you of the method that was evolved and some of the results that followed from that method. The paper by Dr. Lotka of the Metropolitan Life Insurance Company supplements rather interestingly this first paper by Mr. Lewis.

Money Losses to Dependents of Persons Killed in Automobile Accidents

By DR. ALFRED J. LOTKA
Metropolitan Life Insurance Company, New York City

In any individual instance of a fatal automobile accident it is usually possible to obtain information regarding the age, annual earnings, family status, etc. of the person killed, and from these to form a more or less definite estimate of the presumptive money loss suffered by his actual or potential dependents. I say the "presumptive" money loss, because there is necessarily an element of uncertainty introduced into the estimate by the fact that the precise number of years during which the victim would have continued to earn and contribute to the support of his dependents is unknown, and all we can do, all we are expected to do, is to base our estimate on his presumptive after-life time (that is, the average length of time that a person of the age of the victim continues to live from that age forward) and on the money that he would earn in the course of these years.

Without going into technical details we may say that this is essentially the principle underlying the calculation of the money loss to the dependents of a victim of an accident, in the case of a specific individual who has a definite earning capacity readily determined in dollars and cents.

Statistically, however, we are interested not in the case of one particular individual, but in the national situation confronting us in the constantly increasing death toll from automobile accidents. When we seek to obtain even a rough estimate of the aggregate loss to dependents of these victims we are confronted with numerous difficulties. The first and most obvious is that we have no information regarding the earning capacity of the persons thus killed. We shall have to be satisfied with an estimate based on an average figure. Then there is one class of persons whose earnings are very inadequately represented by any scale of wages or salaries, namely the women in the population. Many of these maintain a home, a service to their family and to society for which they receive no definite compensation in dollars and cents, and on which, therefore, it is impossible to fix any definite money value.

Other problems arise with regard to dependency. We may assume with small error that every married man has at least one dependent. In the case of widowers we have, statistically, no information regarding the proportion of these who have minor children or other dependents. Similar remarks apply in the case of divorced persons. Still greater uncertainty exists with regard to single persons killed in automobile accidents. For these include persons of mature years who support aged parents or other relatives; they also include young persons, many of whom would later have acquired dependents, when their parents or other relatives became incapacitated. This kind of dependency is quite different in character from that of wife or children upon the father of the family, and, if it can be dealt with at all, requires special methods, applicable to individual cases, but hardly in a statistical way to a general body of population. A difficulty of another kind is introduced by the differentiation of our population according to race, which commonly brings with it a corresponding differentiation in earnings and in mortality.

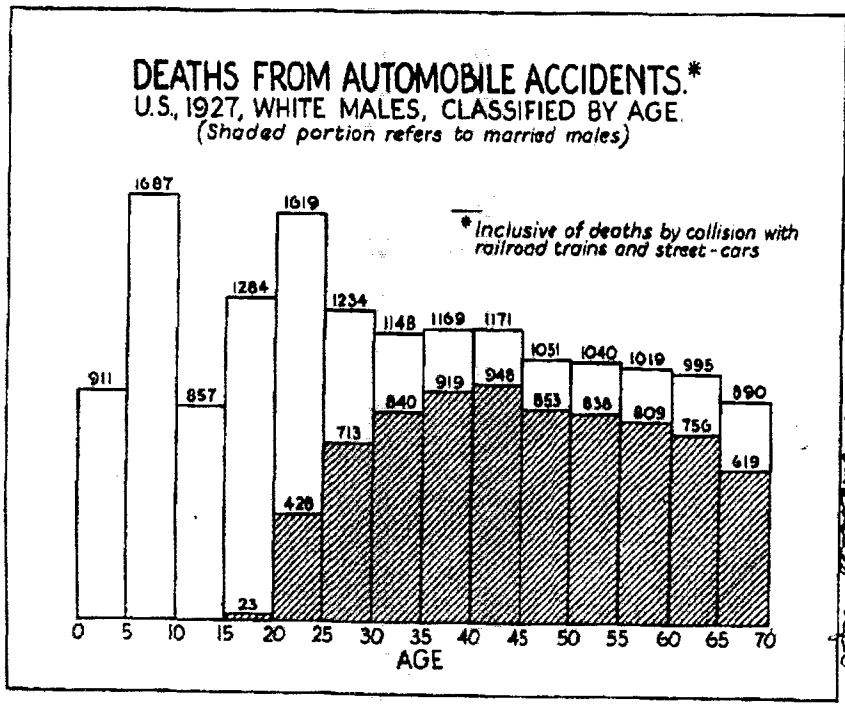
With these difficulties in mind, let us approach more particularly the specific problem of losses to actual dependents of married white males. The number of deaths among these, between the ages of fifteen and seventy, in the United States in the year 1927 was 7750.* Table I shows these 7750 deaths classified according to the age of the victim, and exhibits the corresponding present worth, at four and a half percent discount, of the net future earnings of these victims, computed on the supposition

*If we may assume that the marital ratio among victims of automobile accidents is the same as in the general population.

The Money Loss to Dependents by Deaths of Married White Males from Automobile Accidents,*
United States, 1925, 1926, 1927

Age	Deaths of Married White Males			Money Loss per Capita, Dollars	Total Money Loss in Dollars		
	1925	1926	1927		1925	1926	1927
All ages	6,300	6,870	7,746		90,568,800	99,359,100	110,921,800
15-19	19	22	23	18,400	349,600	404,800	423,200
20-24	327	376	428	21,350	6,981,450	8,027,600	9,137,800
25-29	597	618	713	21,900	13,074,300	13,534,200	15,614,700
30-34	688	750	840	21,150	14,551,200	15,862,500	17,766,000
35-39	783	861	919	19,650	15,385,950	16,918,650	18,058,350
40-44	739	807	948	17,300	12,784,700	13,961,100	16,400,400
45-49	714	857	853	14,450	10,317,300	12,383,650	12,325,850
50-54	705	769	838	11,400	8,037,000	8,766,600	9,553,200
55-59	642	657	809	8,150	5,232,300	5,354,550	6,593,350
60-64	586	604	756	5,000	2,930,000	3,020,000	3,780,000
65-69	500	549	619	2,050	1,025,000	1,125,450	1,268,950

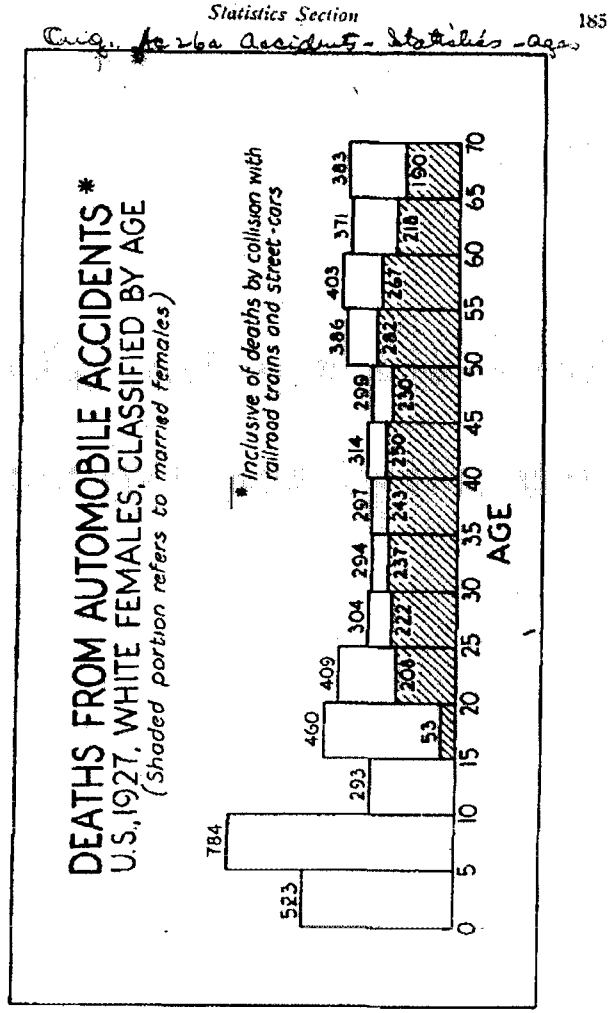
*This includes railroad and street-car accidents involving collision with automobiles.



that their annual earnings correspond about to the average for males in the general population of the United States. It is necessary for me to enter into details here regarding the method of computation, as this has been very fully set forth in the book "The Money Value of a Man" which Mr. Dublin and I recently published through The Ronald Press. Extensive tables of the value of a wage-earner at different ages and under different circumstances (earning capacity etc.) are given there

in an appendix. On the basis of those figures, the aggregate annual loss to the dependents of married white males killed in automobile accidents in the last three years for which complete data are available, namely, 1925, 1926, 1927, was thus found to be ninety-one, ninety-nine, and one hundred and eleven million dollars, respectively. It is significant that the increase from year to year in this figure was eight millions from 1925 to 1926 and twelve millions from 1926 to 1927. This comparison is here restricted to the three years mentioned, because the classification of deaths from automobile and railway accidents was modified in 1925, so that figures for prior years are not strictly comparable. The change that was made is that railway and street car accidents in 1925 and later years were classified to show separately deaths in collisions with automobiles. This is a most welcome change in the classification, seeing that in 1927 deaths by collision with automobiles constituted no less than one-fifth of the deaths of white males in "railway accidents" and one-third of the deaths in "street car accidents." It is evidently quite proper to include deaths in such accidents as these among the toll extracted by the automobile and I have, accordingly, included these figures.

So much for that part of our problem that is capable of treatment in definite terms. The aggregate loss which we have found for married white males unquestionably represents the major part of the economic losses to dependents through deaths in automobile accidents. Many more males become victims of automobile accidents, than females. This is only one particular example of the fact that the male of the species is exposed, in the course of the ordinary working day, to greater industrial risks than the female. A glance at any of our busy thoroughfares during working hours will immediately convince anyone, without need of any statistics, of the great preponderance of men in these areas of exposure to the risk of automobile fatality. Statistics for 1927 actually show a total of 14,540 deaths from this cause among white males, as against 5,165 among white females, in the Death Registration States as of 1920. Thus, from the standpoint of numbers alone, the loss of life among males is not far from three times that among females. As to the economic loss by the death of females, in the present order of society the money earnings of males are on an average considerably higher than those of females. To make an actual estimate of the economic value of women presents great difficulties, owing to the fact that so many of them perform their services to society without tangible compensation in dollars and cents. In addition to this difficult item of the money value of fatalities among women, there remains also to be considered the case of minors and young persons having as yet no family. To count up the loss which they would represent to a hypothetical future family would be futile, since the death of the victim removes the possibility of this hypothetical family becoming actual. But there is a definite practical issue involved when we consider that some of these young persons are at the time of their deaths, and others would later become, the means of support of aged parents. In any individual case in which the requisite data are known, an estimate can be made, by suitable actuarial methods, of the present worth of the contribution of such persons, now or at some deferred date, to their aged parents, for example. The case is obviously very different from that of the married man who contributes the bulk of his earnings to his family, during the period of minority of his children *and during the lifetime of his wife.* In the absence of sufficient statistical data regarding dependence, present or future, of older persons upon juniors, it is impossible to give a numerical estimate of the sums of money here involved. We must rest satisfied with pointing out that this item exists, and that it must be superadded to the estimate we have found for the loss to dependents of married men. Perhaps, taking all things together, we shall not be far wrong in estimating that the total loss through the deaths of persons of both sexes, of white and of colored races, and of all ages, may well be one-half as much again as that computed for white married males alone. For the year 1927 this total would accordingly have amounted to something of the order of one hundred and fifty million dollars.



Money Expended in Bringing up of Children in Automobile Accidents*
Both Sexes, under Age 20, White Only.
United States, 1925, 1926, 1927

Sex and Age of Child	Deaths			Expenditure per Capita: Dollars**	Total Expenditure, Dollars		
	1925	1926	1927		1925	1926	1927
Males							
Under 20	4,301	4,435	4,739		18,380,550	19,373,950	20,683,550
0-1	54	63	70	332	17,930	20,900	23,250
1-2	75	40	86	612	45,900	24,500	52,650
2-3	115	120	140	915	105,200	109,800	128,100
3-4	220	249	293	1,230	270,600	306,250	360,400
4-5	327	294	322	1,563	511,100	459,500	503,300
5-9	1,626	1,682	1,687	2,715	4,414,600	4,566,630	4,580,200
10-14	823	817	857	5,145	4,234,350	4,203,450	4,409,250
15-19	1,061	1,170	1,284	8,276	8,780,850	9,682,900	10,626,400
Females							
Under 20	1,911	1,930	2,059		7,497,200	7,577,600	8,019,400
0-1	46	57	53	332	15,250	18,900	17,600
1-2	61	70	85	612	37,350	42,850	52,000
2-3	72	76	67	915	65,900	69,550	61,300
3-4	127	123	150	1,230	156,200	151,300	184,500
4-5	174	165	167	1,563	271,950	257,900	261,000
5-9	730	755	784	2,715	1,981,950	2,049,850	2,128,550
10-14	266	279	293	5,145	1,368,550	1,435,450	1,507,500
15-19	435	405	460	8,276	3,600,050	3,351,800	3,806,950

*This includes railroad and street-car accidents involving collision with automobiles.
**The figures shown in this column are based on the data shown on page 39 of "The Money Value of a Man," adjusted to correspond to the $2,000 maximum annual income class.

I have purposely concentrated, in this paper, on the money losses to dependents, because we can here speak in definite terms. When the head of a family is removed by death, a very definite financial emergency arises, with which it is possible to deal in concrete figures. But I cannot close without giving at least some thought to another aspect of the problem that forces itself upon our attention in the case of fatal injury to a minor child. Although the loss of *future* earnings here represents a problematic item (since the eventual beneficiaries of those future earnings are hypothetical), the *cost* side of the account is a more concrete item. A certain amount of money has been spent by the parents of the child, and we may wish to know the total amount of this expenditure, on these youthful victims of the automobile. An estimate of the cost of bringing up a child, itemized for each year of life up to the age eighteen, has been given by us in the book already mentioned, The Money Value of a Man, page 39. Applying the figures there given* to the deaths of white children nineteen years old and under in automobile accidents we find for the year 1927 a total expenditure of $29,000,000. With inclusion of negroes the total would undoubtedly pass the figure of $30,000,000.

CHAIRMAN DUBLIN: Are there any questions? I feel very strongly that in his paper, Dr. Lotka has opened up a very fertile field for discussion.

R. L. FORNEY (National Safety Council, Chicago): I wonder if Dr. Lotka has compared his total estimated loss with the result that would be arrived at by simply using $5,000 per fatal case.

DR. LOTKA: Yes, I have made that comparison. The total number of deaths is somewhere around 25,000. If you multiply it, you get $125,000,000. In this connection I have seen a figure of $850,000,000. In order to arrive at that figure, you would have to take a great many more dollars than $5,000 for each individual. I think you would have to take a figure that would be quite unreasonable.

MR. FORNEY: The figure of $850,000,000 covers not only loss of life but other losses as well, which will be discussed by others on this program. I was interested to see how the loss of life estimate would compare with the rather arbitrary method of $5,000 per life. It seems that you have about $25,000,000 more in that particular year than would have been determined by using $5,000.

I wonder if Mr. Lewis has made any estimate at all for items in connection with motor vehicle accidents such as medical costs, hospital costs, etc.

MR. LEWIS: The figures I quoted for fatal accidents included only the funeral costs and the presumed wage losses. In the case of temporary disabilities, the cost covered wage losses, hospital expense and property loss.

As a supplement to what Dr. Lotka has said, you will be interested, I think, in this figure. For fatal accidents to employed persons in Philadelphia, where there were widows or children, we computed for each one what he would have received under workmen's compensation and compared that with what he actually did get in compensation, and found that what was actually received was something less than six per cent of what workmen's compensation would have paid. And Dr. Lotka's figures run a good deal higher than workmen's compensation.

CHAIRMAN DUBLIN: It occurs to me to add a word with regard to the women involved in these fatal accidents. Dr. Lotka and I in preparing our work on "The Money Value of a Man" cut across our difficulties by assuming that the average woman is economically about half as efficient as the man of the same age.

There would be justification for another procedure, and that is, to assume that the value of a woman, even if she isn't earning a penny in the usual sense, would be to calculate her earnings as the amount necessary to replace her in the household. If you begin to do that, you run into real values. If we put into the household a paid worker of average efficiency, the amount of money necessary to obtain her serv-

*I. e. loc. cit. page 39, Table II, column 2, plus interest at 4½ percent per annum. The figures are modified to correspond to the $2,000 maximum annual earnings class.

ices would, under present wage levels, run into a considerable sum of money. You can see for yourself that it would be pretty close to $1,000 a year, and $1,000 a year is $20 a week. It is more than half the average wage of an adult male, under present wage levels.

I am inclined to think that on that basis alone, the rough figure of a half would have to be increased. For that reason, I am inclined to think that Dr. Lotka's estimate of $150,000,000 for adults, both sexes, is a minimum.

Then, I would further remind you that the earnings figure in a good many instances runs a good deal above the $2,000 he has used. He was compelled by the necessities of the case to give you a round figure, to assume a rather low figure and rough figure as the average earnings of men killed. We don't know what the true figure is. If a classification were made of earnings, I think you would find that a considerable portion of persons who were killed belonged to the higher wage levels. As soon as you go into the large earners, the amounts of loss involved there is very large indeed. Without attempting to hit upon a figure, I think one would be justified in saying that the figure of $150,000,000 is more likely a minimum figure than an average figure.

DR. LOTKA: It occurred to me after writing the paper that the persons killed in automobile accidents are not average persons. I brought that point to the attention of Mr. Lewis. He tells me that the average earnings among the persons whom they investigated were somewhere around $37.00 or $40.00 a week.

MR. LEWIS: A considerable majority of employed people were earning less than $37.50 a week, and the number of persons with really large earnings was so small as to be almost negligible. It was quite striking that the accidents seemed to happen almost entirely to families of either moderate or really poor circumstances. Perhaps their exposure to risk is greater.

MR. FORNEY: Was there anything that would tend to eliminate from the groups you studied the people in higher wage levels?

MR. LEWIS: No, because we were careful to get all sections of the city, all times of the year, and to take the cases from the police records without any distinction at all.

MR. FORNEY: Did you do anything at all to determine whether the earning classification of your group differs materially from the general wage classification for the population as a whole?

MR. LEWIS: I haven't done that yet, not scientifically. I know what the earnings were of all the people that were hurt. Most of those people were earning less than $37.50 a week.

CHAIRMAN DUBLIN: We will proceed with the third item, which takes us into disability costs of these same motor vehicle accidents. That subject will be dealt with by Mr. Harold Gordon of the Health and Accident Underwriters Conference of Chicago.

Disability Costs of Automobile Accidents

By HAROLD R. GORDON

Executive Secretary, the Health and Accident Underwriters Conference, Chicago, Ill.

Dr. E. W. Burgess, Professor of Sociology at the University of Chicago, has pointed out that one of the economic effects on the American people of the increased use of the automobile has been a decrease in the demand among men for shoes, but an increase in the production of trousers. Perhaps the auto was directly responsible for the popularity of two-trouser suits. But this effect of the automobile is not as serious as the increasing accident hazard it has created, and the non-fatal auto accident has placed a heavy financial burden on our shoulders as well as causing untold suffering and pain.

The subject "Disability Costs of Automobile Accidents" will be considered in this paper as relating only to the actual loss of time caused by injuries due to the automobile. No consideration or calculation will be made of the other "by-product" costs, such as doctor bills, hospitalization, nursing services, and costs of X-rays, electrical treatment, drugs, etc.

The automobile personal accident is distinctly a public accident and chiefly because of that fact the reporting and tabulating of non-fatal automobile accidents has not been accomplished with any degree of accuracy or completeness. Facts concerning fatal automobile accidents, however, are quite well known and dependable data has been compiled for a number of years covering this subject but the lack of similar data concerning non-fatal automobile accidents has been apparent to every one who has endeavored to make a study of this type of public accident.

Statistics compiled by personal accident insurance companies may be the means of revealing certain basic facts concerning non-fatal automobile accidents and if a careful analysis is made of the exposure covering such experience it can be related to the automobile accident disability incurred by the general public and comparatively reliable estimates obtained. The development and growth of personal accident insurance in the past decade or two has been such that statistics from this source are fairly dependable to indicate trends of non-fatal accidents.

The exposure presented by persons insured under personal accident policies would to quite a large extent be identical with the exposure of the 45,000,000 persons listed by the Bureau of Census as gainfully employed—that is, working for wages, salaries, or money profits. This figure does not include housewives. Personal accident insurance indemnifies a person against the loss of income when disabled by reason of accidental injury and consequently because the indemnity is dependent upon a loss of income, such insurance is restricted to only those persons whose ages permit the earning of income—approximately the ages of 18 to 65 and 70.

Necessarily most women (housewives particularly) are not included in the insurance experience as likewise they would not be included in the group of 45,000,000 persons who are listed as those gainfully employed in the United States. Neither would children nor those at the older ages be included in these groups.

In addition, insurance companies are permitted a certain selection so that risks physically impaired and those in hazardous occupations are not insured although I seriously doubt whether the omission of these would affect any determination of disability due to automobile accidents. Therefore, the average person representative of the group of 45,000,000 wage earners in the United States would be somewhat typical of the average risk exposed under personal accident insurance.

From statistics compiled by a number of personal accident insurance companies, it is found that approximately 20 per cent of the number of claims for all types of accident disability are due to public automobile accidents. These are accidents caused while riding in automobiles, in collision with other automobiles and miscellaneous objects, and all pedestrian accidents involving the automobile. Such automobile accidents incurred while repairing or adjusting the motor and all occupational accidents in automobile factories or garages are omitted. This percentage is an average based upon industrial occupations as well as professional and business occupations—either of which groups are quite different factors in determining the ratio of automobile accidents to all accidents. The ratio is also on a country wide basis and would vary if urban localities were separated from rural districts.

The proportion of disability (loss of time) incurred by automobile accidents to disability incurred by all accidents is slightly higher, being approximately 24 per cent. Since the percentage of automobile accidents a higher severity rate for automobile accidents than for general accidents is indicated. As stated previously, this data showing the relation between the number of automobile accidents to all accidents and

the amount of disability incurred is a cross-section of all occupations and the occupation is an important factor in all accident experience. If a comparison is made between the professional and business men and industrial workers, the percentage of automobile accidents to all accidents will be found to be much higher among the former than among the latter.

I have tabulated the experience of over 15,000 disabling accidents with automobile accidents listed separately and divided the experience into two groups according to occupation. The first group called the "professional and business men group" includes such occupations as bankers, lawyers, doctors, all office workers, and all professional and business men. In this group the percentage of automobile accidents to all accidents is over 26 per cent and the ratio of disability caused by automobile accidents to all disability is 32 per cent.

In the next group which is called the "industrial group" and includes such occupations as bakers, drivers, machinists, plumbers, carpenters, farmers, painters, miners, and laborers, the ratio of automobile accidents to all accidents is only 14.5 per cent and the automobile accident disability incurred to all disability is only 17 per cent.

Distribution of Accident claims and Disability by Occupational Groups. Automobile Accidents Separately.

	Number of Claims			Number of Days of Total Disability		
	All Accidents	Auto	Per Cent of Auto Claims	All Accidents	Auto	Per Cent of Auto Disability
TOTAL	15,897	3,153	19.8	310,033	73,366	23.6
Professional business men, and office workers —(bankers, lawyers, doctors, executives, office workers, etc.)	7,325	1,914	26.1	138,374	44,297	32.0
Industrial occupations —(bakers, drivers, machinists, plumbers, carpenters, farmers, painters, miners, laborers, etc.)	8,572	1,239	14.5	171,659	29,069	16.9

These facts, however, do not mean that the professional or business man incurs a greater amount of disability from automobile accidents than industrial workers. The accident disability rate for all accidents in the second group (industrial workers) is considerably higher than for the other group. It does show that compared to all accidents the ratio of automobile accidents is much higher among professional and executive occupations than among industrial occupations.

From the experience of insurance companies, it has been determined that each person over a period of one year incurs about two days of disability* caused by accidental injuries of all types. Statistics from the same source for automobile accidents separately show about forty-eight hundredths (.48) of a day of disability

*Includes both total and partial disability either of a temporary or permanent character. Total disability may be defined as disability resulting from accidental injury causing the person to be unable to engage in any of the duties pertaining to his occupation. Partial disability is defined as disability resulting from accidental injury causing the person to be unable to perform one or more but not all duties pertaining to his occupation. Two days of partial disability have been calculated as the equivalent of one day of total disability.

per person per year. These figures if they are to be transposed to experience for the general public should be adjusted by increasing them 25 per cent to compensate for the selection afforded insurance companies and because of the fact that in many cases there is a limit of time for which indemnity is payable under insurance policies. Applying this arbitrary increase of 25 per cent the "all accident" rate would be two and one-half (2.5) days per person per year for the 45,000,000 persons in the United States gainfully employed and a rate of six-tenths (.6) a day would be obtained in the same group for automobile accident disability. This would mean that the income producers in the United States lose approximately 27,000,000 days each year as a result of disability caused by automobile accidents and at an average daily wage of $4.00 the economic loss would amount to $108,000,000. Please bear in mind that this loss does not include the other incidentals which every income producer or wage earner must pay such as doctor bills, hospital bills, and other medicial treatment.

The automobile is a severe weapon or instrument of injury in that the severity rates of auto accidents are much higher than for other kinds of accidents. We have referred to the fact that while only 20 per cent of the number of accidents are due to the automobile, yet 24 per cent of all accident disability is caused by the same means. This indicates that auto accidents produce more severe disability than other accidents.

Insurance statistics show approximately 20 days as the length of the average accident claim but the average duration of an automobile accident claim is approximately 24 days. In other words, the severity of the automobile accident is one-fifth greater than for all accidents.

All of the figures I have given thus far have been based upon personal accident insurance statistics with an adjustment made to relate such experience to the 45,000,000 people employed gainfully in the United States. Let us now attempt to transpose this experience into estimates for the United States as a whole. Obviously, we will have to make some adjustment for the women, children, and old persons who are not included among those listed as gainfully employed. From all available information there is a higher disability rate for accidents caused by the automobile at the younger ages and the older ages than at those ages during which persons are income producers. The frequency rate of automobile accidents is high among children and the severity rate is much greater at the older ages than at any other time of life. If we are to include children and the old people, the disability rate for auto accidents will have to be increased considerably. However, we still have the group of women to consider and this group is made up largely of housewives. From rather meager but very reliable statistics produced by two of the large industrial personal accident insurance companies, the rather surprising fact was revealed that the automobile accident rate among housewives is less than one-half of that for male wage earners. According to insurance statistics, housewives are exceptionally good risks as far as automobile accidents are concerned compared to men.

I believe that this lower auto disability rate for women because of the large size of such a group would compensate or offset the increased rate for children and old persons and that therefore we could apply approximately the rate of one-half a day of accident disability per person per year due to automobile injuries to the U. S. as a whole. In other words, applying the same auto accident disability rate to the population as a whole as would apply to the group of 45,000,000 persons who are gainfully employed, we would have an estimate of 61,000,000 days of lost time in the United States each year caused by non-fatal auto accidents. I realize of course that this conclusion is open to criticism but I believe I am safe in saying that the actual disability rate for auto injuries is not far from that figure.

MR. FORNEY: I heard Mr. Gordon quote a figure of $108,000,000. Do I understand that he was unwilling to go as far as Dr. Lotka and extend that estimate to include women and children?

MR. GORDON: That does not include children at all, and only includes those women who are gainfully employed.

L. A. DEBLOIS (New York City): If I understood the last speaker correctly, he stated that the frequency of accidents was less in the industrial employee classes than in the professional and business classes. I also understand Mr. Shipman Lewis' Philadelphia experience shows a prevalence of cases among the industrial employee. Is that correct?

MR. GORDON: As far as I can determine, the number of cases are about the same in both classes. However, this is the difference: In the upper class, the professional and businessman, for a number of years, had a very low frequency rate for all accidents. It has been higher in the lower classes. In other words, the plumber and the carpenter have to pay more for accident insurance than the banker or the lawyer, because his exposure is more hazardous.

Within the past ten years, automobile accidents have increased all along the line, and the proportion of automobile accidents in the higher class is much greater than the proportion in the lower class. The upper class does not have as many accidents of a general character as the lower class.

CHAIRMAN DUBLIN: There can be only one answer to this question, for, after all, the proportion of those in the industrial class is so much larger than the other class that if one were to neglect altogether that group you have in mind, the professional and business group, the problem would still bulk in the other group, because they constitute about 80 per cent of the population.

Before we have the fourth paper in this symposium, is there anyone here who would like to discuss a phase of the problem that has been referred to by the previous speakers but with no attempt at an evaluation of the losses involved, and that is the question of medical costs?

MR. GORDON: Dr. Dublin, I didn't want to tackle that question, because it is rather vague and hard to get at. I talked to three physicians (these were general practitioners) to ascertain how many accident cases they attended out of all the calls they made. One physician said one out of ten. I asked the other two, and they said that was about right. If we take the estimate of one out of ten cases that are really accident cases, we may find out in some way the proportion of the automobile accident cases. We know from insurance experience that twenty per cent of all accident cases are automobile accident claims. I would hesitate to use one out of five, because the doctor in making the call for an accident due to the severity of the automobile accident would probably go more often. And so, if we use one out of four accident claims as a basis for the number of calls that the doctor would make, that would make one out of forty of his calls an automobile accident call. This is equivalent to two and one-half per cent.

Assuming that the same percentage would apply to other medical costs, and using the figure of two and one-quarter billion dollars given by Dr. Lotka and yourself as the cost of medical treatment we would arrive at a figure approximating $50,000,000 as an estimate of the cost of medical attention, which would include hospitalization, doctor fees, doctor bills, drugs, etc.

CHAIRMAN DUBLIN: Gentlemen, we are beginning to get into real money, when we begin to put on the table all of the items that go into this matter of automobile accidents. And we haven't yet scratched the surface on the score of physical loss, that is, loss in terms of wrecked machines and property damage due to collision.

MR. TAYLOR (New York): I wonder if Mr. Lewis has taken into consideration in figuring the Boston payments the fact that in Massachusetts they have a compulsory automobile insurance law. Would that have any bearing on the excessive payments that are made in Massachusetts? My experience has been that it has considerable bearing because of the fact that a large number of very small cases are settled by the insurance company; and we have also found that the rates up in Massachusetts during the past three years have consistently increased.

MR. LEWIS: The reason, Mr. Chairman, that we made a study in Boston was because they have compulsory insurance. We wanted to see what happened. I think there are two explanations of the great increase in Boston. One is that every person that is struck knows about the plan and every jury knows that there is an insurance company carrying the risk. Another thing rather curious is that the durations of disability are considerably higher in Boston than they are in Philadelphia. I thought at first that we might find that everybody in Boston stayed in bed just long enough to get a good settlement. In Philadelphia, about one-fifth of all the cases were cases in which the injury didn't last more than a day, while in Boston the percentage was something like five per cent, as against twenty. I thought I would find the extra fifteen per cent shoved up into the class immediately above, where they could get out of bed as soon as they got the money. Instead of that, it is spread over the duration of the disability.

MR. FORNEY: Mr. Whitney of the National Bureau of Casualty and Surety Underwriters has Mr. Haugh's paper, which he will read.

Property Damage Costs of Motor Vehicle Accidents

By C. J. HAUGH

National Bureau of Casualty and Surety Underwriters, New York City

Before embarking upon a discussion of the details involved in arriving at an estimate of the total cost of property damage arising out of motor vehicle accidents, it is essential that a definition of property damage costs be arrived at. I have interpreted this phrase to mean the total cost of property damage resulting from motor vehicle accidents for which the owners or operators of the motor vehicles are legally liable but excluding damage to the motor vehicle or other property of the owner whose vehicle caused the damage. With this interpretation of my subject it is possible to develop an estimate based upon the property damage liability statistics of insurance companies writing that line of insurance.

The most recent period for which the experience of all insurance companies is available (or at least all of those whose experience is available for any recent period) is calendar year 1929. In that year the total written premiums for property damage liability insurance for all companies combined amounted to $97,590,406. These total premiums are distributed among the several types of carriers for this line of insurance as follows:

Fire and Marine Companies	3.9 per cent
Companies Specializing in Automobile Insurance	8.7 " "
Mutual Companies	14.8 " "
Reciprocals and Lloyds	5.7 " "
Stock Casualty Companies	66.9 " "
Total	100.0 per cent

Unfortunately, there are not available for all of these classes of carriers the exposures represented by the premiums written. However, there are available exposures of the stock casualty companies members of the National Bureau of Casualty and Surety Underwriters, which group of companies writes the bulk of the business written by stock casualty companies.

To develop a proper estimate it is essential that we determine as closely as possible the proportion of total motor vehicles which are insured for property damage liability.

In order to accomplish this the total written premium for all companies must be converted to an earned premium basis since a portion of the premiums written is not fully earned but represents advance premiums for coverage extending beyond 1929. This adjustment has been made by applying to the total written premiums for all companies combined the ratio of the earned to written premiums as reported in the New York Casualty Experience Exhibit for calendar year 1929, which exhibit includes the experience of all stock casualty companies transacting this form of insurance in New York State. The factor developed in this way is .963 which, when applied to the written premium of $97,590,406 produces an earned premium of $93,979,561.

The average rate countrywide for stock casualty companies amounts to approximately $14 for a year. If we assume the average rate of all other carriers to be the same, we can then develop from the earned premium for all companies combined a figure which represents the number of car years of exposure. The use of this average rate of $14 for all companies is predicated upon the assumption that all companies use the same rates as the stock casualty companies and that the distribution of business by territories and type of car for all companies is the same as that for stock companies only. By dividing the total earned premium of $93,979,561 by the assumed average rate of $14 we develop a total insured exposure of 6,712,826. This exposure represents the number of car years, a car year in turn representing one automobile insured for twelve months.

The total motor vehicle registration in the United States for the year 1929 is given as 26,501,443. This figure, however, is on a different basis than the exposure which we have just developed. This difference arises out of the fact that our exposure as developed from the experience of insurance companies is on a car year basis while the registration does not reflect the element of time but merely the number of vehicles registered during the course of the year. It has been possible to develop for New York State a factor to convert the total registration to a car year basis as there are available reports of registrations by month. It was assumed that on the average the registrations in each month were made in the middle of that month, and on this basis it was then possible to determine the number of car years by applying factors of 23/24 to the January registrations, 21/24 to February registrations, 19/24 to March registrations, etc. The ratio of the total registration developed for New York State on this basis to the total actual registration is .846.

Inasmuch as registrations by month are not available for all states, it was necessary to assume that the factor developed from the New York State registrations is representative of countrywide conditions, an assumption which may or may not be reasonably accurate.

By applying this factor of .846 to the total countrywide registration of 26,501,443 we obtain a registration expressed in terms of car years of 22,420,221. However, it should be pointed out that there is a lack of uniformity among the several states with respect to the method of reporting registrations. For example, in some states when ownership of a motor vehicle is transferred from one individual to another that transfer is counted as an additional registration, with the result that that particular vehicle enters into the total registration as two vehicles. In some states dealers are issued quantities of plates all bearing the same registration number and it is possible under these circumstances for ten or more cars to enter the registration as a single car. The net effect of these and other peculiarities of the registration statistics is to increase the previously developed registration of 22,420,221. The necessary correction is a matter of judgment, but a conservative adjustment, in my opinion, would be to take 90 per cent of the 22,420,221 or 20,178,199.

The ratio of the total exposure developed from insurance companies' experience of 6,712,826 to the total countrywide motor vehicle registration adjusted to a car year basis and amounting to 20,178,199 equals .333.

The total incurred losses developed from the experience of insurance companies amounts to 41,581,495. By dividing this total incurred loss of 41,581,495 by the foregoing ratio of .333 we develop a total cost countrywide of $124,869,354.

This amount may be taken as the estimated property damage cost of motor vehicle accidents for the entire country only if it be assumed that the proportion of uninsured motor vehicles remains the same throughout all territories in the United States, and if it be further assumed that the actual hazard of the uninsured business is the same as that of the insured business. These two assumptions we know to be in error, but the difficulty lies in determining the extent of the error. For example, we know that in the larger cities where the accident frequency is greater the proportion of motor vehicles carrying property damage liability insurance is greater than in the rural territories where the accident frequency is much lower. Likewise, a greater proportion of commercial vehicles are insured and this type of car is more hazardous than private passenger cars of which a smaller proportion are insured.

At this time I am not in a position to determine with any reasonable degree of accuracy the adjustment required to recognize these facts. However, I do venture the opinion that the total property damage costs of motor vehicle accidents as previously defined is approximately $100,000,000.

I have made no attempt to quote any average cost per car for the entire country for the reason that such a figure is extremely misleading and serves no useful purpose. I would caution you against attempting to make use of any averages developed from this estimate. Costs vary widely by type of motor vehicle and within each type by classification. Equally wide variations are found by territory.

The figure of $100,000,000 is submitted as an estimate arrived at on the basis of a series of assumptions which involve a considerable amount of judgment and is at best a very rough approximation.

If the phrase "property damage costs" is to be interpreted broadly so as to include the costs of damage to the motor vehicle or other property of the owner whose vehicle caused the damage, the problem becomes more involved. The best available data for attempting to estimate the additional amount resulting from the inclusion of such costs are the losses incurred by the companies writing collision insurance. However there are a variety of forms of collision insurance written. In addition to the so-called "full coverage" form under which the insurance company assumes the total amount of loss there are a number of "deductible" forms under which the assured assumes his own loss to the "deductible" amount. There is no need here of delving into the details of the variety of "deductible" forms of coverage nor of the other forms of collision coverage and I have referred to them merely to point out the difficulties of attempting to determine the total countrywide "collision" losses. Under the "deductible" forms of coverage the losses reported by the insurance companies include only the losses incurred by the company so that no record is available of the amount of losses where the loss is less than the "deductible" amount. Further difficulties arise in connection with other forms of collision coverage—and on top of all this we find that a very small proportion of the automobiles carry collision insurance in any form.

So many assumptions would have to be made to develop the total cost of this class of losses that any figure which might be developed would be of doubtful value. It can be said safely that the additional cost would exceed the figure of $100,000,000 previously developed but I am not prepared to venture an opinion as to how much in excess of $100,000,000 it might be.

CHAIRMAN DUBLIN: Thank you very much, Mr. Whitney. Are there any questions?

MR. GOLD (Indemnity Insurance Company, Philadelphia, Pa.): Just as another indication, I believe the collision premium rate is approximately four times the property damage rate. I believe, on this basis, that the losses would be at least three times as great for collisions as for property damage in the narrow sense.

CHAIRMAN DUBLIN: We may now put together some of the items that the several speakers have thrown out as minimum estimates of the losses involved. In the case of fatalities, Doctor Lotka estimated a loss of about $150,000,000. In connection with disability costs, that is, time lost from work, Mr. Gordon was willing to hazard the guess of a little over $100,000 and for medical costs $50,000,000. Then, finally, this figure of Mr. Haugh's on property damage running into perhaps $200,000,000 or $300,000,000, indicating the ghastly totals which are involved in these million accidents that occur in the United States every year.

DR. T. F. MURPHY (Chief Statistican for Vital Statistics, Bureau of the Census, Washington, D. C.): I should think that if a synopsis of these papers could be gotten together and published in the form of a symposium by the National Safety Council, it would be the most striking thing we could put out along the lines of public safety. And let me add that I think Mr. Gordon was very conservative in his estimate on the cost of medical care. In my judgment another twenty five or fifty million could be added to it, without any exaggeration at all.

ADJOURNMENT

Education Division

Tuesday Morning Session
September 30, 1930

BEN GRAHAM, Chairman
Acting Superintendent of Schools, Pittsburgh, Pa.

The first session of the Education Division of the Nineteenth Annual Safety Congress convened with Mr. Ben Graham, acting Superintendent of Schools, Pittsburgh, presiding.

CHAIRMAN GRAHAM: I recall that in 1920 safety education first came into the public schools; I attended the Congress of that year. I heard the head of the Training School at St. Louis, Dr. Paine, describe what was being done in his school. From that time I think you have noticed the strong development of safety education in schools all over the country. We have been fortunate in having at the head of our work Dr. R. M. Sherrard, who has carried it on.

We welcome the two sections of the Safety Congress and wish for you a pleasant and profitable session.

Over in Akron they are doing excellent work in safety education and since the reports of accidents must clear through the office of the Assistant Superintendent of Schools, it was thought fitting to have R. H. Erwine, the Assistant Superintendent there, speak to us this morning on the subject, "Can We Measure the Result of Safety Teaching?" I have pleasure in introducing Mr. R. H. Erwine!

Can We Measure the Results of Safety Teaching?

By R. H. ERWINE
Assistant Superintendent of Schools, Akron, O.

Before attempting to answer this question it will be profitable to review the introduction and development of safety education in the public schools. It is especially desirable in dealing with this subject to recognize the many agencies and activities through which children today learn the ways and means of safety.

It was only a few years ago that President Hoover, then Secretary of Commerce, wrote to school officials calling attention to the necessity of including safety instruction in the curriculum. Forcefully, he stated that accidents are primarily the result of ignorance: that success of the safety movement is dependent upon education. At that time 30 percent of all automobile accidents happened to children of school age and under. This meant that approximately six thousand children were killed every year by automobiles.

School executives were prompt in responding to this suggestion. Committees were appointed to formulate specific procedures and methods of introducing safety instruction. It cannot be denied that within the ranks of education there was some reluctance to accept any new responsibility. The post war period brought the necessity of giving instruction in health, in temperance, and in thrift. Where was the time to be found for additional special instruction in an already over-loaded curriculum? After all, in the opinion of many, was not safety instruction a matter to be properly taken care of in the home? The friends of the safety movement countered with the statement that under prevailing conditions it was not only necessary but desirable that the schools should make a united attack.

The progressive attitude among school men at that time is indicated by the statement of Superintendent Thomas W. Gosling: "If concentration on thinking on a subject and the inculcation of certain habits have an effect upon life procedures, there can be no doubt that a safety campaign in the schools is very much worth while. Continuous education may reduce the later social and industrial losses which bring measureless suffering to many homes." In similar vein, it was pointed out that hazards are all about us. It will never be possible to remove all of them. Only by stressing the right type of thinking on the subject of human safety can we hope to bring about a reduction in the appalling losses by accident.

When once the matter was under serious consideration school executives realized that the situation was so serious that safety teaching had a definite claim to a place in the curriculum. Furthermore, the subject had considerable possibilities of educational value as it related itself to citizenship. It would offer an additional means of relating education to life. To be effective, it must be dependent upon knowledge, proper habit formations and right attitudes and ideals. In this latter relationship it became a branch of moral or character instruction. In this connection it could not be approached as a superficial process. While devices and technique would be valuable, these would be inadequate except as a means of establishing right habits of thinking on safety problems.

As a result of this inquiry we have reason to feel that an effective program is being worked out. In the primary school this calls for emphasis in developing right habits of acitivity while in the junior and senior high schools it stresses service and respect for personality. With the organization of junior safety councils, the development of the safety scout and junior traffic patrols, with the introduction of classes in swimming, seamanship, safety, life-saving, first aid, child care, home nursing, personal and public health, a tremendous impetus has been given to this movement. Realizing that many things are taught indirectly, emphasis was placed within the class room upon the development of poise, prudence, alertness, judgment, physical stamina, and the ready articulation of mind and body. Physical training is making a noteworthy contribution in these procedures.

The result of all this activity on the part of teachers, supplemented by public officials and semi-public groups, has been that twentieth century children are today more traffic wise than their elders. In 1925 there were 20,000 accidental deaths among children of school age and under. With no safety teaching in the schools, the fatality rate at that time was one accidental death per year for every 2,000 children of school age and under. It is interesting to observe that in New York City where safety programs have been in operation, between 1925 and 1929 there was a decrease of 19 per cent in accidental deaths of children under the age of fifteen. During this same interval there was an increase of 5 percent in fatalities among persons over fifteen years of age. If we turn to Louisville, Kentucky where a splendid program of safety education has been carried on in the public and private schools of the city, we observe that in the interval of 1923 to 1929 the number of deaths of children killed by motor cars declined from 35 to 12. In this same period the population of Louisville increased 44,000 and the number of motor vehicles registered also showed a large increase. In a report covering accidental deaths in the United States between 1922 and 1928 the number of fatalities among children under fifteen years of age remained practically stationary. In the same period there was an increase of 32 percent in the number of accidental deaths of persons over fifteen years of age. If the fatalities among children had increased during this interval at the same rate as with adults there would have been 6,000 children killed in 1928 who are probably living today. These statistics have been confirmed by a number of excellent reports issued by the National Safety Council.

With this as a preliminary statement of the development of safety education in the schools the question arises—can we measure the results of this teaching? Can we subject it to the same objective examination as we have other subjects in the curriculum? In attempting to answer this question I can not see at the present time any inherent difficulties here that do not exist in other fields of educational measurement.

At the beginning of the present testing movement Thorndike directed attention to certain fundamental considerations: "Whatever exists at all, exists in some amount. Anything that exists in amount, can be measured." To this we add the observation of McMuffy "To the extent that any goal in education is intangible, it is worthless." Do not these apply to safety teaching? McCall has emphatically stated that the worth of methods and materials in the class room will be unknown until their effects are measured. Why should not safety teaching and learning yield to those testing skills and techniques which have been employed in measuring other parts of the curriculum? In this connection it is interesting to note that the National Bureau of Casualty and Surety Underwriters has recently published The National Tests in Safety Education. These have been prepared and standardised by Dr. Herbert J. Stack, Supervisor of Safety Education for New York City. Since Dr. Stack is to participate on this program this morning, I am leaving the further development of this subject to him.

In examing this topic from another angle, it appears possible to form valid conclusions as to the effectiveness of safety teaching and learning if we carefully observe and tabulate the habits and attitudes of children. Here, however, the laboratory will yield far more satisfactory results than can be obtained in any other way. This promises an interesting field for future research.

Another method of measurement and one which should arouse the interest of all school officials lies in the field of student accident reporting. Two years ago, forms were prepared by the National Safety Council. These have recently been revised to form a comparatively simple and yet reliable means of studying the results of safety teaching in any community. Fortunately, they do not limit consideration to fatalities alone. Non-fatal injuries frequently mean intense suffering for children, heavy expense for medical and hospital service which falls upon the home, and the loss of instruction opportunity for the school.

In Akron we have great faith in student accident reporting as a means of measuring the effectiveness of safety instruction. School principals are expected to file a written report on all accidents to children which involve medical or surgical attention and absence from school. This is done regardless of where the accident occurs. Each report calls for the following information:

(a) The place where the accident occured.
(b) Details of the accident.
(c) How the case was handled.
(d) Probable length of time the child will be absent from school.

A special report form has been prepared for local use which meets all the requirements of the National Safety Council.

These reports sent to the administrative office as soon as the principals learn the details of accidents have made it possible from time to time to correct conditions

and practices which, unknown to school officials, have contributed to the injury of children. They supply information as to what care and attention injured children are receiving. This has a direct bearing upon their early return to school activities. The reports enable school officials to locate specific weaknesses in the safety program and to begin corrective measures. Above all they assist the teaching staff as well as the central office to see how safety instruction prepares or fails to prepare children to meet a crisis. It is one thing to show satisfactory knowledge of safety principles upon an objective test and quite another to act along safety lines when confronted with sudden hazards. This forces the conclusion that perhaps the analysis of accident statistics will prove the most effective means of measuring the effectiveness of safety teaching. Where superintendents show a vital interest in these data, principals and teachers are disposed to work for an increasingly effective safety program. It is to be hoped that the Student Accident Reporting System prepared by the National Safety Council will find wide recognition and use among the schools of the country.

I want to tell you just a little about a device we have worked out in the city in which I work, with the idea of measuring the effectiveness of our teaching and locating our difficulties.

I have asked the chairman to have passed out to you a sheet from the accident report system which we happen to use. If you will survey this you will realize it is a modification of the Child Accident Reporting System issued by the National Safety Council. We have taken some liberties with this matter of accident reporting and I think it gives us a fairly reliable approach to measuring our safety education, that it is a success.

We feel that the matter of accidents happening within and without the schools, which affect attendance of children, is a matter of such importance that principals are required to file in the Superintendent's office a report of every such accident that occurs, requiring medical or surgical attention and one day's absence from school. In my opinion these blanks furnished by this division of the National Safety Council are very much worth while. They can be used without a great deal of difficulty; they can bring to the attention of the principal, the Superintendent and the parent vital statistics relative to hazards in the community, and they can give you some insight as to where you can buttress your safety teaching.

CHAIRMAN GRAHAM: One of the things I like best about this speaker is his emphasis on reporting accidents not only within the school or the limits of school property, but in the street or the home. I think this is a fine feature of the work being done in the Akron schools, deserving the commendation of all.

We shall now have discussion, led by Mr. Alvan D. Battey.

Discussion of Mr. Erwine's Paper

By ALVIN D. BATTEY
Assistant Statistician, National Safety Council, Chicago, Ill.

Mr. Erwine has described to us some of the methods that can be used to develop in school children habits that make for safety—both at work and at play. I am sure all of us have obtained some suggestions that will improve or enlarge our school safety activities. This work of safety education is especially difficult because it is not enough to drill children until they can give the correct, and in many cases obvious, answers to questions concerning accident prevention. A high proportion of all accidents result from situations where there is not sufficient time to select a correct answer and follow instructions. To be effective a child's safety knowledge must be so thoroughly a part of his personality that he will react almost automatically in a safe way to every dangerous circumstance. It is this aspect of the problem that gives especial interest to Mr. Erwine's talk.

Mr. Erwine has also pointed out the many advantages of recording and classifying student accidents. It is difficult to over emphasize the importance of obtaining accurate data on this subject, for little is known about it except in a general way. I believe little can be accomplished in safety education as long as we fail to make clear to pupils that certain hazards are of major and others of minor significance. It is characteristic of child psychology that general instructions or general warnings make little impression. We must be specific, but our statements must come from experience, not from guesses. And the only way to secure this information is to record accidents and to summarize the significant details according to a standardized method.

The details of the method employed are of secondary importance, but they must be given careful consideration if serious omissions are to be avoided. Some of you are now using the recording system designed by the Statistical Bureau of the National Safety Council. To those who are using a different system or who have not yet installed one I wish to urge a careful consideration of the Bureau's forms. They have been in use only two years, but have been accepted by schools and school systems with a total enrollment of more than 350,000. When the question of revisions came up this summer only two small changes were suggested. If, after studying the forms, you have any differences of opinion regarding their construction, I shall appreciate the opportunity of discussing them with you.

Now, let me summarize the student accident statistics for the last school year for those schools reporting their accident experience to the National Safety Council. During the year 19 pupils out of every thousand were injured by accident. Fourteen per cent of the accidents occurred in school buildings and 20 per cent on school grounds. Another 10 per cent came while the pupils were on their way to or from school. These are the accidents in which every educator is immediately interested. Thirty two per cent happened at home, and 24 per cent in places other than the school or the home. These are not "school" accidents, but they certainly are of equal importance to every one working in the safety education field, for their task is to train children to be careful at all times and in all places. To them there can be no question of shifting to parents the responsibility for pointing out the hazards of home and street.

Turning again to the school buildings accident record we see that more than one-half of those which could be classified occurred in gymnasiums, and that the frequency was highest in the junior high school years. Next in importance comes class rooms with an even distribution throughout the grades and high school, but with a total far below that for gymnasiums.

Accidental injury on the school grounds comes twice as frequently from organized athletics, as from playground apparatus, although the one school ground death reported came from the collapse of a circle swing. There were nearly twice as many injuries from baseball as from football, but this is in part a function of the longer season for baseball.

Home accidents are classified according to type rather than location or activity, which gives a different although equally clear picture. Falls account for nearly 70 per cent of the total, with the frequency almost equal in all grades from the kindergarten through the eighth. Injury from burns, scalds, or explosions and from cuts or scratches were equally frequent, but neither type accounted for one-third as many as did falls.

During the school year 51 deaths were reported. Twenty four of these came from motor vehicle accidents. Eleven more were home accident deaths—two from falls, two from burns, scalds, or explosions, one from cuts or scratches, and six unclassified. Only one death resulted from a school accident, the one mentioned above as a circle swing accident.

This summary of student accidents covers schools with an average enrollment of 276,000. This year, we hope, at least twice as many schools will send reports to the Council so that our record will be even more complete and representative than it was last year. Effective action for accident prevention, as for any other human endeavor, must be based on accurate knowledge of the problem.

CHAIRMAN GRAHAM: Dr. Herbert J. Stack, who is Supervisor of Child Safety in New York and Lecturer in Safety Education at Teachers College, will continue the discussion from this point.

Measuring the Results of Safety Education

By DR. HERBERT J. STACK

Supervisor of Child Safety, National Bureau of Casualty and Surety Underwriters, New York City.

I can see three methods of measuring the results of safety education.

First—Measurement through an analysis of accident records.

Second—Measurement by the use of tests of information and attitudes built up by the method of objective tests.

Third—Measurement of test scales or inventories of childrens' habits.

The first measure of the results of safety education and safety measures comes from a statistical study of the number of children killed. We know for example that in the last three years while there has been an increase of nearly 25 per cent in the number of adults killed in motor vehicle accidents, an increase of 8 per cent in pre-school children killed by the same cause, that there has been actually a 10 per cent decrease in fatalities of children of school age.*

Futhermore we know that in New York City in the last five years, while there has been a 5 per cent increase in street and highway accidents to persons over 15 years of age, there has been a 19 per cent decrease for children under 15 and an even more marked *decrease* for children of school age. Our most recent analysis of Police Department records for the last three years showed that while adult fatalities *increased* 34 per cent, those of pre-school children 15 per cent, fatalities to children of school age actually showed a 23 per cent decrease. These and other crude facts that may be gleaned from statistical data indicate that our child safety program is proving its value in many communities.

The change in the number of fatalities over a period of years give us a fair measure of the success of a safety program although I believe personally that the total child accidents—fatal and non-fatal—give us a more valid measure of the result of our safety activities than fatalities alone. This is particularly true when a small city or school system is surveyed. The superintendent or safety council manager may become disheartened over his safety programs when he finds a marked increase in fatalities in a single year. But the fatality is an extreme case and after all the total accidents become a truer measure of the success of the campaign. For this reason it is quite necessary for a city to use some kind of an accident reporting system to get at the facts about student accidents.

Now, there is one word of caution that needs to be given in connection with this. When we observe a certain phenomenon such as the reduction of child accidents we immediately go looking for causes. The playground enthusiasts will say that it has been increased facilities for playgrounds. The police will say it is due to improvement of traffic conditions. The fire department will insist that it comes as a result of improved fire prevention. The schools will say that it is due to the school program. But as a matter of fact such reductions are a result of all of these programs. We could without difficulty find a high positive correlation between several numerical variables such as number of boys in safety patrols, attendance on playgrounds, number of forms of traffic control on the one hand and reduction of child accidents on the other. The best attitude for us to take is to conclude that many different agencies are helping reduce child accidents. We find in many cities that there has been an increase in fatalities to adults and at the same time a decrease for children of school age. Of all the variables that might improve safety conditions there are only two that are not common to both adults and children. These two are improved playground facilities and the school safety programs. We must, therefore, conclude that the influence of these two factors must be marked.

*Data from the National Safety Council.

But as educators and safety directors you are probably very much interested in the other phases of the measurement of the results of safety programs. I refer to the use of objective tests of safety information and safety habits. Just as fundamental school subjects—reading, writing and arithmetic—can be measured by achievement tests so it is possible to measure achievement in safety.

Some time ago I prepared the National Safety Test, Alpha, for the purpose of testing the safety knowledge and attitudes of pupils. This test was made up of 80 items following an analysis of textbooks and courses of study. It is designed for the secondary schools but may be used in intermediate grades and has a reliability of .74. Administered to over 4,000 pupils in approximately sixty schools in the country tentative means were established as follows:

Grade	Mean	Grade	Mean
7	59.0	10	64.5
8	59.6	11	67.0
9	62.0	12	75.0
	Superior adults 88.0		

The principal value in the test lies in its use for diagnostic purposes—for finding out what pupils know and do not know about safety.

Some general conclusions could be given in regard to the findings in this testing.

1. The judgment type of questions while less objective seems to be of greatest value in determining pupils' real knowledge. In life situations involving safety as a rule there is no one around to say, "Now take one of these choices. Which is the best solution?"
2. This test does not measure what pupils would actually do in life situations, but only what they think they would do.
3. There is a positive correlation between intelligence and high scores on the test. Yet we are not as yet convinced that there is close relationship between high intelligence and freedom from accidents.
4. Where there has been special stress placed on safety in a school we find high mean scores. Kansas City pupils, for example, appear to be unusually well informed.

I believe that teachers and supervisors can afford to use safety tests in many ways.

1st. For testing achievement following the use of motion pictures, slides or any particular safety lessons.

2nd. For diagnostic purposes at the beginning of the school year.

3rd. For testing achievement at any time during the school year.

I want to say a word about tests of habits. How can we determine the results of safety instruction as measured in terms of improved safety habits? The work of Hartshorne and May,* in their tests of traits and that of Watson** have paved the way for us in devising a measurement of habits.

It is quite possible for us to measure safety habits of children in similar ways. There is not time to go into detail as to this, but here are a few suggestions for those of you who are interested in attempting such studies.

*Hartshorne and May, *Studies in Deceit.*

**Watson, Goodwin. *The Measurement of Fair Mindedness.* Bureau of Publications, Teachers College, Columbia University.

First: We can make counts of street crossing violations of children before and after safety instruction has been given.

Second: We can establish parallel and control groups of kindergarten or lower grade pupils and by the use of trained observers make counts of crossing habits for a period of one week. This may be followed by different types of instruction in the experimental groups and no special instruction in the control group. There is a good field for a special research here.

Third: We can allow pupils to rate themselves on safety score cards before and after special campaigns. (While this sometimes tends toward dishonesty, nevertheless many successful studies of this kind have been reported.)

Fourth: Through the use of traffic officers or safety patrols for a day we may take samplings of pupil violations or bad safety habits and after special instruction follow this with another count. (Although the reliability of such counts may be questioned by the inadequacy of the sampling, nevertheless it is one way of getting evidence.)

Fifth: We may get a sampling of principals' and teachers' judgment as to changes that have been observed in safety habits of children. This is the least valid method but may have some weight. At least it is the method we use so often.

There are many opportunities for measurement in the field of safety. An analysis of accident record cards and other statistical data should give us helpful information. The use of objective tests of information and attitudes will help us find out whether or not safety instruction is getting across. The measurement of safety habits by a sampling of the actual practices of individual children or groups is entirely possible. But there is plenty of room for further experimental studies. Pancok of St. Louis has been working for over a year on picture tests for elementary school children. I know of two researches that are going on this year on the effects of different types of instruction on habits. We in the field of safety should be ever alert to these measurement movements because they not only will help us justify our program but also will assist us in improving the quality of the various types of instruction we are to use.

CHAIRMAN MURRAY: Mr. Whitney has asked to say a word or two at this point.

ALBERT W. WHITNEY (National Bureau of Casualty and Surety Underwriters, New York City): We in the Education Division have been as much astonished at the statistics that Messrs. Erwine, Battey and Stack have reported to you as you have been. We have been sure that safety education was worth while but we were not prepared for its showing up in statistical form with such apparent conclusiveness. I may say, furthermore, that the results from all other sources that we know of confirm the figures that have been quoted today.

To what degree these results are due to education and to what extent they reflect the greater adaptability of children to new conditions, we do not know, although figures that we have compiled on cities of over 100,000 population show that the group of cities having the best safety education work in the schools have by far the best statistical record as regards child fatalities.

In any case, however, there is unquestionably in this field a great educational opportunity. We cannot afford not to cultivate a field which is capable of showing such remarkable results.

Further evidence of the value of the work with children came out in a traffic meeting yesterday where it was stated that traffic accidents to children in Philadelphia went up 15 per cent in the year following the abandonment of the school boy patrols in that city.

I am convinced that this statistical showing will bring in a new era in the safety education movement. I do not see how the schools can fail to regard it as a very, very important thing, to be given serious consideration.

CHAIRMAN GRAHAM: So far as the public schools are concerned, I think there is a growing spirit in favor of safety education: there is a "show us the way and we will do our part" spirit on the part of school men over the country.

Those results could not have been obtained if no method had been set up. The remainder of the program deals with the methods by which results have been achieved, possibly through extra-curricular activities; there is no one better fitted to speak on that matter than Dr. McKown.

Teaching Safety Through Activities

By HARRY C. McKOWN
Department of Secondary Education, University of Pittsburgh

In the development of educational theory there are two main periods, the first of which is the period of "learn about." All of us are familiar with it and its emphasis upon memorizing facts, creeds, commandments, quotations, etc., which were, on the whole, probably of little value beyond serving as definite material in which we could be examined for honor or promotion.

Let me go back to my little old course in physiology—a course designed originally, I suspect, for physicians and embalmers. I believe there is only one thing I learned in the course that was at all beneficial. I learned about the bones of the body and can sit down now and locate the phalanges, the patella, the cranium, the cerebellum and the os innominatum. I can do it but I have never been called upon to do it, of course. Busy work! But I remember two pictures in the book; on the left page was a picture of a hunchback, in terrible shape, with the legend underneath "See what coffee did to him!" On the opposite page was a picture of a great, big, magnificent outstanding man (from the ears down, at least) and underneath was written "He did not drink coffee." That is about the only thing I got out of physiology that to my mind had any value at all and I doubt, seriously, its value. Whose fault was it?

I am awfully pessimistic about your formal course in safety education. I say it with the utmost respect for those who are directly interested in it and who know more about it than I. I am pessimistic about your campaigns, slogans, exhibits, quotations, your codes and creeds. (I know you are too, to a certain extent.) I am awfully pessimistic about those things. Why? Because they emphasize too much the learning about, and too little the actual practicing of desired actions.

Suppose I should offer to teach you to drive a truck. I say, "Here are the things you must learn. Push this, pull that, step on the other, etc. Now drive away." Other things being equal, with the help of Providence you might go off down the street; but I would certainly not think of saying, "There is my car; drive it."

If the only thing a child gets out of safety education is a bundle of facts he can recite to his teacher or visitors, I don't believe we have taught him a thing. You don't have to agree. We are recognizing our lack of success in teaching the youngster to be a good citizen by educating him to pass examinations on what a good citizen is. I have quit trying to *be* good, but I have not quit trying to *do* good. I wish we would stop talking about *being* good citizens. I wish we would talk about *doing* good citizens, if you understand me.

Our first period in educational theory was a period in which we emphasized "learn about." In the present period we are emphasizing "do," "act" and "practice." The present wave of enthusiasm for the so-called extra-curricular activities is due to this interest in practice. You are familiar with traffic and fire patrols, inspection groups, fire squads, auditorium and assembly presentations and other actual and natural settings for the establishment of functioning habits.

You are all familiar with the clean-up campaign. In some ways it is fine, in some ways it is awfully cheap. We see in these campaigns bales of paper, junk and rags

out along the sides of streets awaiting collection and I was in one school where they took out all the chairs to make room for the junk! If the purpose of this campaign is to teach safety, perhaps you can justify it, but if it is done for financial reasons, it is cheap.

In getting off a train once at a town in which I was scheduled to speak at the high school, I fell in with some youngsters I suspected were going to school. Some of them carried tin cans in their hands, some were dragging "tails" of them, others had necklaces, still others, baskets of them. I asked the young man with whom I was walking what it meant, and he replied, "Wait till we get to school and I will explain." In front of the school there was a stack of tin cans as high as this ceiling; probably many of them coming from perfectly legitimate resting places. He said, "Everyone took a vow to bring in at least one a day." The advertising value was probably more important than any other consideration. In one school the same rat was slain seventeen different times!

Have you used the "Trial of Fire"? Many playlets are written by the youngsters themselves. Others more or less well known are "Fire—Traitor," "Broken Glass—Murderer," "Pageant of Misery," "Rescue of Safety," "Sir Safety and the Knaves," "Voyage of the S. S. Good Health," "King Good Health," "Flies in Paradise," etc., —all these appeal to the little kids and the auditorium period can be used to good advantage here.

I know of three schools that had fly catching campaigns in the spring. In one school was a box containing a swillion of flies; every youngster "swore an oath" to bring one to school every day. Mathematicians figured how many were in the box each day and through the papers and posters there was publicity. I was interested, later, in learning two things, "In the first place, what did you do with those flies? In the second place, what of it?"

The principal wrote me that he declared a holiday the last period on Friday and the school staged a mock funeral procession down the main street to the tune of the "Dead March" from "Saul" played by the band. The flies were carried on a small wagon. After the funeral orations held in the square the flies were returned to the school where some gasoline was poured over them and an "executioner" touched a match to them. The band then played "There'll Be a Hot Time in the Old Town Tonight." I'll bet killing a few million flies did not dent the fly population of the city.

In answer to my second question the principal stated that on Wednesday he sent students to all the hardware stores in town to buy fly swatters and screen wire and there was not a fly swatter or an inch of screen wire to be found. I think this was the real test—folks buying up screen wire and fly swatters, instruments of protection. What we are emphasizing is that the youngster will have to participate, rather than listen to you lecture on safety, or learn little nothings about it.

You all saw the recent cover on the Saturday Evening Post—the youngster writing on the board "I was tardy" seven hundred and fifty times—the same sort of thing was working a hundred problems if he throws a spit-ball or an eraser, thereby penalizing him by requiring him to do something he should be interested in doing. (I hope safety education escapes this foolishness.)

We have been talking about physical safety. Let me mention, very briefly, one or two other kinds of safety in which we should be interested. The first is emotional safety. The child comes to school for the first time and he doesn't know what it's all about. If he comes to junior high school from the elementary school, he comes from a school in which he was at the top to a school in which he is at the bottom; from a school in which he was important and well acquainted to a school in which he is insignificant and unknown. I would like to have him come happy, glad to come. There are one or two things that may be done. I would like to have something arranged for him before he comes. A school near here had a "grade school day" and invited the parents and children from the outlying schools. In the morning

regular classes were held. At noon all ate the lunches they had brought with them and the school furnished coffee and ice cream. A short formal program and games and stunts were scheduled for the afternoon. I'll bet these youngsters looked forward to coming to that school with pleasure. I would like to have the youngster know we are glad to have him and to be glad he is in my school.

I was visiting one of my students a while back and sat in the back of the room listening to a typical home room program. The president remarked that a "new individual" was present and asked, "We will all be glad to hear from him, won't we?" They all answered, "Yes!" She then turned to a boy in the front row and said, "Willie Smith has just come from Boston. Wouldn't you like to hear from him?" Of course, they would. Well, he got up and talked about Boston. When he sat down somebody said, "Madam President, none of us has been in Boston, we would like to ask questions. May we?" You know what the questions were, and at the end of a few minutes the boy sat down thoroughly assimilated. You remember how we used to assimilate new pupils in the old days. Now Willie goes home and tells Mamma and Papa how happy he is, and how glad the boys and girls are to have him in school, and some day when the school needs a new wing, some new devices on the playgrounds, some more teachers or salaries, it will get them because it has supporters and support. Emotional safety may be built upon wise use of school clubs, assembly, music, athletics and dramatics.

In the last place in just a word let me mention financial safety. Recently I have been riding this hobby. Every school has a program of saving but very few have a real program of thrift. I believe thoroughly in saving but this is only a small phase of thrift. Other phases are giving, spending and investing. All of us buy, mostly as amateurs, while we are "sold" by professionals, we keep alive cheap methods of financing worthy activities and we invest most unintelligently. By having the youngsters give, spend and invest a hypothetical amount each term and then compare and discuss their schedules, we could give some very actual practice in financial safety.

I have tried to emphasize the establishment of habits, not only the learning of lessons. You cannot succeed in safety education or anything else without intelligence, ideals and habits. You cannot leave out any one of these and be successful. Any safety education must be based on intelligence and basic knowledges, worthy ideals, and desirable habits.

CHAIRMAN GRAHAM: Dr. McKown is always entertaining and interesting. At this point Miss Stevenson wants to make an announcement.

CHAIRMAN GRAHAM: I have pleasure in presenting next the Senior Supervisor of Health and Physical Education, State Board of Education, Hartford, Dr. Charles J. Prohaska!

Promoting Safety Education in the Schools of Connecticut

By CHARLES J. PROHASKA, M. D.
Director Physical Education and Health,
Connecticut State Board of Education

Assuming the attitude of Humboldt that "what you would have in society, first put into your public schools", we set about to emphasize certain aspects of the school curriculum. In modern education we have come to recognize the importance of three relatively new developments, viz., those of character education, health, and safety training and instruction. Unlike so much of the prescribed work in the schools, these subjects must be lived in order that they may be learned; they must permeate the entire curriculum, the entire life of the school.

The state of Connecticut has been unusually fortunate in having for ten years, in

Dr. Albert B. Meredith, a Commissioner of Education who recognized ten years ago, and has guided since, a constantly changing educational program based upon modern needs. To quote him in part from a paper before the Fourteenth Annual Safety Congress in Cleveland, in 1925:

"A study of the average present day elementary school curriculum reveals the fact that it contains very little which is designed to teach children their relations to modern society. The program is also relatively barren of instruction with regard to the advantages or disadvantages of our social and industrial organization. The reason for this is not hard to find. Formerly the schools were not charged with the responsibility of general preparation for life. . . ." All this has changed in recent years. Life has become enormously complex and many new hazards have come into existence which did not appear in an earlier form of social organization. The home can no longer unaided prepare the child for active participation in trades and industry, or for effective adjustment to the social life of his community. The school has accordingly been called upon to increase very greatly the range of its activities and we are now at the point where school authorities are besieged with all sorts of proposals, thus making new demands upon the course of study, and upon this public institution."

It was through the untiring efforts and sympathetic leadership of Dr. Meredith that a course of study in health and safety training and instruction was made an integral part of the program of instruction in the public schools of Connecticut. The legal minimum time requirement for health and safety instruction is thirty minutes a week; the course of study, however, emphasizes the necessity of teaching health and safety at every opportunity that arises during the day in connection with other subjects and activities.

On the whole, the course of study, together with other efforts to promote health and safety as an integral part of the school program, has taken hold in the schools throughout the state. A year's study and observation of the need and accomplishments in safety education revealed some interesting facts to us in the state department. We gathered a great deal of information from our regular visits to schools; statistics furnished by the State Motor Vehicle Department broadened our scope in highway and street safety; parts of a survey conducted by the bureau of character education research put us in touch with some outstanding programs and projects in safety education; returns from a questionnaire sent to county and local parents and teacher organizations gave us a better picture of conditions, good and bad, as they actually exist in those communities reporting.

Realizing the importance of a complete and progressive program in safety education, and the wealth of safety information and materials available to teachers and schools, a state-wide safety education campaign was launched in April, 1930, by the State Board of Education.

It was felt that the campaign at this time should emphasize accident hazards confronting children during the spring and summer months, and that a similar step be taken late in the fall to emphasize the so-called winter accident hazards indoor and out of doors.

Accordingly, the state board of education voted to endorse a safety education campaign, and "to emphasize through the proper administrative channels the safety aspect of the health and safety education program, and to secure the cooperation of the several societies and groups most interested in this work, to the end not only that the program be emphasized, but as a practical outcome that special emphasis be laid on accident hazards confronting children during the spring and summer months with a view toward prevention of and protection from such accidents." A vote was also passed to adopt a slogan, "Promote Positive Safety Education—Make safe for every child in Connecticut—the Home, the Schools, the Streets, Recreation and Play."

Realizing also that parents as well as teachers are major elements in the situations to which children respond in the schools, our efforts were then directed to parents in the home as well as teachers in the schools. Interest and cooperation were evident

for, at the annual meeting of the Connecticut Congress of Parents and Teachers, a resolution was passed to endorse the action of the state board of education.

For the balance of the school year our efforts were directed toward making every school administrator, school teacher, parent and child "safety minded." All mail sent out bore a seal showing the safety slogan; every opportunity was grasped to convey the significance of an all-round program of safety education.

In promoting the campaign, free use was made of the splendid materials furnished by the National Safety Council; street and highway safety was promoted in cooperation with the Connecticut State Motor Vehicle Department; the Junior Red Cross, and American Red Cross first aid and life saving courses were promoted; teachers' institutes, student assemblies, safety clubs, etc., were addressed; many pictures and devices were displayed. Thanks are due the many organizations who have contributed much helpful material throughout the campaign.

This marks only a beginning. The response on the part of school administrators and teachers was most gratifying. They have convinced us that they are ready and have been waiting for an opportunity to give safety education its proper place in general education. Requests for materials were overwhelming and many invitations to assist in organizing programs of safety education were received. We feel that the soil has been cultivated and now the seed can be sown.

The first step has been taken, a further analysis of safety work will be made; with the cooperation of the state motor vehicle department and with other divisions of field service in education, we hope to enrich existing programs; in the four state normal schools we have already developed a health and safety conscience in our teachers to be.

We in Connecticut are convinced that a state department of education can pave the way in an education program that will reduce the number of accidents among its school children, and make their life and play activities safe as well as wholesome.

CHAIRMAN GRAHAM: I now call on Miss Emma A. Schad, Supervisor, Intermediate Grades, Baltimore Public Schools.

New Developments in Safety Education

By MISS EMMA A. SCHAD
Supervisor, Intermediate Grades, Public Schools, Baltimore, Md.

There has been in Baltimore a decrease in the number of fatal accidents occuring to children of school age. This decrease can be attributed to the vigorous Safety Education program of the Baltimore Safety Council and the Baltimore Public Schools.

Safety education, having as its primary objective the development of safe individual and group habits and safety-mindedness, should be a part of every curricular and extra-curricular activity in the school. Baltimore, realizing the immediate need for this emphasis upon safety habits and attitudes, has taken a definite step in the right direction. In order to carry out the program of safety education as a special rather than a general subject, it has been decided to furnish every teacher with a monograph which will show the situations and materials in each subject through which she can contribute to safe habits and safety-mindedness.

If we conceive the various school subjects as important in equipping the child for vocational, civic, and recreational activities, a clear comprehension of the relation of safety to economic and industrial welfare is necessary. The problem is not how much knowledge of arithmetic, history, and geography the pupils acquire, but how the subject matter of arithmetic, history, and geography will affect the behavior of the child in his work and play.

A representative committee appointed by Dr. Weglein, Superintendent of Public Instruction, is now working on the problem of a safety course of study or monograph for the elementary grades. The committee consists of the Superintendent of Public Instruction who is directly responsible for the committee's findings and who, because of his great belief in safety education, has inspired this committee to put forth its very best efforts; a supervisor, especially assigned to safety education, who is chairman of the committee and who confers with the superintendent between general meetings of the committee; a supervisor from each division of the school organization, primary, intermediate, and secondary; several principals and vice-principals; and last, but most important of all, classroom teachers, who have evinced an interest in safety education by some outstanding piece of related work. Naturally, the greater part of the material will be contributed by these teachers who have and are trying out methods and materials to determine their relative value.

One part of the committee is studying the various school subjects to determine the safety knowledge, habits, and attitudes that naturally grow out of topics and activities. Only enough illustrative units will be used to show the teachers of Baltimore how much opportunity there is for unifying safety education with the school day's work. It is through drawing out these threads of safety education from every subject and activity in the curriculum, that teachers will experience "safety" as coordinating safety knowledge, habits, and attitudes in the life of the child. Through this experience, they will be able to develop in children "safety-mindedness" and safe habits.

Another group of the committee has gone through the readers, the geographies, the histories and the health and science readers listed on the annual requisition lists of the Baltimore Public Schools and has listed with annotated page references every story or bit of material that bears directly or indirectly on safety.

Another group is working on the routine activities of the school day; dismissals, fire drills, recess periods. We do not wish to standardize these to the extent that every school will be expected to conform to one method. The committee hopes to get the best practices used in each type of school building and suggest from these three or more procedures as the most desirable and most efficient from the standpoint of time and safety.

No course of study would be complete without a section devoted to the two organizations that stimulate and foster safety interest in the school, the junior safety council and the safety patrol. They are being studied intensively, especially in those schools where they have already been tried out successfully and where they have been a vital influence in enforcing safety habits and creating and sustaining desirable safety attitudes. We hope also to get much help from the book that has just been written by one who from her valuable experience in the field of safety will be able to make a much looked-for and longed-for contribution to workers in safety education. Miss Idabelle Stevenson, executive secretary of the Education Division, N. S. C. is the author of the book now being published.

Dr. Weglein has not only asked for the organization of a patrol and council within each school but so great is his interest that he has instituted the student accident reporting system in every school in the city, elementary and secondary. This work will be carried on in connection with the Baltimore Safety Council. An intensive study will be made at the end of the school year of the accidents occurring to every boy and girl of school age. We shall then be able to determine the nature of our own local accidents and plan the work accordingly.

The Safety Course of Study Committee has no desire to formulate a conventional course of study, nor any intention of asking for a definite time allotment for safety education.

Safety education is not a subject that can be pigeon-holed. It is too vitalizing and too much a part of life. The committee is planning to give to the teachers a monograph that will embody the safety philosophy of Whitney; that will show where in the work of the school, safety education will be naturally emphasized and give complete units of work that have been experimentally determined as contributing to safe habits and safety-mindedness; that will give many suggestions for a continuous school safety program; that will give suggestions and illustrations for the establishing and sustaining of worthwhile safety organizations within the school.

The committee in preparing this monograph has made a study of the principles of curriculum construction agreed upon by authorities in this field and is endeavoring to apply these principles to the best of its ability.

CHAIRMAN GRAHAM: We have here with us Miss Blanche Fuqua, Supervisor of Kindergarten and Primary Grades, of the Terre Haute Public Schools.

New Developments in Safety Education

By BLANCHE FUQUA
Supervisor, Kindergarten and Primary Grades, Public Schools, Terre Haute, Ind.

I shall mention briefly three significant principles which are characteristic of the viewpoint in the teaching of Safety in Indiana schools, and shall tell of the results of the publication of a bulletin on safety.

Principle I.—The foundation of any instruction is its most important part; so, from the beginning of the child's school experience he has some line of safety work offered so that ideals of safety will be established. Each speaker yesterday emphasized the effects of safety practices and safety teaching on the problems of the factory, of transportation, of traffic, etc. Everyone interested in the building of our educational structure agrees on its one failing, that is, the difference between the problems of real life and the problems met in the academic school. The solution of this failing lies in the observance of Principle II. The problems of real life must be met in the school.

The new types of curricula which we are developing attempt to do this. More and more opportunities for experiencing are included. Among the experiences are those having to do with helping children choose their adventures wisely and with helping them carry these adventures through intelligently. Experience seems to be of such a nature as to effect changes in the organism not merely add to it. Through experiencing attitudes are changed and permanent habits may be developed. The State Activity Bulletin, Part III, contains units of work relating safety activities to the Language Arts. This material was developed in one of the Terre Haute Schools, and since it is the result of actual teaching where pupil participation is emphasized, the problems are on the level of pupil interests and experiences. It is proving to be a great help to the teacher who wants to make the work meet life needs.

Principle III.—The organization of our instruction around unifying items of content should displace the hodge-podge teaching which we have had. This organization of safety instruction will help supply the knowledges and good judgment which are needed so that the child knows what to do when emergencies arise for which no habit has been established.

The program of the State Executive Committee included the publication of an Activities Bulletin on Safety Education developed according to the three principles given. It has been in the hands of the teachers one semester, so no measures have been made of the effect upon ideals of safety, habits of safety, or good judgment which it may have developed. One step in improvement resulting from this Safety Bulletin, and other forces, is the classification of schools and the issuing of these standards to be met if a commission is to be given. These standards are in accordance with the law and the interpretations of the Board and are tentatively

approved by the State Board of Education. Standard I has to do with the teaching staff as to appointment, licensing, etc. Standard II has to do with supervision and administration of the schools. I will mention one item—"The safety and health of the pupils should be properly safeguarded by the selection of careful and dependable bus drivers and careful supervision of children enroute to school. Are any children transported to school? If so, are careful dependable bus drivers employed? Are pupils given instruction concerning safety in travel to and from school? Number of accidents occuring last year while children are enroute?"

The following instructions are developed to guide the examiner in determining the standard of the school: "Score I. Excellent bus drivers selected upon basis of efficiency and dependability and carefulness. Student patrol system in the city, definite supervision of pupils in heavy traffic, instruction concerning conduct of pupils traveling to and from school—no accidents." "Score II. Good, careful, dependable bus drivers, careful supervision of pupils crossing streets, safety instruction—few accidents."

In Indiana Education News, Volume Number I, sent by the State Department, September 20, 1930, the Department of Public Instruction recommended the organization of school patrols. "Many school corporations of Indiana are making definite efforts looking toward proper provision for safeguarding the smaller children. Such efforts are very commendable. Every school corporation in Indiana should do its utmost to insure the safety of the children while they are in its care. The Department of Public Instruction recommends the organization of school patrols in all corporations where considerable numbers of children are required to cross busy streets or roads. Teachers should also give Safety instruction to the children. Township school corporations shall demand that all drivers absolutely obey all safety regulations and law." The question of "How shall we build right attitudes toward safety education measures in our State" is solved by this one item which is used in measuring each rural or one room, city elementary or high school in the State.

The State has accepted its responsibility for a program of safety teaching and wants to plan its school procedure from the kindergarten through all the grades on the basis of educative activity and worthwhile interests, so that the greatest citizenship value may result.

ADJOURNMENT

Wednesday Morning Session

October 1, 1930

L. H. DENNIS, Chairman

State Department of Public Instruction, Harrisburg, Pa.

The second session of the Education Division convened with Mr. L. H. Dennis, Deputy Superintendent, State Department of Public Instruction, Harrisburg, Pa., presiding.

CHAIRMAN DENNIS: In discussing the topic "Can the Vocational School Turn Out Safe Workers?" Dr. Leavitt is speaking not as a man from the side lines but really from authority and from broad experience. We are proud of the Pittsburgh education program, which is entering a period of rather broad development and expansion in the opening of the fine new two million dollar trade school. Dr. Leavitt will extend you an invitation, but I want to say that if you have an opportunity during the sessions of this Congress to visit the school it will be well worth your while.

I take pleasure in introducing Dr. Frank M. Leavitt.

Can the Vocational Schools Turn Out Safe Workers

By DR. FRANK M. LEAVITT

Associate Superintendent of Schools for Vocational Education, Pittsburgh, Pa.

It should be recalled that no school of whatever grade can ever become 100 per cent efficient in reaching any of its objectives. No vocational school, therefore, could ever hope so to train its pupils that they would be invariably safe workers, either in the school or in later life in the shops.

All trade schools give some consideration to safety. In most schools there are more or less effective rules laid down to insure the safety of the pupils and of the teachers. Although not required to do so by the laws governing practices in industrial plants, dangerous machinery is almost invariably equipped with safety devices. In other words, we must readily believe that all trade schools attempt to develop safe workers.

From an extended observation and an extremely brief study of the question, it appears to me that the philosophy of safety education in connection with industrial training may be set forth under the following heads.

1. The worker, whether amateur, apprentice or journeyman, is "safe" in proportion as he has formed habits which in themselves make for safety.

Professor William James, the father of educational psychology, described the method of habit formation as follows:

"Make a strong first impression and never permit an exception."

In the forming of these habits, therefore, it is evident that the shop teacher must carry the major burden through insisting on the employment of safe methods of work in season and out of season. As explained by the shop instructor, these methods would be such as to protect the worker from improper contact with machinery and would include safe practices in the use of hand tools. It would also include such practices as would protect others.

Interest in the general subject and particularly pride in being rated as a safe worker would contribute greatly to this desirable habit formation.

2. The worker is safe in proportion as he understands the hazards of the job.

He must be made aware of the fact that things can go wrong and probably will go wrong unless great care is always taken in planning as well as in executing his work.

Obviously the precepts and example of the shop teacher will bring much of this understanding to the pupils, but here is an opportunity for the classroom teacher to make his contribution. In the comparative quiet of the classroom it is easier to present and to explain the rules and regulations which have been laid down for the pupil's protection by the management of the school. The classroom teacher can explain what we have learned by practice regarding safety; for example, that fooling and playing, those activities so natural to the youngster, have caused many accidents and should be reserved for some other place than the shop. He can explain why more accidents occur in the afternoon than in the morning and urge that special care be taken toward the end of the day.

The classroom teacher may also make use of safety posters appropriate to the shop.

Nature of the Shop Work Most Important

3. The worker is most likely to be safe when he is serious about his job.

Anything that gives the pupil an attitude toward his work like that of the conscientious and effective adult worker will make for safety.

The nature of the shop work on which he is engaged is important. A commercial product that is really needed and is to be used, and soon, has a steadying influence on the pupil. When the Supply Department is waiting for the delivery of his product, the young worker, without hurry or nervousness and also without delay, will carry forward his job toward completion and will not easily be turned aside or become careless or slip-shod in his activities.

It helps in the securing of this seriousness to enlist the interest of the parent. Before a boy is allowed to work on a dangerous machine in any of the Pittsburgh Public Schools, he is required to present to the teacher a signed statement from his parents to the effect that they realize the danger in operating the machine and that they, nevertheless, permit their boy to practice on the machine. This tends to seriousness of purpose.

4. The worker is more likely to be safe when he is made to realize constantly that the management places safety first, and production or instruction second.

The realization of this attitude of the school management can be accomplished mainly by frequent reminders by the principal to the teachers that safety is of major importance. A principal can give this impression to the teachers by frequent reference to the subject at teachers' meetings and by the use of notices on the bulletin boards. Eternal vigilance is the price of safety as well as the price of peace.

It would be more valuable if I were able to place before you a few examples of safety programs in trade schools, particularly if I could show that these programs had succeeded measurably in reaching the safety objective set up by the management, but it must be confessed that there are no standards of comparison, so that it is impossible to judge to what extent one or another school system has succeeded in training safe workers. It may be of interest, however, to mention briefly three or four such illustrative examples.

In the May 1930 number of the publication "Labor and Industry" put out by the Pennsylvania Department of Labor and Industry is an article entitled "The Safety Program in Industrial Education at Williamsport", by G. H. Parkes, Director of Vocational Education, Williamsport, Pa. Undoubtedly copies of this address may be had for the asking. It would seem that this school system is on the right track, even though the writer confesses that it was "not until the present year that the problem has been carefully analyzed from the teaching angle."

In the publication of the National Safety Council, the *National Safety News* of September 1929, Gordon C. Graham, safety engineer of the Detroit Public Schools, writes as follows:

"Two hundred and fifty school shops, 5,000 shop students, 27 years of school shop operation with but one or two minor permanent disabilities—why, with such a background, should the Detroit Public Schools be deeply concerned with the problem of industrial accident prevention?"

In glaring contrast is the study of accidents in the Essex County Vocational School. This study was presented as a doctor's thesis by Max S. Henig, Ph. D., and was published in 1928 by the National Bureau of Casualty and Surety Underwriters, New York. The study was made in the Essex County Vocational School for Boys at West Orange, N. J., and covered a period of three years and a practically stationary enrollment of 120 pupils. All accidents, even of the most insignificant nature, were recorded and the aggregate of these accidents for the three year period totalled 208. It is obvious that a school of this size could not have had 208 significant "accidents" in the period. The study, however, is highly significant and is well worth a careful study by anyone who would prepare a safety program for an industrial school.

In Pittsburgh, we seem to have reached a position somewhat between these two extremes. We have five trade schools for boys and two trade schools for girls. During the past two years the daily attendance probably has averaged not far from 2500 boys and girls.

All Accidents Reported at Once

By rule of the Board of Education all accidents of whatever nature must be reported to the superintendent at once. A study of the records of these accidents during the past two years reveals several interesting facts, among which I would select the following:

Eliminating four accidents which occurred on the way to or from school or resulted from personal illness, such as epilepsy or hysteria, there were during the two years 32 accidents reported from the trade schools. Of these 32 accidents, 21 occurred in the shops and 11 in the classrooms, or chiefly in the gymnasium. Of the 21 shop accidents, about one-half resulted from faulty machine operation and the rest from pupil negligence.

69.5 of these accidents occurred in the afternoon and 29.5 in the morning.

So far as we know, none of the accidents resulted in seriously maiming or handicapping the individual as an industrial worker.

I am inclined to think that the present meeting of the National Safety Council in Pittsburgh will atimulate the management of the Pittsburgh Trade Schools to even more serious efforts at accident prevention.

I am inclined to think our record is a very good one, and yet we have not done as well here as in Williamsport, we have not worked out a program this last year except as we say that eternal vigilance is the price of peace and the price of safety.

I had a little teachers' meeting this year, and I said, "I am going to ask for the resignation of the next man who has an accident." Of course I didn't do it, but I felt like it! And the men knew it. We did not have any serious accident for a long time after that meeting. I am inclined to think we will do better in Pittsburgh from now on, and these meetings, whether the addresses are any good or not, will have a good effect on our practices in the trade schools.

CHAIRMAN DENNIS: We can give credit to the railroad companies for being among the pioneers for safety development in this country. They have much they can tell us. I think it is very logical, therefore, when we want the point of view of some great industry with regard to vocational training, that we should turn to a representative of a great railroad company and ask him to give us that information.

I take great pleasure in introducing Mr. Walter R. Lye, District Superintendent of Motive Power, New York Central Lines, Collinwood Shop, Collinwood, Ohio, who will speak on the employer's attitude toward safety training.

The Employer's Attitude Toward Safety Training

By WALTER R. LYE
District Superintendent, Motive Power, New York Central Lines, Collinwood Shop, Collinwood, O.

Appreciating that you are particularly interested in the attitude of employers toward safety training as it pertains to Vocational Schools, I have faithfully tried to analyze our methods when dealing with our vocational or apprentice school boys as compared with our method of handling the accident problem with our other employes. You will, of course, understand that my opportunity for such an analysis is confined to my particular District on the railroad with which I am connected.

We employ approximately 135 apprentices on our District, and in the past two years we have had only two boys who sustained reportable injuries, and in one of the past two years we had no boy injured, which record measures up very well with the results obtained with other employes in the same period. We have not up to this time found it necessary to have one plan for dealing with the apprentice boys and another system for the remainder of the workmen. Is it then to be considered that we have simply been fortunate in the excellent record made by our apprentices, or is there an underlying reason? I believe there is.

Before enrolling an apprentice, a close check is made by authorized supervision to know that the boy does not merely want a job, but that he has a definite purpose in view in entering industry. His records in his home and school life, his reaction to home discipline and his home environment are closely investigated. After these conditions have been found favorable and the boy having reached at least the age of seventeen years, we believe that we have enrolled one well equipped mentally and physically to take his part in the simple duties to which he is assigned, to assimilate the general policy we pursue in accident prevention without any particular deviation from the policy set up for more mature and experienced employes. And what is that policy?

In the first years of our safety activity our ideas were confined almost entirely to the correction of unsafe conditions. The Safety worker of that day considered himself negligent if he could not have at least a dozen items of loose planks, close clearances, machines unguarded, etc., to report, and having performed that duty leaned back with a sigh of satisfaction and watched for the accidents to stop. Records show that it did help, but the process was very slow and required carefully prepared statistics to indicate the improvement. This primary stage of Safety was fundamental and very necessary.

Passing through the period of close checks on condition of tools supplied to workmen, of campaigns for clean premises and shops, of intelligent practice in the arranging of materials, and improved devices for handling the parts as the weight of our locomotives increased, we emerged gradually from the second phase of the movement. We were learning all the time and it resulted in bringing home to the people devoting part or all of their efforts to this study the fact that all the safety devices in the world could not insure against injury to certain types of men regardless of any mechanical precautions that might be taken. We, therefore, entered into the third and present line of thought and action, and the remarkable results produced in the past few years quickly developed in most cases, and are continuing to develop today.

The cause of accidents, aside from the unsafe conditions and practices which have been gradually eliminated, resolves itself down to the mental attitude of the workmen and the supervisors. While it is said self preservation is the first law of nature, we are not all equally equipped with the proper instinct of self preservation.

We have a large group of careful, thoughtful men, concentrated on their work, living clean lives, a happy home environment. With this class of men the problem is simple—they seldom get hurt. We have the naturally careless man—careless of himself and his fellow worker: the chance-taker; the fellow who considers himself so clever that he can get away with unsafe practices due to some imagined superiority in his makeup. We have the thoughtless man who as a result of trivial injury or indisposition remains away from work long enough to become a reportable I. C. C. case; and finally, we have the cheater—the man who is injured away from his work or has a disease that is not occupational, and will attempt to make his company assume the responsibility so that he may be paid for his lost time.

I do not care to insert a lot of statistics in this paper, but it is desirable at this point to give you a few of the records that obtained at Collinwood Locomotive Shop in the past few years to make apparent the absolute turnover that occurred in that shop, and incidentally, on the District, after June 1st, 1928.

In our shop during the past years the records reflect there have been employed from 600 to 900 men, according to the fluctuation in business.

In 1923 we had a total of 1 killed and 290 cases reported to the Interstate Commerce Commission.

In 1924 we had 119 cases reported to the Interstate Commerce Commission.
In 1925—107 cases,
In 1926—129 cases,
In 1927— 87 cases,
In 1928— 23 cases, only two of which occurred after June 1st.
In 1929— 9 cases, and
For the first eight months of 1930—3 cases.
What happened to bring about the change?

Previous to June 1st, 1928, I considered that I had been doing everything a supervisor could do in the way of properly instilling enthusiasm into the organization. We had cleaned up our shops and roundhouses in first-class shape; we had removed thousands of dollars' worth of material which was not moving in the shop—good material, but which belonged in the storehouse; we had provided expensive benches for the piling of material for locomotives and properly designed scaffolds for the safety and convenience of boilermakers and others; we altered entire shop floor plans in order to acquire more floor space; we had our boundary lines for material carefully marked with white paint; our aisles through the shops similarly marked; we had placarded our shops to the best advantage with Safety slogans; I had personally delivered talks to the workmen; we had organized sub-committees in the shops; I had personally talked with every man who had been injured during that year, having them together in a group, discussing the cause of their injuries; I appointed them as my personal representatives: I figured if any men knew how to avoid injury, they did, and should be able to warn their fellow workmen—but, gentlemen, all these things did not bring the answer.

On June 1st, 1928, after all these things had been done, and appreciating the necessity for better records, I conceived the idea that caused results so remarkable that I feel it is the message to bring to you.

I gathered every supervisor, day and night, on my District, together at a meeting at our headquarters, and in effect I told them something like this:

"You men are going to listen to one more Safety talk, and I do not want you to sit back and think it is just another one of the numerous talks you have listened to, and that you are going back to your station and imagine that you can get by with taking the amount of interest you have seen fit to take in regard to this movement in the past.

"I know that regardless of all that has been said, you have felt, and still feel, that this matter is one of secondary consideration, one that can be attended to when the spirit moves you; that it is after all, a side issue. You have been talked to and

pleaded with, your sympathies aroused by picturing the destitution of families brought about by injuries to the wage earner.

"I am not here to arouse your sympathies today. Evidently that is not the method of approach necessary. If you men think we can operate economically and efficiently by allowing the number of injuries to occur that are happening in our shops, you have not the least conception of what constitutes a properly organized institution. You are trying to operate with a man or two missing from this gang and the other gang, doubling up people's work to get by, placing men unfamiliar with the duties on to work, openly inviting more injuries, and you have not up to this time apparently had the slightest idea that this has anything particular to do with your efficiency as a supervisor.

"The substance of the entire proposition is this: The accidents on the District have got to stop! If we continue to have accidents, the blame is going to be placed where it belongs, and that is, with the supervisor in charge of the man injured. Your efficiency as a supervisor is going to be weighed by just that measure, and by that measure entirely until this condition is cleaned up. If there is any one here who does not care or does not feel able to assume this responsibility, it will be well for him to get his affairs in order as he will be placed in a position not requiring this ability."

Gentlemen, I left that meeting with a feeling in my heart that I had finally done the thing that would bring about the necessary results, and it did.

What did the supervisors do about it?

They went out with a spirit that they had never displayed before. They interested the Federated Shop Crafts so that they concurred in the spirit of Safety and expressed a desire to co-operate with the management. Programs were inaugurated whereby speakers were provided in the lodge room of the men; labor leaders and company officers appeared on the same platform and talked of the Safety movement; they inaugurated effective systems of checking in the shop; they held noonday meetings at which workmen got up and talked of the thing we were trying to do; where gang foremen and departmental foremen addressed the men. As a result, not only the supervisor but the workman became intensely jealous of his own Safety record and the record of the gang in which he was placed. The active participation of the Shop Crafts represented a new step, at least in this territory, a new departure for better team work and a wider and more effective interest in the safe shop operation.

The fellow who remained home unnecessarily was no longer immune. His supervisor, his friend, or somebody picked out who had influence over this man, got to him quickly, and as a result, the slight injuries, the cases of indisposition coupled with a slight injury were practically wiped from the books. Where men could come back to work and satisfactorily perform their duties with the doctor's consent, could earn their wages, they were glad to come back.

It is remarkable that since that period there has been no demonstration in the way of meetings, no further lectures, and no supervisor has been brought before me on account of not fully appreciating his responsibility.

Therefore, in conclusion, I want to say just this: By all means clean up mechanical deficiencies and unsafe conditions; by all means keep your shops and premises clean—it is vitally necessary; it makes men more safe; they are able to concentrate on their work, and concentrating is the thing that counts.

But above all else: my analysis is that results can never be properly obtained until it is brought home to the supervision of any shop, individually and collectively, that they are equally responsible with the chief supervisor, and that they thoroughly understand they will be held equally accountable.

MR. MCGARVEY (Federal Board of Vocational Education): I was very much interested in what Dr. Leavitt said about the decrease in the number of accidents in the schools, particularly the vocational schools. I think we as educators ought to be credited with foresight in planning and equipping our shops along the most modern and safe lines that have been offered.

I know that a good deal of attention is being given to properly protecting the machinery in the shops, and to proper lighting, but we do not stop there. Dr. Leavitt did not say just how the instructors are given training, but they have the best practices of safety for their particular trades brought to their attention.

I would like to stress this point if I may. It seems to me we are crowded in our schools, not only the vocational schools, but generally, with a multiplicity of subjects. If I am correct in my recollection, somebody has said that there are over two hundred and fifty subjects in the high schools at the present time. Perhaps safety and health is not a subject if offered in a general way. I believe there is a great deal that can be offered in a general way, but I do believe in the trade schools we have an opportunity to do something very specific, that is with regard to the hazards of particular trades or occupations. We get that from the practical teachers. Dr. Leavitt did not mention it, but the men and women teaching in these trade schools are usually practical tradesmen teaching the manipulative side of their trade. They not only know the theoretical side thoroughly, but are well versed in the safety conditions of that trade. That point is one which it seems to me should be emphasized in a meeting of this kind; that is, the practical person teaching the trade is the one who probably can put across the safety conditions of that particular trade or occupation, and they do it, not as a class room proposition but at the time the boys and girls are working on the machines or in the places where accidents occur.

School Work Under Actual Trade Conditions

Much of our work is not carried on, in the trade schools, under the conditions which the boys and girls will later meet. The last speaker mentioned work in railroad shops. Much of the work under public control utilizes many of the plants for the carrying on of the so-called manipulative work. That is of course supplemented as Dr. Leavitt mentioned, by work in the schools under public control.

I do believe, however, there is a very good opportunity for us to observe as educators what these plants and corporations demand of their workers.

It is very interesting in visiting building construction work, which is a field in which I am particularly interested, to note the different conditions on the job for the protection of the workers and apprentices. I notice for instance all kinds of signs posted up. I noticed on one job recently at every temporary stairway there was printed a sign, in red letters, calling attention to certain things. I looked at the scaffold which was of the most modern type, with guard rails and so forth. The impression was that they would almost fire a person who kicked off a piece of material. There were signs indicating where to go in case of slight injury. That is the sort of thing that is going on in certain types of construction work.

Particularly is this true where apprentices are employed in the various trades; perhaps they are attending school on a part time basis: they bring back reports to the school, the conditions under which they are working and in most instances they are favorable. The public schools in their programs of trade education are paying attention to what is going on outside, and trying to emphasize this in the work in the trade organizations.

CHAIRMAN DENNIS: I suspect Mr. Lye covered his subject so thoroughly that discussion and questions have been headed off, and in the continued absence of the next speaker I have asked Mr. J. A. Miller of New Kensington, on the spur of the moment, to read Mr. McCarthy's paper.

A Practical Safety Program for School Shops

By JOHN A. McCARTHY
State Supervisor of Trades and Industries, Department of Public Instruction, Trenton, New Jersey

A practical safety program for school shops must be based upon situations as they exist in unit trades, rather than by attempting to set up a program that might apply to a group of industries. For example, a practical safety program for silk textiles or wool textiles would not contain the same kind of instruction units in safety that might be included in a safety program with the machine trades or electrical trades. Even in certain trades the character of the safety instruction, if it is practical, will vary with the objectives of the training in the trade. Training electrical workers for house wiring will have a different safety content than that involved in training electrical workers for factory maintenance or electrical railway maintenance workers.

The only practical type of safety education for school shops is that which is based upon an analysis of the various trades for which shop instruction is given to determine the objectives of the shop training and to further determine the safety requirements of each job in each trade in the program. Much has been done in analyzing jobs during the past fifteen years. Almost every vocational teacher training course has devoted considerable time to job analysis. Trade organizations have made job analysis in the development of courses of study and the preparation of instructional material. The Federal Board for Vocational Education has prepared a considerable number of bulletins for various trades, each of which contains a job analysis of the trade. We have available, therefore, a considerable amount of very excellent material in which the safety requirements for each job are outlined in detail to serve as a basis for a safety program of a practical character.

Too much stress cannot be placed upon the importance of clearly defining the objectives of the trade training program. We must know what we are trying to accomplish in our shop training. If the major objective is to prepare pupils to enter a specific trade, then we must set up training situations which approximate as closely as possible those which will be experienced in the trade. If the training is based upon cooperation between the school and industry, the problems of industry as they are experienced in the pupils' training must be duplicated as far as possible during the training in the school. At its best, the school shop is only a poor substitute for the shops in industry. In many instances even where there could be more industrial environment there is too much school atmosphere and artificial situations. Practical safety instruction cannot be carried out under conditions of this kind. In some instances the school shop does not approximate the conditions found in the industry because the teacher lacks sufficient trade contact to maintain industrial conditions. This may be due to his selection as a teacher because of high academic standing and limited trade contact, but in some instances it is due to the teacher's failing to retain contact with his trade and to keep abreast of trade developments. In cases of this kind the teacher becomes more academic each year and creates shop situations which he can more readily develop and control.

Practical safety education to a great extent will depend upon the development of right work habits and trade judgment. We cannot expect satisfactory results in safety by setting up a series of "Do's" or "Don't's" and expect them to carry over when the pupil meets an industrial situation that differs from the one he experienced in the school shop. The development of right work habits and judgment also is dependent upon shop situations which approximate industrial situations. In an electrical department in which boys were being trained for factory maintenance work the teacher placed a rail around the front of the switchboard, completely enclosing it, and posted a sign, "Danger—No pupils allowed near this board." This switchboard was a modern installation exactly similar to that which the pupil would find in industry. It was equipped with the same protective devices and, since it was a low voltage board, the dangers were not very great.

This teacher changed a real situation into an artificial one; he evaded his responsibility in this instance; he prevented the pupils from facing an industrial situation and he retarded the development of necessary trade judgment. The pupils were not given an opportunity to develop good work habits which would be an asset on the job or to develop poor work habits which could be corrected by school training. They were given a great amount of technical content—a greater amount than the job would require—but they were sent out to the job without any training that would enable them to work about or operate an industrial switchboard safely and intelligently. Here was a training job that was left to industry and which could have been done in the school.

This is only one example of a teacher's failure to maintain an industrial situation for which he has a responsibility for training. It is common to see signs in school shops: "Pupils not allowed to use this grinder", "Pupils not allowed to start this machine", and many other such prohibitions which only serve to relieve the teacher of certain responsibilities for safety and to keep the pupils from situations which they will eventually have to face.

The development of work habits in the school shop is quite as important as the development of trade skill or technical knowledge. These work habits should be good work habits and in this respect the teacher must teach by example rather than precept. If pupils are being trained to use machine guards, the teacher cannot take them off the machine when he is operating and expect that the pupils will use them when they are carrying out the operation on the same machine. The pupils like to take the same chances as the teacher does; the more regard they have for his ability the more likely they are to establish patterns that are similar to his.

This taking of a chance, as the teacher does, was responsible, to some extent, for the discharge of three recent trade and industrial school graduates from an industry in which gasoline under pressure is used for cleaning. The department was liberally posted with "No Smoking" signs, and the Department of Labor regulations regarding smoking in industrial establishments were prominently displayed; the boys took a chance and were discovered. When these boys attended the vocational school the teacher, whom they greatly admired, took similar chances in obtaining his morning and afternoon smoke in violation of state school laws regarding smoking in school buildings.

A practical safety program in the school shops should give considerable attention to the occupational diseases of the industry in which these pupils are to be employed. Some occupational diseases, while slow in their action, are just as deadly in their results as the more rapid accident on the machine. It is more important to give attention to this matter today than it was five or ten years ago. Each year more and more occupational diseases are made compensable by states having workmen's compensation laws. This is because of the rapid changes in industry and the development of new materials and processes in industry.

Instruction in modern processes, as far as is possible, should be included in an industrial training program, particularly that which gives trade extension training. Instruction should be given on the prevention of the occupational diseases which may accompany these processes. The pupils in some of the trades in which instruction is now being given in all-day vocational schools will develop the occupational diseases of these trades if proper precautions are not observed within the schools. Sufficient information is available on most diseases developed in industry for the school to establish a preventive program. In most instances proper working conditions and instruction in personal hygiene will do much to develop such work habits as will permit instruction to be given in such trades with little likelihood of the pupils' being affected.

Lead poisoning is perhaps the most common occupational disease. It develops in workers in the plumbing and painting industries and in more than one hundred other occupations which use lead in some form. Its development can be traced to improper ventilation and to personal habits of the workers by which lead enters the system through the respiratory organs and the alimentary canal. Unless the safety program of the school gives attention to personal hygiene in trades in which lead is used and establishes adequate working conditions in the shop, the pupils may absorb sufficient lead into their systems during their training period in the shops to give them an acute case of lead poisoning soon after entering the industry. Pupils who absorb lead into the system while in the school shops may find it difficult to obtain employment in industries where physical examinations are given to job applicants. The use of tetra ethyl lead and benzol in automobile fuels will cause poisoning to the systems of automobile shops if this material is used for cleaning. Benzol is used also in paints and varnishes and produces poisoning of a very dangerous type. The use of tetra ethyl lead and benzol in motor fuels is a development of the past five years. Previous to this time the automobile shops did not have to give attention to this phase of their safety instruction.

A practical safety program for any shop will not remain static. It will be changed and modified to meet the new industrial developments of machines and materials. The shops should be set up as models for the industries for which they offer training. The machine guards should not be makeshift affairs but should meet the standards set up by state departments of labor or insurance organizations. The shops should be as regularly inspected by state factory inspectors as are similar shops in industry and the recommendations for improvement carried out.

The system of cleanliness and order, light and ventilation, should be as good as that found in modern industries. One school has installed a transformer vault that was designed to incorporate all the modern principles found in safe electrical construction. This vault is regarded as a model by the public utility corporation and is inspected by engineers from other industrial organizations when similar vaults are to be built in industrial plants. This school has done a very practical piece of safety education in the electrical field.

Modern industry is giving attention to the adjustment of workers who are emotionally unstable. This is done to increase production and to eliminate accidents, since it has been found that emotionally unstable workers are direct causes of accidents. A New York department store recently conducted tests with their truck drivers and found that 50 per cent of such drivers were unable to adjust themselves to abnormal road conditions. A further study of the accident records of this group showed that they were the ones most frequently involved in street and road accidents.

The schools should keep abreast of industry in this study of human behavior, and a practical safety program in the school shops should give considerable to the effect of emotions on the job and the proper placement of pupils on jobs for which they are emotionally fitted. Even the pupils who are emotionally stable will find it somewhat difficult to adjust themselves to industrial conditions when they leave school. This adjustment period will be long or short, easy or difficult depending upon the relationship of school training to industrial situations and the suitability of the worker for the job for which he has been trained. Industrial statistics show that a large per cent of industrial accidents occur during the first week of employment. No doubt most of these accidents are due to certain difficulties which new workers experience in making their adjustments. Some trade and industrial schools have recognized this problem and have a staff member visit the industries in which the graduates have been placed to assist them in finding themselves in their new environment. Careful case records have been made of adjustment problems and in every instance it was a human relationship problem and not one of trade skill or technical knowledge.

No practical safety program will be complete unless it includes some provision for adequate first aid instruction and treatment of the pupils. The objectives of such training should be to develop some skill in applying first aid treatment in cases of industrial accidents and to develop an appreciation of the need for treatment of minor injuries that are likely to result in infections.

Perhaps many of you have expected in this paper a practical safety program that you could carry away with you and use in your own shops. Instead, attention has been directed to certain procedures which should be followed in the development of a practical safety program for school shops. These procedures, summarized, are as follows:

1. A study should be made of each job in each trade to determine the safety requirements of the job.
2. The creation of shop conditions that will approximate those found in modern industrial plants.
3. The development of good work habits and trade judgment on situations of a practical character.
4. Setting up working conditions and training that will prevent the development of occupational diseases.
5. Keeping safety programs up to date to meet changing conditions in industry.
6. Making provision for the easy adjustment of the pupil when he enters industry.
7. Maintaining such standards of safety in the school shops as will make them a model for the industries of the community.
8. Making provisions for adequate first aid instruction and treatment.

GORDON C. GRAHAM (Detroit, Mich.): I was much impressed by the talk Mr. Lye gave, as it brought home to me what has been to safety engineers more or less an old story in safety work; that is the fact that in any organization where safety is being promulgated you cannot, to use the slang expression, get to first base unless you have the sincere and earnest desire on the part of the executives who are at the top to put the safety story completely through the organization.

Safety begins at the top in any industrial organization; if the chief executives of that group are not thoroughly, actively sold you cannot hope for any record in the shop.

Mr. Lye simply pointed out one of the many stories we constantly hear of successful safety programs being brought about in this manner. No amount of posters, booklets, pamphlets used in a factory or shop are indicative of the success of the safety movement; they go along with the spirit coming from the top. I think this is equally true of our work in the shops.

We in Detroit, our superintendents, have taken hold of this matter in an active way, not just encouraging it. The biggest obstacle we have had to overcome in the shops in Detroit has been the inability of the instructors to realize the real objective of our school shops safety movement. They seemed to feel, off-hand, "Well, we don't have any accidents in the school shops; we are doing a pretty good job because we don't have any accidents."

They didn't take any particular interest in this safety work that was being handed down to them from this executive group until we pointed out that their job was the prevention of accidents in industry in years to come, that they were preparing students in accident prevention as well as in manipulative ability. At that point we began to get real action in our safety program.

Likewise, so much has been heard about teaching the students accident prevention and very little was said about the necessity of doing the same thing for the instructors. Safety is a comparatively recent development. We cannot hope to have the teachers teach safety, if they have no knowledge of the actual motive behind it, as well as the operation necessary to put it across.

So we think, in Detroit particularly, it is necessary to provide a vast amount of

material to the instructors so that they can become interested in accident prevention work, and turn their knowledge over to their students in turn. The instructor is apt to devote little time to it if you say you want him to teach it; it is apt to get no further. In this connection, I think this should be brought out; the instructors have got to be interested. We have got to instruct the instructors, if you please, in order that the students may be instructed.

DR. FRANK M. LEAVITT (Associate Supt. of Schools for Vocational Education, Pittsburgh): I am glad to see that Mr. McCarthy has come in. I want to reverse the usual procedure in a meeting of this sort, where a man reads his paper and the audience asks him questions. I want to ask the audience some questions. I took this doctor's thesis of Dr. Henig to which I referred, which was published by the National Bureau of Casualty and Surety Underwriters in New York. I found he based his whole procedure of a safety program on modification of the curriculum, giving instruction in the class room and not in the shop, not by the shop instructor. Therefore in my discussion of a hypothetical question I conceived a program where we would have the shop instructors doing what they could do, and I thought very likely this program Dr. Henig had worked out at the Essex County Vocational School for Boys at West Orange, N. J., might make some contribution too.

I was going to ask whether anybody in the audience had had any experience with the sort of safety program worked out in this thesis? I don't think Mr. McCarthy said quite this, but something like it, that the only people who could make boys safe were the instructors; but I thought there might be some elements of a safety program handled in the class room, perhaps better there.

I would hate to have my shop, if I were an instructor, cluttered up with pictures; I would want the boys to be looking at the thing they were doing. I want to get something useful out of this, I want us to get something that we can carry back to our schools and have better safety programs than before.

I want to hear from anybody who knows whether you can help a safety program by having lectures in the class room.

CHAIRMAN DENNIS: Mr. McCarthy knows about these things; probably, though his paper has been read, he would like to put his own personality into the presentation given for him so well by Mr. Miller.

JOHN A. MCCARTHY (State Supervisor of Industrial Education, Trenton, N. J.): Dr. Leavitt mentioned the lecture method of teaching safety. There were some statements in my paper regarding the development of safety through habit. I have not much regard for the lecture method, particularly with youngsters; I do not think they can carry any amount of the things we impart by the lecture method to the industrial system he is going to face. He cannot remember; if he is operating a lathe he is going to be too preoccupied trying to develop the skill he will have to have.

I think some information on safety of a general kind can be given in the class room, but it cannot be done entirely that way. It is a matter of safety habits. We don't learn to drive automobiles in lectures and expect to carry them over into abnormal road conditions. Some of the schools in New Jersey do carry out their programs on the lecture basis, but of course we cannot agree with all the practices. Some of the doctors' degrees are got by writing about things on which little is known. Dr. Henig is one of our teachers, but he covers a number of subjects besides safety. He teaches civics, English and non-vocational subjects which can be better taught in the class room.

I do not agree with all the opinions held about education; I don't agree with the class room teaching of safety.

Some time ago there was an article written in one of the Industrial Arts magazines, in which it was said that applying the intelligence test to this was causing conflict with shop teachers; there was merely confusion between the application of the Stenquist picture test, while the teacher was thinking of mechanical performance.

In my opinion, you have got to create a shop atmosphere; I agree with the gentlemen who said you have to keep your teachers informed; we are constantly trying to keep our teachers abreast of the developments in industry; it is a hard job.

I had an experience with a shop evening class. I picked out the finest bricklayers I knew of because of their standing and ability at their trade. I went in one night, and found each boy had a drawing board and drawing instruments. You can imagine the hard time they were having handling them. I asked if that was the way they laid out the work on the job. The instructor took out a piece of chalk and drew an outline. He forgot this when he was teaching, trying to become a professor using a set of artificial instruments.

DR. LEAVITT: Out of my four points the first was that safety was pretty largely habit formation which had to be inculcated in the shop by the teacher. So you see, we agree; I just wanted to see if there was anything good in this other thing. I learned a lot. Thank you!

MR. CAMPBELL (Parish Schools, Pittsburgh, Pa.): I like Dr. Leavitt's challenge that we should carry home something practical. I think too many figures are used; I think we have very unmanageable figures here in Pittsburgh; after becoming enthused over saving lives of children, we found the fatalities had increased about sixty per cent during the period. That is one of those unmanageable facts which you cannot get around. We thought we were going at the work in an intelligent way. In the previous year we had had twenty-four fatalities of children on the streets; and in the year in which we were all enthused about safety work, we had forty-one.

I was reading an article the other day about health which we attack in somewhat the same manner as safety. There was a very strong recommendation that every child, speaking of the junior high school age, has the urge for self-expression and should be given an opportunity to satisfy this. The habits of study can be given to all children naturally, not artificially, by creating situations; but we cannot create all situations in modern life. The children going out from the schools and shops meet situations in life which they never met before. The child is going to meet situations we never met; a great part of the work of teachers is to create not so much proper habits, though that is important, as to create proper attitudes in the minds of young students toward life, safety, thrift, health, and if this is done in relation with other subjects it can be very well done from analyzing situations in a psychological manner.

This is practical, that we should give these students in the lower grades where the situations cannot be created, the proper attitude by instruction, and give him the opportunity to satisfy his urge for self-expression.

CHAIRMAN DENNIS: Thank you. Mr. Sherrard touched upon those points yesterday. I think perhaps Dr. Whitney would say something.

DR. G. D. WHITNEY (University of Pittsburgh): The safety program from the standpoint of the school ought to and does interest me particularly. The philosophy behind the whole thing in the teacher's mind is something like this: the school is one agency for making a contribution to the social life of the people; it is but one agency; the home, the church, the newspapers and many others are working along with it; it is probable that the school has certain things to do and takes on a residual function laid down by these other agencies. But do not think that the shop teacher takes safety for granted because it is so much a part of our everyday affairs. Safety is like other things, like language, for instance; the shop teacher does not think it is his job to solve this particular problem. I think that probably accounts for his attitude.

We have done this in our training classes for industrial teachers, organized separate classes, trying to bring the teachers to the realization that this is part of their job, and we have tried to develop proper effective means of getting this into their practice.

I was head of a group of teachers in a school and one day the print shop teacher sent for me in haste; I found a boy had cut his thumb off, or lost the thumb. The

teacher was operating the press for cutting paper and brought the lever down and it didn't quite cut, and he brought it down again. This youngster reached through from the other side to get some of the cuttings. *I had to take that boy home* and explain to his parents. I think it would be good for every teacher to have this experience.

I once heard of a teacher in a school shop being taken into court because a boy had injured himself in the shop. This was the sort of thing he met with: the lawyer asked him among other things, if he had a record of the days and hours he had given the instruction; the teacher said he had such a record. The lawyer said to produce it in court.

Now anyone who takes safety for granted and who is faced with the possibility of having to produce evidence like that, surely ought to be alive to his responsibility, moral as well as legal, for attending to these matters.

So the college professor has to say this morning that we are trying to cope with this situation, making the shop teachers come to us, trying to give them ways for accomplishing this.

ADJOURNMENT

Home Safety

Friday Morning Session
October 3, 1930

DR. R. M. LITTLE, Chairman
Bureau of Rehabilitation, New York State Department of Education, Albany, N. Y.

The meeting of the Home Safety Section of the Nineteenth Annual Safety Congress convened with Dr. R. M. Little, Bureau of Rehabilitation, New York State Department of Education, Albany, New York, presiding.

CHAIRMAN LITTLE: I shall take a few moments to speak of the importance of home safety in the general safety movement of our country. It seems to me that it is first on the program, because life begins in the home and usually ends in the home, and while we continually go out of our homes and travel afar, we always like to go back home. It is not only the first of our human institutions, but I presume we all believe it is the best, and certainly it is the most influential in the forming of habits of conduct.

I have observed for nearly twenty years that the stress in education for safety has been upon safe habits and safe practices, and if safe habits and safe practices are the secret for a safe, and well disciplined, and well preserved life, quite surely the place to exert the largest influence in the formative period of life, would be in the home. It should be more influential than the school and a great deal more influential than industry. Indeed, the school, and industry, and commerce, and the community get the finest things they have quite largely from the home. Therefore, the subject which we have for consideration this morning is fundamental to the whole subject of safety in life.

The first speech is to be upon the subject, "Training Little Children in Safe Habits," by Dr. Ada Hart Arlitt.

Training Little Children in Safe Habits

By DR. ADA HART ARLITT
Professor of Child Care and Training, University of Cincinnati, and Chairman, Committee on Parental Education, National Congress of Parents and Teachers

I submit the proposition that training in safety education is exactly the same sort of training, as an educative process, as training in the English language, or training in politeness, or training in any other thing which you wish to have your child do; that it is nothing new, nothing strange or startling, and I make that point advisedly.

Perhaps the best way to make the point clear is by means of an illustration. The

question that we get most from our parents in connection with safety education is, how can I train my child to cross the street?

You could approach that in three different ways, two bad and one good. In the first place, you could tell him how perfectly terrible it could be if he crossed the street without looking from side to side, and what perfectly awful things happen to children who do that. And that would be, let's say, wrong. Or you could sit down and tell him about how to cross the street, and where it is safe, and that also might not be quite so good. Or you could take him with you when you cross the street, beginning at the time he is about two and can walk, and let him show you how he can look for things in both directions, and give you the signal to start when it is safe, and all the time you being with him and taking the responsibilty for his acts, so that you know when he is wrong, and so that you can check him on it. Having practiced with him from the time he is two to the time he is six, gradually giving him more and more responsibility, and finally letting him do it with you standing on the curb to check him even then, you would find you had him trained in how to cross the street safely.

That is true of all safety education. Suppose we see what might happen if we trained him in either of the other two ways. You know and I know that if we sit down and tell a child about a thing, he doesn't get very much out of it unless he has had a lot of experience. For example, I could say to you, please give me a nice description of a rhinoceros sondaicus, and I am quite certain that unless you are a naturalist the description would be quite odd.

Now, when you train the child in safety education by sitting down and telling him these things with which he has had no experience, he is in exactly the same position you are in the description of your rhinoceros sondaicus. He gets the wrong idea if he gets any at all, and he forgets it just as rapidly as you will forget that scientific term I just used.

What about the second of those methods, making him scared to death so he will be careful? Let me tell you of two interesting experiences we have had lately. A mother came into our office, and she said she just couldn't get her child to cross the street without a good deal of upset, that he cried and she had to drag him across, and what was the matter.

We said, "What was your first approach to getting him to cross the street?"

She said, "He is my only child, and I took him to the street corner where an automobile had run over a cat, and I said, 'John, look at that cat. If an automobile catches up with you, that is what you are going to look like.'"

I don't believe that only applies to two and three-year olds. Not so long ago in a western city they put up twelve crosses where there had been a terrific accident at a bridge crossing, from large to small, indicating the size of the people I suppose. The men who crossed that particular bridge wrote in violently because they said when they came to those crosses their cars swerved dangerously. They were so afraid they couldn't control their cars. Those were the nervous drivers, of course. I have no doubt there were careless drivers that passed them perfectly calm. So instead of keeping the crosses up, they put in red reflectors with the word "Caution."

One more illustration. I have found, in going by a certain schoolhouse that I have to put my car in second and go by that way, because if I toot the horn the children are paralyzed and won't move. Instead of getting out of the way, they stand perfectly still in the middle of the street and shake; so that I am pretty careful not to blow the horn for fear of an accident, they being made so afraid they can't get out of the way.

That is all in connection with that simple little situation of crossing the street.

How do you expect your child to know how to be safe unless he has had some practice in it? Let's use the third method. Let's take him to the street corner and let him have the practice. I might say that I have never seen a person become a professional golfer, without practice. That is no more complicated than all of the things involved in safety education is for the child.

We have an old maxim, that one of my friends here will remember from her kindergarten training: There is no impression without expression. You don't learn to do a thing until you have had a chance to do it, and that is just as true in safety education as it is in learning to read or learning to speak. Make your child cautious but not afraid.

If any of you have ever had the experience of driving with a cautious driver, you haven't had a very great number of shocks, but how many of you have ever driven with a fearful driver, one who was scared to death? I'll warrant you, you were pretty glad when you got out of that car. And it is so when you set up those experiences anywhere along the line in this training process.

Were you ever afraid you were going to run into a post, and you looked at it so awfully hard you did run into it? I wonder if you were ever afraid you were going to say something to a person, and you watched yourself to see that you didn't. If you do that enough, I'll guarantee you'll say it to that person. It not only puts you at a disadvantage; it may actually make you do the thing you are afraid you will do. On the other hand the child must be cautious.

A doctor friend of mine was driving down a hill, when a little boy shot out in front of his car in his little wooden wagon. My friend put on his brakes and luckily stopped his car. The little boy stopped the wagon in front of the car, and my doctor friend got out to tell him what he thought of him, and he stood over this seven-year old and he told him all about it. All the response he got was, "You go to blazes. Why can't I coast here? Mine's as good a car as yours, and it needs cranking."

That child, I submit, needed to be made cautious and he needed it rapidly and accurately. So that I am not saying, do not make the child cautious, but just don't scare him.

Take the responsibility with your child, whatever you are making him cautious about. Don't turn too much responsibility over to him until he has learned how to take it. You and I know from the mental hygiene workers of this country, that one of the worst things to do is to put so much responsibility on the person he becomes insecure. So give him practice with you there and show him how to do it.

Now, the question that is going to come up is, shall I ever punish my child so that he won't do things that are dangerous? I didn't say anything about that because I think you can punish a child without making him afraid. I think you may sometimes have to do that to make him, or help him to remember not to do that thing again. It is possible you may if a thing is dangerous and he doesn't seem to learn quickly enough; but let me ask you, if you do that, to keep in mind one or two other principles of learning: That the more exciting you make that thing that you punish the child for, the more sure he is to do it, and I know that one of the greatest rewards in early childhood—and I am not so sure it isn't so true of other people—is to be the center of attention and the cause of excitement.

So if you make that child think it is the most exciting thing in the world to do, it will be like my friend John who is four years old. I met him the other day, and he said, "Gee, this is good fun."

I said, "Well, what is the riot?" I heard his mother boiling over.

He said, "She thinks I've a lighted match, and I haven't anything but a stick."

You and I both know what would happen in that case. He got such a show out of it, he was willing to take a spanking, and he did get a spanking too, just to get that show pulled off. So please don't make it so exciting that he is bound to do it.

There are other things that you are going to ask I know, such as, shall I ever make my child obey me so very quickly he won't get in danger?

The other day I was in an outlying rural district, and the leading light in the district met me with this question: What would you do in this case? Here we have

two boys. This one obeys and this one doesn't. There is a train coming, and the mother speaks to this one and he gets out of the way of the train, and the other boy hasn't learned to obey.

That was all right. It hadn't happened. It was just a stock situation, but I submit that the second boy should have been taught obedience, and he should have been trained to know when it was an emergency.

We use what we call an emergency tone to the little children in the nursery school, and we have seen it used with a great deal of success with children in the home. You can say to a child something like this: When you come in to me, and I am awfully busy, and you ask for something, I say, "Wait a minute," and when I clear up some of the work, I do it; but if you come into me with your finger cut, that is an emergency and I drop everything and take care of it.

Now there are emergencies for mother and father. When you hear this tone, you must obey right away and then you can give him a little practice in the tone.

I have a young friend who used to go into the next room, and say to his mother, "Try out the emergency tone, mother, and see if I know it."

But once you have developed your child's response to that emergency tone, it is not an awfully good thing to use it too much, because after one of my friends had trained her child as to the use of the emergency tone, she then used it to show the baby off when her friends came to the house, and it wasn't long before the emergency tone stopped.

You are *giving your* child enough technique so that he knows what to do, and when and how to do it all the way along, whether it is in crossing the street, avoiding matches, or any of these other things, teaching him what to do in that situation, so that he not only will be safe but he will feel safe while he is being safe. Civilization is so full of shocks anyhow, that what you are trying to do is to diminish them not increase them, and I submit that merely making the child afraid does not protect him, but on the other hand it puts him in a more dangerous position; that what you are trying to do with your child in the home, at any point, [illegible] place, is to make him feel safe because he knows how to be safe.

CHAIRMAN LITTLE: Perhaps some one wishes to ask Dr. Arlitt a question.

J. F. H. WYSE (Canadian National Safety League, Toronto, Canada): I would like to ask Dr. Arlitt to let me know what, in her opinion, is the best way of reaching the mothers in the home. Is there any better way than a letter to those parents, which we send out every year, and through that letter try to reach the homes in the entire province?

DR. ARLITT: You can reach them by your system, which is an excellent one, but you can also reach them by pre-school study groups which are a common unit in parent-teacher associations, and in all parent educational programs. You can also run short articles in your newspapers. Material and brief articles on the woman's page, and the like, will help.

MISS MARIAN L. TELFORD (Field Secretary, Educational Division, National Safety Council): Not long ago I faced some six or eight hundred elementary school children who had been discussing the dangers of riding bicycles in traffic, and a little boy, probably in the sixth grade, stood up in the center of the group, and this is what he said, "I ride my bicycle down town in heavy traffic just to get a thrill out of it," and then with a toss of his head, "What are you going to do about it?"

Here is a boy facing you before 600 or 800 children. What are you going to do?

DR. ARLITT: I am going to give you a mean answer to that. You must change his attitude. You will have to show him that there are other things that are more daring and more interesting than that. And if you got that question in the middle of a speech you would have to be an awfully quick thinker.

A great many people feel that when they are doing the thing that is forbidden, they are being awfully smart and daring. There are a great many adults who even

encourage in the child that kind of showing off. The very fact that he got up and tossed his head, with that "What are you going to do about it?" manner, shows that he knew he was going to cause trouble; he got the center of attention by doing that.

You will have to give him something else exciting, and you can do that very often by getting him into a Boy Scout troop in which the leader plays with that spirit of adventure.

CHAIRMAN LITTLE: It is just as adventurous to be safe as it is to be unsafe. Why won't stories about Lindbergh, about Admiral Byrd, and about Coste, and these successful aviators and explorers, appeal to the imagination, in a positive way, of the boy who likes the thrill? I had a thrill the other day watching Coste take off. I could imagine why he could cross the Atlantic Ocean, and why he could fly to all the countries of the world. The positive and safe thing also has its satisfaction to the inner nature and gives a thrill quite as well as reckless deeds.

A. W. WHITNEY (National Bureau of Casualty & Surety Underwriters, New York City): I would like to add just one thing; I think there is no thrill in danger particularly, except in doing things successfully. If you do things unsuccessfully, there is certainly no kick in it and so I think that is really the key to the situation.

Safety is something that you exercise in order that you may do the particular thing that you want to do and do it successfully.

MRS. JAMES N. DOWNEY (Director Women's Activities, Police Department, Detroit, Mich.): I want to tell you of the reaction of a child to the sensible safety teaching of one of the mothers in Detroit. On the 22nd day of February her little six-year old daughter attended a program at the school, and when she returned home, her mother said to her, "How did you like the program?"

And she said, "Why, it was very nice, mother, but you know I don't think much of George Washington."

Her mother said, "Why, what do you mean by telling me that?"

She said, "He was standing up in a boat."

I believe that shows if mothers will give their instructions in the proper way, it is sure to have an effect.

DR. ARLITT: Just so Mr. Whitney will know; when I said, "Train them in technique so they will know how to do the thing and do it properly," I meant just exactly that. There is just as much thrill in crossing the street the right way as there is in dashing madly across, and arriving breathless on the other side, safe. One gives you a sense of power, and the other leaves you more or less panting, and breathless, and with the wrong kind of a thrill.

If you train your child how to do the thing, the way to do it, he gets fun out of doing it well, and that, I think, is exactly the point that Professor Whitney was making. I agree with him entirely. What you want to do is to know how to be safe in order to be able to face new dangers, or something that is more dangerous.

MR. E. T. CHAMBERLAIN (State Safety Chairman, Pennsylvania Congress of Parents and Teachers, Erie, Pa.): In starting our study classes, we have the parent-teachers taking it from the pre-school right up through to the high school, and we have a correlated program. Is that a good idea?

DR. ARLITT: In intergraded study groups you get your best results if it is a co-ordinated program that takes your child through two or three phases. I doubt, however, if any parent group should continue studying parent education for the entire school life of the child. That makes, you see, twelve years of parent education.

MR. CHAMBERLAIN: We are dividing the groups. All the mothers of children of pre-school age are studying at the same time the same program, and the same is true of the mothers of children in the grades. They aren't in the one group all the time.

A. F. TYRA (American Carbolite Co., Duluth, Minn.): I would like to ask what

effect, if any, has the training in industrial plants had on safety in the home. Has there been any reaction that has been noticed?

DR. ARLITT: I wish I could answer that question. I don't know at all and I do not know of any study that has been made. It is an excellent study for research, because you can follow into the homes of those particular workers and compare them with the homes of the same type of people who haven't had that training in the plants.

We human beings are interesting. We do not transfer much. You train a student in physiology of the nervous system and you put him into a class on anatomy of the nervous system and he doesn't know the two things are the same.

You train your child to be polite at home, and unless you transfer it yourself you will find him doing all the things you never expected him to do at all when you take him out. It doesn't transfer unless you make that transfer, unless you say, "When you go to Mrs. So and So's I want you to do all the things you do at home."

Mothers have had that experience just as teachers in colleges have had it. There is one reason for all of these orientation courses and integrating courses in the colleges, to get the transfer from one subject to another. You may study economics or sociology for four years and never get from one to the other in your life time. That applies to the man in the plant, and it also applies to John doing the things you want him to do.

CHAIRMAN LITTLE: The next subject is, "The National Bureau's Study of Home Accidents," by Miss Gertrude Zurrer, a Fellow in Home Safety, at the University of Chicago.

The National Bureau's Study of Home Accidents

By MISS GERTRUDE ZURRER
Fellow in Home Safety, University of Chicago

I welcome the opportunity to discuss my study in home safety for two special reasons. First, I expect to get a lot of help from the audience. Secondly, if I can talk about it, perhaps I will know a little more when I get through. I know very little about it.

When I was looking through statistics and figures to find out what had been done to combat this tremendous figure of home accidents, I found that there was very, very little being done, and I was interested to hear this morning that although surely everything Dr. Arlitt said could be used in home safety, nevertheless there were hardly any examples brought up that actually referred to home accidents.

I don't think they have been studied to any great extent. I know that some of the groups of parent-teacher associations and women's clubs have given it some study, but it has not been done as fundamentally as, for instance, studies have been made in traffic or in industrial accidents. And I think that until we have made this study, we cannot outline a really positive preventive program.

May I just draw a parallel between what figures we have on home accidents compared with the figures we have on, perhaps, traffic accidents, to substantiate my statement that practically nothing has been done as regards home accidents?

Domestic accidents are classified as falls, and burns, and asphyxiation, poisons, and minor cuts and scratches.

Of course, many burns may be caused by falls, because we hear very much about children falling into things, and we get a burn and the burn is recorded, whereas it really was also a fall. Those are details that I don't think it is worthwhile to spend the time on, because we want to prevent both that burn and that fall, and there is no use arguing about which it was.

Information like that would be equal to information on traffic accidents and collisions, collision of one vehicle with another, collisions with fixed objects. That kind of information never brought about a change in the traffic problem because it was evident that two cars collided, but why they collided was the question. Was it a poor view of the road, some trees or hedges that obstructed the view, or was the driver in no condition to drive, or was it a poor car? That is the information that you want if you want to prevent traffic accidents. The same holds true in home accidents. It is not enough that I know people fall down; I must find out exactly why.

After all we are just speculating on slippery floors and rugs. We say, "Yes so and so many people do fall because of those things," but we really don't know. I don't think there are any figures that really indicate the trend of these things properly.

Then comes another factor that has also not entered into studies of home accidents. Studies were made of hazards in industry and it was learned that the men would have to wear goggles to protect their eyes. Then arose the very big question, which perhaps hadn't been thought of at all, "How can you make men wear goggles?"

This is just as important as the fact that people do hurt their eyes working at certain types of trades. And in home accidents it is just as important to learn about that personal factor too. I would like to show you that that intensive study of details seems to be indicated in this field of home accidents.

Such basic material is necessary for the construction of a preventive program, and since it doesn't exist I think the study is entirely justified. You have certain outlines of safety teaching in school, and I know they contain quite a bit of information on home accidents, but they don't give very specific instructions, and that is what we need.

The study should yield material to be used in formal teaching in your women's clubs where a certain group comes for information.

Then the third kind of teaching which I think is especially indicated in this field, and which has not been tried is home teaching. If you have a group of women in a club, you already have a select group. They have shown interest in what you are going to give them; otherwise they wouldn't come. But we all know where perhaps most accidents happen. (That is just it—perhaps; we have no figures to show.) It is where the woman must leave her children and go to the factory, or where she has a very large family, or where she is a foreigner. These women do not go to the clubs.

I think that sort of teaching can be carried out by social workers, among whom I like to list visiting nurses who have until now not taken advantage of this opportunity to teach safety. I think it is a wonderful opportunity, because no one has a better entrance into the home than a nurse, who brings a message in health and who is right there.

I haven't many ways and means for my study, and perhaps the least I say about it the better. I will have access to the records of the Visiting Nurses' Association of Chicago, because I will do the study there under the direction of Chicago University: and I shall take their cases, perhaps as they are reported, and try to get their detailed material that I have outlined.

It may be possible to get a spot map of certain districts of cities, which I hear has already been done, although perhaps we can imagine which parts of a town have more accidents than other parts. On the other hand, if we could possibly count exposures it would be very helpful. We really don't know if poor children have more accidents than children of the better homes, and they are forever exposed to so many dangers. We really don't know that.

Important material that I don't know how to gather are facts on very minor accidents. Nevertheless it was just by mere chance that they weren't very serious accidents. Falling objects are really dangerous. It may be something that I hardly

feel when it falls on my foot, or it may break my foot. It falls down and that is what we want to prevent.

Then finer questions such as fatigue in the home will enter a great deal into this question of home accidents, and something that I really should have mentioned first of all is this question of home management. I would like to get material on this, because it seems to me, as it seems to many other people that efficient home management is safe management. Safe management may not always be efficient when it comes to home management, but the other way around it is certain to work. An efficient house is a safe house, and we have to find out just how efficiently these households are run, and possibly how we may see to it that they are run more efficiently.

Another piece of information which will be valuable but is even less available is the answer to the question, why do certain households have things happen and others don't. You, yourselves, know of families that always seem to have things happen to them. Their children are always getting hurt, and their grownups are always getting into trouble. And another family, living perhaps in the same house and the head of which is working in the same mill seems to be spared.

I think it is an insult to God to think He sends all these things to us. We know that He does not punish one family and not the other; therefore, there must be another reason, and we may get at it, although I confess that I don't know how.

I haven't anything else to say, but I hope very much that you will assist me in gathering this material. There is the big question of getting material from rural communities. The rural home is just as important, if not more so, than the city home and I have not been able to outline a program as to how to get that material satisfactorily, and since I have no questionnaire, I cannot today say exactly what I want, but I do hope that I will be able to include the rural home. Many governmental agencies, such as the extension service of the Department of Agriculture, get the rural home but I am sorry to say that they are not very conscious of this factor of home accidents.

I was astonished to learn that teaching does not include the most elementary lesson in safety. I found certain publications, and it astonished me very much, indeed, to learn that anyone today advertises, for instance, the use of gasoline in homes for cleaning rugs and such things.

I would like to point out in my study that safety itself is not an end, just as health is not. To be safe so you can do things, and to be healthy so you can do things are what I will put more than anything else in my study; that to do things safely is the only way to do them if you want to do them at all. Life should be used, not hoarded, but neither should it be wasted through unintelligence.

CHAIRMAN LITTLE: I think it is exceedingly fortunate that Miss Zurrer is to make this comprehensive study, following out the various leads which she has suggested and others, and when she brings her report to a subsequent meeting, we will have a great many more definite facts than we have this morning. This subject is open for discussion.

A. W. WHITNEY (National Bureau of Casualty & Surety Underwriters, New York City): May I say a little more about the background of this study? The study is to be made at the University of Chicago, under Miss Edith Abbot, head of the sociology department. The subject specifically is the correlation between home safety and good home management.

The thing that led to that was this: When the industrial safety movement was begun, it was supposed that industrial safety would have to be gotten at the price of efficiency; that when people wore goggles, and when the operators stopped to be careful, it would slow things down. As a matter of fact, exactly the opposite has been proved to be the case. The safe factory has turned out to be the efficient factory, and the efficient factory is the safe factory.

In the beginning safety was sold to executives on the ground of humanity and on the ground of the direct saving they could make. Today safety is being sold to executives on the ground that they can't afford to have the kind of a factory that has accidents; not that they can't afford to have accidents, but you see the difference.

So the question is this, won't we find that the home that is safe is also the home that is efficient, and charming, and well managed, and happy?

R. M. SHERRARD (Associate Superintendent, Pittsburgh Public Schools): It seems to me that the public schools of this country can be of very, very great assistance in a study of this kind. We have, in our safety work, city maps in all our schools, and whenever there is a street accident that concerns the immediate community of the school, there is a mark made on the map, and there is a discussion about that center or about that intersection. Is that a bad place? Could it be avoided? Is there anything we can do to make it better?

It seems to me all schools, because they reach so many homes, ought to be able to collect and keep for reference, every accident that happens, that causes a loss of time to school children. That is exactly part of the study that Miss Zurrer is talking about. The machinery might be a little heavy to have a report made as soon as the accident occurs, but the principals of the schools over the country, at the end of the month, could, perhaps, make a report showing how much lost time there was, or analyze the accidents that have happened in their schools, and in that way we can aid in this reduction of accidents, or in trying to make our parents realize that there are certain things that they ought to do and do all the time.

E. ROSS FARRA (Manager Grand Rapids Safety Council): I don't think this group is cognizant of the fact that there are two types of reports that are being gathered by a large group of local safety councils. Because the superintendent of schools is in charge of our school and child safety work we secure reports of every accident that not only occurs in the school but that occurs to a school child, whether on the street, at home, or in the school.

In addition to that, we started in our city, in the first part of 1928, securing reports from the three hospitals. Every month a record of every accident case is reported. It is true that we do not get every accident but I think we get 90 per cent of them.

At the end of this year we will have had three year's experience, and we will know whether falls in the home or falls in the street are the things that are causing the most non-fatal accidents.

I will say, very frankly to you, I am not interested in these little accidents, that is, cuts of fingers and things of that kind, for the simple reason that there isn't a safety council that has as yet successfully licked the fatal accidents. I am interested in the serious non-fatal accidents that cause hospitalization, and I am interested in the fatal accidents, and those are the things, it seems to me, we ought to concentrate our efforts on, and when we get those licked we will not have any trouble with the minor ones. That is the kind of accidents we know about through these reports.

WILLIAM C. KNOELK (Assistant Supt. of Schools, Milwaukee, Wis.): May I suggest that the technique that is to be adopted by Miss Zurrer is going to be the determining factor as to whether her study is worth while. If you will permit, Mr. Chairman, I should like to take just a minute or two to tell about the various plans that we have made in our community to do the things that Miss Zurrer has suggested, not only from the point of getting information from the various schools, but also from the standpoint of getting information from the industries, and from the standpoint of getting information through the health survey of the community.

We have gotten all the information that we can take care of. We have gotten a mass of material on, not only the school age child, but the pre-school age child, and we have a sufficient number of accidents on which to base conclusions, but what we lack and what every study of this sort lacks thus far is the necessary criteria

on the basis of which to make our judgments. It is an accepted fact everywhere that before you can cure anything, you have to diagnose that particular thing as to its necessary ingredients and find out just what particular phase of that accident has caused that particular accident.

We heard the gentleman suggest that only fatal accidents shall be of interest to us. I beg leave to submit that he is entirely wrong. I say that many accidents that occur, in their possibilities, and in the incipient nature of the accident, carry with them all the contents of a real fatality, and, therefore, I submit that it is very necessary to study not only the fatalities but those things which carry in themselves the possibilities of a fatality.

A child may receive a bump, or a burn, or a fall and may get away with it and the mother is grateful and thanks the Creator of all things on her knees that the child did get away with it, and precisely the same thing may happen in another home and the child passes out. No, I think that the crux of the whole thing is to determine what criteria we shall have.

If it isn't a selected group, and if you have a mass of information that runs over all phases of society and all types of homes and can determine what measuring stick shall be applied to this, and therefrom select the causes of these accidents, then, and then only can you get home accidents on the basis where industrial accidents are now or where traffic accidents are.

Miss Florence C. Fox (United States Office of Education, Washington): I thought you would be interested to know that there are a great many courses of study, especially on safety, being put out now by the school systems in different parts of the United States, and in almost all ordinary courses of study there will be some section on safety.

I just want to make one point on those courses of study: They are having home inquiries made by the pupils. The pupil goes home and says, "Mother, where is our medicine chest?" and, "Is it up high enough on the wall so that the baby can't get into it?" and, "Mother, are there any unlabeled bottles of medicine that are not in the chest?" and, "Have we a rubber mat in the bath tub and a hand-hold in the wall," because, probably you know, a great many serious accidents occur in the bath tub.

Those questions are asked of the parent by the child himself, and the mother says, "I don't believe we have a medicine chest. I believe we ought to have one," and, "Where shall we put it?" and so on. That leads to a great many little items of safety which the mother in the home hasn't thought of at all. There are a great many other suggestions in these courses of studies, but right along this line, it seemed to me the home inquiry by the children would prove to be a very beneficial feature of this home study in safety.

Mr. Farra: I don't think the gentleman understood me correctly. I said, "In addition to the fatal accidents, non-fatal accidents that were serious enough to hospitalize."

I have had fourteen years' experience, a good part of it in analyzing industrial accidents, and I know it is the feeling of industrial engineers all over the country that we must get the grip on the fatal and the serious non-fatal. Please don't misunderstand me, we will at the same time care for these very minor accidents, the problem is so big—it is a whole lot bigger than anyone thinks it is until he gets into it—that if we don't centralize on the most important things first, we are going to be an everlastingly long time getting it solved.

Chairman Little: I agree with you that analyzing and keeping the statistical records, and so forth, is monumental if you take in everything, but underlying it all the same education, the same training that will prevent the large accident will prevent the small accident. I had that impressed on my mind by Mr. Schultz of the United States Steel Corporation, some ten or twelve years ago.

They had been attacking the problem, as industry always did, from the point of view of the major accident and how to prevent that, and they had succeeded in reducing their serious disability rate in a very considerable degree, but the small accidents kept going up, and he made his study from the point of view, of why, when we are reducing the serious accidents, do the little accidents increase? And he reached the conclusion in his study, that the program which will really prevent accidents must be so directed that it will prevent the minor accidents as well as the major accidents, and to keep on successfully preventing major accidents, you have to make your program of safety education and prevention so clear, so definite, and also so comprehensive, it will cut down both types of accidents.

I will admit that the small accident will not get the care that the major one does, but if you get the right philosophy, and the right method, and the right approach to it, you will be reducing both, and I think—am I wrong or not?—that at present we are reducing both rates in the better organized industries.

A gentleman asked the question a little while ago, have we any data as to the results of industrial safety on home safety, and I suppose we have only very general impressions, with perhaps a few accidents, of where there has been the transfer of the safety idea and safety practice from the industry into the homes of working men, but we have no considerable data.

Take, for instance, the calendar, of which the National Safety Council publishes two hundred thousand, or a half a million a year, my figures may be wrong but it is a very large number. It is a most beautiful calendar, and on the back of it there is a great deal of home safety instruction.

It ought to be very interesting, if we could check up on it, the benefit from the public utility corporations making their installations in the homes, for gas and for electricity. The public utility corporations are forward in industrial safety, and they are developing their business along safety lines, and it is of tremendous concern to them that all installations shall be made properly in order that the electricity and the gas, and so forth, may be used safely in the home.

Plumbing is also a large item of safety in the home. It is, however, not very often installed by public utility corporations. Therefore, to what extent does the city inspection of buildings in the process of completion cover all the major physical hazards within the home? Does city inspection break down at times? And, if you are studying the accidents and the causes, and getting them in any large number, that would be a significant thing to bring out. I recognize that you can't bring out everything. But the question of the influence of industry, and the larger industries upon safety in the home—is there any transfer by the Safety Council through the safety calendar? Is there any transfer by the public utility corporations in their careful installations and inspections of their own work, and their instructions to the housewives and others as to how to use the electrical appliances safely? Is that bringing the safety idea of caution and method into our homes?

Oh well, there is no end to it and we will go on to another subject.

"The Safety Program of the General Federation of Women's Clubs," by Mrs. Edward M. Land.

Safety Program of the General Federation of Women's Clubs

By MRS. EDWARD M. LAND
President, North Carolina Federation of Women's Clubs

During the meeting of the Board of Directors of the General Federation held in Washington last winter, Mrs. Sippel brought to the attention of her official group the problem of accidents in the home, and asked for the co-operation of the Presidents of the State Federation in a movement looking toward the elimination of the most fruitful causes of these accidents. In consultation with representatives of the U. S. Bureau of Standards and the National Safety Council, joint plans were made for

a program of mutual helpfulness, the General Federation to serve as a medium through which to operate, the Bureau of Standards to use its equipment to devise ways and means of bringing under control existing hazards, and the National Safety Council to lend the wealth of its information and experience to the furtherance of the experiment.

The General Federation was sought as the medium because it is not only a national, but a general organization, the largest organization of women in the world. It comprises in its membership not only every state in the union, but women scattered in seventeen foreign countries. Since it is over-whelmingly an organization of home-makers and mothers, this question of home safety should be of vital concern.

In opening the Home Safety programs at the meeting of the General Federation of Women's Clubs at Denver in June, Mrs. Sippel, said, in part: "The question of accidents in the home was brought to the attention of the General Federation not primarily because we are citizens, but because we are home-makers who have a great responsibility in making homes accident-proof. A danger recognized is a danger eliminated."

The survey in North Carolina yielded results of such value that their inescapable facts will form the background of a campaign to bring home-makers to a realization of the dangers that are lurking in our homes. A vigorous program of accident prevention and first aid is to be inaugurated the coming year by the General Federation and in this movement we have been assured the assistance of the United States Board of Standards and the National Safety Council. Ours is to be an Educational Campaign, the object of which is to make women and children "Safety Minded."

If it is true that 90 per cent of the home accidents are avoidable, we who are responsible for the well-being of those within the protection of our homes, have before us a task that is a challenge. With these splendid cooperating agencies seeking a remedy for present conditions, we women must translate into terms of daily living the timely suggestions of those who are striving to make safe the American Home. Let it not be said of women by another 24,000 persons this year, "Because you would not think, we had to die."

At the suggestion of the Bureau of Standards it was thought wise to initiate a survey in a single state, before undertaking a program on a nation wide scale, as this would give an insight into the situation among a specified and restricted group. Based on this information the General Federation would be in a position to evolve a general program. Mrs. Sippel was given the privilege of designating the state for this preliminary survey, and North Carolina was gratified that her club homes were made the field of demonstration.

We know that the difficulty in obtaining facts regarding accidents that occur in the home is due to the secrecy that surrounds such accidents. We are rather ashamed to acknowledge that we have violated our intelligence and training by a flagrant disregard of the rules of prudence. We are startled to find that we have been thoughtless and careless of those whom we are most anxious to guard and protect, the members of our family circle, and that we have been wasteful of our own, and their welfare and well-being. In the light of after events we have been able to see how easily accidents might have been obviated.

I am perhaps far enough away from home to speak of an indiscretion of which I was guilty that was not covered by the survey, which called for accidents of the past year only. This leaf from the book of my experience may serve to deter others from attempting a like experiment. In the early days of my housekeeping experience, I was busily engaged in making draperies for an upstairs room, trying to finish the task in a given time: The machine was conveniently placed in front of the window, and when the sewing was finished, I mounted the machine to hang the draperies. It seemed to offer a firm footing and I thought nothing could serve better as a substitute for a stepladder. It would be an economy both in time and effort

to use it! The window was a double span and my whole attention was directed toward the proper spacing and draping of the hangings. In order to reach across the wide span of the window, I stepped out on the extension leaf of the machine, and down came the curtains, the machine, the lady and all. My left foot caught the full force of the fall and I suffered a severe sprain from the hip to the ankle, which incapacitated me for six weeks. The amount spent for medical attention was sufficient to have paid a decorator to have done the work. It was a costly experience as well in suffering, but it was a valuable lesson, for as I lay inactive for several weeks I had time for much wholesome thought. While I did not know it at the time, that was my period of preparation for the work as chairman of the Home Safety Committee of the General Federation.

This does not mean that my home has been made accident proof. I am learning that eternal vigilance is the price of safety. I was to make the report of the home accident survey in North Carolina, at the recent convention of the federation. I sat down one morning to write this report and gave orders that I was not to be disturbed. I had hardly made the statement before an agent appeared at the door. When I excused myself, my Mother took compassion on her and agreed to see her. She entered the door with her case of extracts, synthetic lemon pie, cake coloring, etc. and at the same moment I heard a terrific crash, the breaking of glass, a piercing scream. I ran down the steps about three at a time and found the case open, the broken bottles, and the person herself stretched on the floor in an agony of pain. The cause of the accident was a small rug on a polished floor. Later, at the hospital, an X-ray revealed a break in the small bone of the leg, near the ankle. As no members of this person's family were at hand, I had to stay with her until the leg could be put in a cast. When I returned to my desk in the afternoon I sat down and wrote the report of the home accident survey that has been conducted by the club women of North Carolina, and urged that we become "safety-minded". I might have added that I intended to begin at my front door.

The survey in North Carolina was of great value to us in calling sharply to our attention the responsibility that rests on the shoulders of women for the elimination of home accidents. The method of campaign was to ask the president of each of the 286 clubs comprising the state organization, to give her active, interested, wholehearted support in the effort to secure a personal canvass of every member of her club. The cooperation of the Home Demonstration Clubs of the state was enlisted. This is an organization affiliated with ours, whose membership is made up of rural women. As the circumstances surrounding the rural home are different from those of the city home, we thought it would be helpful to ascertain facts regarding conditions in the average country home as well as the town homes. Prior to the launching of the campaign, news articles were published in all of the leading papers of the state and in the official bulletin of the federation, calling the attention of club women to the importance of the survey. We felt that it would add interest to the work if all club women would engage in a whirlwind campaign, and so an effort was made to complete the canvass in thirty days. Experience taught us that women are a little slow to fill out questionnaires, but we were immensely gratified with the response given in this survey. While the canvass was not altogether complete, the quality of the replies was good, giving a very vivid picture of what is taking place in the average American home. The reports were sent directly to the Bureau of Standards where the material was analyzed and tabulated. While the object of the survey was not so much for the purpose of assembling statistics as to ascertain typical accidents, with a description of these accidents in order to aid in the removal of the causes contributing to them, a splended statistical report resulted from this intensive campaign.

At the outset, Dr. Burgess of the Bureau of Standards, stated that he felt if women could be acquainted with typical conditions in average homes, it might stimulate them to action which would reduce the toll of life and limb now claimed annually

through avoidable accidents. It seemed to him a purpose well worth the attention and the united effort of both the Bureau of Standards and the General Federation of Women's Clubs.

The North Carolina club women were spurred to action by the challenge from Mrs. Sippel that she selected North Carolina because of the efficient way in which the club women of the state have undertaken tasks entrusted to them.

As the purpose of the survey was to collect accurate data the period covered by the survey was limited to twelve months. The details were thus fresh in mind, and the description of the circumstances surrounding the accidents gave many gripping stories. It was specified that no traffic accidents were to be included in these reports, nor accidents happening to the man of the house on his way to and from work. The reports did include all members of the household who suffered accidents in and about the home, and the children to and from school and on the playgrounds of the school. One thing worthy of comment is that only one accident occurred within a school room, and that was of a minor nature.

Perhaps the most startling revelation of the survey was that the majority of the accidents could have been avoided by the exercise of reasonable care and forethought. The statement that accidents occurring in the home exceed the number that occur in industry has been one which women have been reluctant to accept. When statistics are given based on facts which home-makers have themselves furnished, however, the proof is irrefutable, and the story thus told is startling. It is said that about a third of all accidents that occur in the United States annually are within the home, the home which we have always thought of as the safest place in the world for our children. So much of a woman's thought and care is given her little children, in an effort to throw around them every possible safeguard, yet in spite of this vigilance, we find that a large number of the accidents are to children under five years of age. Ten in every one hundred accidental deaths are to babies under five years.

Many of the serious and fatal accidents occurring to small children, as reported by our club women, were through contact with unguarded fires, heated stoves, or from placing a child in its high chair too near stoves.

One tragic report was that of a busy mother who left her small child in a high chair near the kitchen stove as she was preparing breakfast. The child stood in the chair to reach out for the handle of a kettle on the stove, the chair was overturned, throwing the child against the stove and as he clutched wildly for something to break his fall, his hand caught the handle of the kettle, which he brought down on himself, receiving a death-dealing scald.

Another fatal occurrence was that of a bright two and one-half year old boy who was playing alone on the porch. He took up a handful of dried beans, put one in his mouth, and started to laugh as his mother approached. The bean was sucked into his wind pipe. The baby was rushed to the hospital, but the doctor's arrival was too late. Other small children were strangled by peanuts, lemon drops and marbles.

One morning a mother was called to the phone while she was at work in the laundry. Her little girl attempted to operate the washing machine as her Mother had done, and in the attempt her hand was badly scarred. When it is too late we can see how easily these tragic occurrences might have been avoided.

These instances could be multiplied many times over. While they relate to things revealed by the North Carolina survey that are by no means confined to this one state. They are typical of what is taking place in the homes of the nation.

It has been estimated that about 3,500,000 non-fatal, and 24,000 fatal accidents occur annually in or about our homes. If some great catastrophe or epidemic were taking such an annual toll, all citizens would be up in arms. Enormous sums of money would be expended in an effort to avert such a calamity. In a home safety program, the remedy is so simple that any woman without special training may be an active worker and participate in the cause. To arouse women to the gravity of the situation is a task worth every ounce of effort that can be put into it.

The facts revealed by the survey show that accidents of sufficient seriousness to be recalled occurred in approximately seven out of every 100 homes in North Carolina club women the last twelve months.

It is quite likely that this is an understatement rather than an over-statement of the situation as the proportion of accidents in relation to membership reported in small clubs was greater than the proportion reported by some of the larger clubs. The homemaker herself is the chief victim of accidents in and about the home.

This is especially important because there is no accident insurance available to compensate the family for doctor's bills incurred or for the loss of homemaker's services while incapacitated. Almost half of the fatal accidents occur to people between the ages of 15 and 54, ages at which the economic importance of each member to the family is greatest.

The larger number of accidents occur during the years of greatest activity, that is in youth and vigorous maturity, rather than in infancy and old age.

There is a definite relationship between sex and age in home accidents frequency. In infancy, the boy and girl seem equally susceptible, but as childhood is outgrown the boy with his more vigorous and more adventurous tendencies far outstrips his sisters in his liability to be hurt while playing. Among adults and elderly people it is the woman who is the chief victim of accidents in or about the home, a situation to be expected in view of the fact that the modern husband does not spend much time in active labor or vigorous play about the home.

The fatal accidents reported occurred to young children and to elderly people. Burns, scalds, explosions and choking brought death to infants and children whereas falls caused fatalities among elderly people. More than half of all non-fatal accidents occurring in or about North Carolina homes were due to falls.

The larger number of these falls were not spectacular. They occurred on level surfaces, either on slippery floors or slippery sidewalks. An accident reported by one club woman from Asheville is typical of a number of such conditions. This lady says: "While hurrying through the hall which had a highly polished floor, I turned the corner, slipped on the rug and fell, my weight coming down on my hand which I threw out to catch myself. A bone in my hand was broken and it was useless for several weeks." Obviously non-skid rugs must be brought to the house-wife's attention if the danger ever present in polished floors and small rugs is to be overcome.

Falls from steps are frequent causes of non-fatal accidents. These were occasioned by poor illumination, loose or broken treads, badly spaced treads, or by obstructions left on the stairway. Falls occurring in the course of play are frequent causes of accidents to boys and girls.

In addition, North Carolina women and children fall in bath tubs, out of beds, from ladders, from porches and windows, from vehicles, trees and platforms. Some of these falls may not be preventable, but the larger number are due to inherent faults in mechanical construction or to personal carelessness.

About a fifth of the accidents reported brought about cuts and scratches. Boys are the principal victims of this type of accident occasioned primarily by the handling of or falling on sharp objects. Almost half of the accidents resulting from such causes occurred to children under fourteen years. One account of heroism on the part of child and mother of Plymouth, North Carolina, may be illustrative of the need for first aid information on the part of the mother. A little girl was struck with a baseball bat accidentally. The cut reached to the bone. The family automobile was away at the time. There was no telephone. This mother sterlized the wound and with a needle and thread, took stitches in the little girl's face. She reports that the wound is healing satisfactorily. This happening in a small town

is just one of the many causes in which a physician can not be reached quickly and where first aid must be given by the housewife.

Burns, scalds and explosions also happened to children more frequently than to adults. From these reports it is obvious that all hot surfaces or hot liquids need to be put out of reach of the infant or the playing child. A wire guard around stoves used to heat living rooms, placing all cooking vessels at the back of the stove so that their contents will not boil over on to children, placing handles so they can not be reached by small children, would avoid many a severe and painful burn.

While there is a wide range of causes of the occasional accident in North Carolina club women's homes, it is obvious that modern mechanical equipment in the home, such as electrical and gas apparatus are infrequently mentioned in this list. The toy pistol, air rifle and other fire arms, the kerosene can, are still more potent dangers about any home than the washing machine, the electric iron, the electric fan, the gas stove and other modern inventions.

The conclusion reached from the survey of these accidents is that it is not the unusual condition or the new implement that brings about accidental injuries in or about North Carolina homes. It is the condition people have grown accustomed to that causes the majority of accidents to the adult. This survey will call to our attention the hazards lurking in ordinary home and play equipment and conditions. Through a dissemination of these facts and through the exhibits which the Bureau of Standards is preparing we believe sufficient stress will be placed on the actual causes of home accidents to bring about necessary changes in home buildings, equipping and furnishing, to eliminate the sharpe edged or firing toy, and to reduce the human carelessness that makes some homes unsafe for small children.

CHAIRMAN LITTLE: I am sure we all feel indebted to Mrs. Laird for that splendid survey. If the women's clubs of the country will take it up as earnestly as the women have in North Carolina there will certainly be great progress made.

MRS. JOHN A. NORTHWOOD (Sparrows Point, Md.): I was thinking of a simple illustration of my school days many years ago. When a child in our home drops a plate and it doesn't break, we laugh. If it is a good plate and it breaks, the child is reprimanded. If a plateful of gravy falls on mother's best gown, the child is severely punished. That is the attitude of the public.

Just recently we drove the full length of the driveway, watching two little tots under eight riding on an automobile tire on the rear of an automobile. They rode, I am sure, eighty squares, and I saw dozens of people chuckle as they passed. Even the policeman didn't stop it. That happened on Broadway, New York City, in these days of safety.

We must change our mental attitude and scold the child when the plate falls, whatever happens.

CHAIRMAN LITTLE: We shall move on to the "Safety Program of the National Congress of Parents and Teachers," to be presented by Mrs. Hugh Bradford.

The National Congress of Parents & Teachers at Work on Safety

By MRS. HUGH BRADFORD

President, National Congress of Parents and Teachers, Sacramento, Calif.

As the representative of the National Congress of Parents and Teachers, we congratulate our associate organization upon its past record and its great possibilities. We greet you with the hope that the future may bring you the successful fulfillment of all your projects.

Our National Congress of Parents and Teachers might well be listed as another "Safety Council", for its purposes, while listed under child welfare, really concern

themselves with the safety of children—their mental, moral and physical safety. The safety of any child or adult is quite naturally dependent upon his ability to prevent that mischance which will wreck him physically, mentally or spiritually. Our organization is, through its numerous committees putting forward an educational program that seeks to put into the minds of the adults who are the natural protectors and teachers of children, such cooperative methods as shall enable them to prevent accidents to children in any phase of their living. Homes, and schools, communities and states are responsible to a very great extent for the mental and moral hazards that accidentally lead to hospitals and prisons. In no lesser degree are homes and communities responsible for the physical well-being of children in the prevention of those accidents that lead to hospitals and sanitariums.

The particular phase in which you, as a great national safety organization, are interested is that development which is the work of our National Committee on Safety. Functioning through its national chairman and associate it is reinforced by a committee on safety in each of our states, these in turn instructing, encouraging, upholding the work of local committees not only in every large city in the United States but in most of our rural communities. This mechanical side of our work is mentioned only to show that a national program on safety may carry through from the national plans to every community, rural or city.

Our national chairman, Mrs. J. B. Potter, of Redondo Beach, California, is assisted by our associate chairman, Miss Marian Telford of your own Education Division of the National Safety Council. The plan jointly prepared by them is constructive and educational; it will keep before the associations the subject of prevention of accidents to children and is built upon the needs as shown in the safety survey of last year.

The plan briefly outlined will provide for information and instruction on safety projects to go out every month through the states to the local communities; there will be given five-minute safety talks at the monthly meetings of the locals, as well as those special afternoon and evening programs devoted entirely to instructing parents and teachers.

(1) Then, programs, definitely prepared by the national chairman and her associate and put into the hands of safety chairmen; it has been found wiser to have talks prepared rather than to leave them to be developed by the members.

(2) Bulletin articles for circulation in our state and district publications, setting forth the hazards and the need for prevention.

(3) Articles in our national magazine prepared by Miss Florence Nelson of the National Safety Council.

(4) Exhibits at state and national conventions as a phase of visual education; also distribution of material at this time which presents facts and general information.

(5) Publicity through newspapers both as to aims and achievements and containing stories of interest.

(6) Editorials on safety for children in prominent papers and journals.

(7) Convention speakers for district, state and national meetings.

(8) Radio talks on home accidents.

(9) Copies of all letters to be sent to all national board members that they may be able to speak on safety if necessary.

All of these activities have been devised to carry forward the program that is a continuation of the work already begun.

We are convinced that parents are not aware of the many dangers to children in the home. It will be our effort to stress the hazards of fire, dangers of falls, unguarded medicine chests, electrical apparatus, and machines. Along with this effort to emphasize home accidents we will seek the safety of the child in the community.

At the national convention in Denver we passed a resolution endorsing regulations of the Standard Safety Patrol presented by Miss Marian Telford of your

organization. Miss Telford gave a demonstration of a school patrol at work, during one of the general sessions of the convention and following the demonstration the resolution was adopted.

Parents and teachers are responsible for the child on his way to and from school, in the public playground, and on the street. Consequently, our program of education for accident prevention cannot stop with the home. We are concerned with street crossings and traffic; we are concerned with subway passes for school children and with school buses. We must seek to understand hazards before we can prevent them. We also advocate teaching of swimming to young children. Our work is not theoretical. With your permission we will quote partially from an annual report given by one of our city safety chairmen to show in a small way some of the practical things that have been done. The report is merely typical of what is going on to a greater or lesser degree in our cities. The chairman says: "Following a questionnaire sent to our Parent-Teacher Associations, it was reported that eight safety talks had been given over a state-wide broadcasting station, fifteen talks were given at local associations in the city, safety conferences were held every fourth Friday of each month at which the chairmen of the local Parent-Teacher Associations discussed safety problems and reports; and analysis of hazards and accidents showed the need for parents and teachers to stress the dangers of children playing in streets, skating, bicycling and jumping aboard moving vehicles; the analysis shows that parents should enlist the aid of city authorities in providing one subway near a school, nine new traffic signals, four safety zones, more traffic officers, another bus for transportation of crippled children; four more junior traffic reserves; a new ball park, more playgrounds, an emergency hospital service, a new school, etc."

May we particularly call your attention to the fact that this community-committee seems fully conscious of the fact that if there is danger from street play the need is for playgrounds; that heavy traffic demands safe crossings and subways, that fire hazards demand a safe school building as well as a safe home.

This same report tells of the instruction given mothers at a Parent-Teacher meeting on first aid for burns, poisons, drowning, electric shock; it shows cooperation by conferences with seven traffic officers, with seventeen officers of the regular police department, with the supervisor of the playground, the safety council, the fire department, the state automobile association, the playground committee, the school department, the health department, the Boy Scouts, and the R. O. T. C.

Through this partial report is shown the effort the Parent-Teachers are putting forward to create a public consciousness of the need for safety measures, and to provide suggestions for the elimination of the dangers. The more public opinion as represented by the parents and teachers is aroused the fewer the accidents will be to children.

We believe with Lincoln that "he who moulds public opinion goes deeper than he who enacts statutes or pronounces decisions" and it is our earnest desire to cooperate practically and effectively in all its endeavors with the National Safety Council.

CHAIRMAN LITTLE: Is there any discussion?

DR. EUGENE E. WILLISON (American Red Cross, First Aid Service, Washington): There are two things that are of more value to you than anything else in this world. The first is, how to take care of yourself, and the second is, how to make a living, and at the risk of being thrown out by some of the school people, I am going to say that our public schools do not teach us very much about either one, and particularly not very much about how to take care of yourself.

The accidents that have been mentioned this morning in some of the reports, show two things. First, that most of your accidents are caused by carelessness. Second, that when the accident does happen, there are so very, very few people who are prepared to do anything about it.

We have been doing first aid work in the American Red Cross for a considerable period of years. You are probably all familiar with the first aid work that is done by the Bureau of Mines. We go so far with this work as to say that the primary purpose of giving first aid training is not to take care of the accident after it happens, but to make the individual a safer person. That is not theory. We can quote instance after instance from the industrial world, factories, mines, quarries, where simply giving the individual first aid training, not with any idea at all of taking care of the accident when it occurs, has very markedly reduced the number of accidents.

The last report from a large steel corporation near Chicago shows a reduction of 43 per cent in their number of accidents following a period of training.

In the very fine work that Mr. Stack published some years ago, he brings out particularly this work on first aid, both for the taking care of the accident and as a measure of prevention.

If I may cite one personal instance. Some of you are probably familiar with the large public school camp that the Chicago Public Schools conduct each year, Camp Roosevelt. They usually have about 6,700 boys away from their mothers for the entire summer. We have, in the same camp, about 40 high school boys who are the laborers around the camp, not under camp supervision.

We require all of the youngsters in the camp to take a first aid course. In the two summers that I was with them we had only two serious accidents among that entire group, and they were both broken arms caused by a horse falling, which, in a way, the boy could not be responsible for.

I do want to leave that with you. In your work on accident prevention, think also of taking care of the accident when it does occur, and remember that in teaching how to take care of this accident, you are going to bring the individual, in terms of pain to himself and pain to his pocketbook, to realize what accidents do cost him.

MR. E. B. LEFFERTS (Automobile Club of Southern California, Los Angeles): You people might be interested in knowing what has been accomplished in Mrs. Bradford's home state. I, unfortunately, have not with me the figures for the entire state, but I do have the figures for Los Angeles County which I think are indicative of the success of the safety program in the state.

In eight months, in the county, fatalities to children under 15 have been reduced 16 per cent. In the traffic field, concerning children of school age, there has been a reduction of 29.4 per cent.

MRS. JAMES N. DOWNEY (Director Women's Activities, Police Department, Detroit, Mich.): May I just state, in reference to tunnels, that in Detroit, we have two very busy boulevards. We are at present discussing a plan for more tunnels and the argument has been that the money would be better spent teaching all the children how to avoid danger rather than providing protection for a few. We also know that a great many children do not avail themselves of the tunnel. They walk the same way as they did before.

MR. LEFFERTS: We have something more than 40 tunnels in Los Angeles, and the children do use the tunnels. Through the system of the school safety committees, the tunnel use is as near 100 per cent as can be.

I don't believe, on some of the heavy thorofares where the vehicular flow is several thousand cars an hour, any degree of education will supplant some definite adult protection to the children in elementary schools. No matter how much education you give, there is the danger of collision between the child, even though he is educated, and the motorist who possibly has not been educated.

I speak of adult protection. It may be in the form of a police officer, or it may be in the form of a separated grade or a tunnel, and I submit to you that from the standpoint of economics, the tunnel is the best protection that you can get. Our tunnels have averaged slightly more than $8,000 a piece. The interest on that will

not pay the salary of a police officer approximately four hours a day during school time, and there is the added intangible of the saving to the motorist through the elimination of the necessity of stopping, and last, but not least, it affords 100 per cent protection.

MRS. J. F. KITCHEN (Erie Council of Parent-Teacher Association, Erie, Pa.): I thought it might be interesting to you to know that we have already put on a campaign of safety in Erie, through the Parent-Teacher Association, which has reached our women, I might say, 100 per cent.

Three years ago we organized classes to take the course of lessons as given by The National Safety Council. Those lessons were given by our visiting nurses, our insurance men, and the mothers, and others qualified to give the lessons.

We are an industrial town with a large foreign population, and we made an especial effort to reach the foreign mother through the visiting nurses and the International Institute. These lessons were given in Polish, German, Italian, and to other mothers who are unable to speak English.

Last year we supplemented our work by putting on a course in first aid in every Parent-Teacher Association. The school board gave us the use of the buildings. Our instruction was volunteer. The head of the visiting nurses' association took her free time at night to instruct classes. The first aid man at the General Electric company conducted two classes, the head of the Boy Scouts conducted two classes, and so on through our several organizations.

At the end of the year we had the pleasure of issuing first aid certificates to 260 mothers who completed the course of fifteen hours.

CHAIRMAN LITTLE: The impression made upon my mind today by the papers presented, the attendance, and the interest is that the Home Safety organization in the Council may become, under proper leadership, one of the strongest and most effective of the whole body. It ought to be first.

I am sure we all feel indebted to the women who have brought us these finished and dependable thoughts upon the subject today, and to the women's clubs and the Parent-Teacher associations.

When Miss Zurrer has made her year's study and placed in the hands of the various groups, materials to be used that are practical and interesting and stimulating, certainly we can get under way in America a tremendous movement for home safety, and that will help to take care of industrial safety and public safety.

I do not know whether or not to approach the minds of the women with the idea that good housekeeping will be safe housekeeping; but I do know that it is a fine approach to industry to sell safety to the general management because it is a part of good business, and because the efficient plant will be the safe plant, and the unsafe plant will be the inefficient plant.

Why, of course, the same principle applies to good housekeeping. So it would have a very great effect in, not only the immediate concrete thing of preventing accidents to children and adults, but it would bring a tremendous toning up of the home life of the American people, and make it even sweeter as a home, wouldn't it?

Another point: Twenty-four thousand deaths in the homes of American people a year, three to four million accidents. Well, it is, of course, very distressing. Thirty-one thousand automobile deaths last year in the country. What is the exposure? We must remember that in the home is the maximum exposure for we all live in homes, one hundred and twenty million of us.

What is it in the basic industries of the country? Should we say twenty or twenty-four million workers are engaged in mining, manufacturing and transportation, or is it more than that? At least it is not one-third of the home exposure. And so while it is all too distressing that there are twenty-four thousand deaths from accidents in homes I don't think it ought to get out that the homes are more dangerous than the streets, or that the homes are more dangerous than the working places. Upon the whole they are not, but they run distressingly close.

Mr. Palmer, won't you come up here and say a word to us? Mr. Palmer went around over this country twenty years ago with a brief case, and they thought he was half crazy. He was attempting to promote the National Safety Council. He has launched it, and he has been talking to me about how the whole program of industrial safety has reached the place that we can't make adequate advancement until we get it going in the home life of the American people.

MR. LEW R. PALMER (Equitable Life Assurance Society, New York City): I talked to Dr. Little yesterday, and I have talked to him many times on this vital subject of home safety, and I think all of us in the National Safety Council and those that have been associated with the management, have been far from satisfied with what has been accomplished thus far in home safety.

Now just why we haven't gotten hold of the subject any better than we have, it is hard to say. Of course, I think we should explain to you that we started out more or less following a demand for industrial accident prevention, but it was only a few months after we named the Council, the National Council for Industrial Safety, that we changed that name to the National Safety Council, realizing immediately that our field and our obligation extended beyond industry into the home and to the public as well.

In trying to analyze our obligation, and what we have done, and what we hope might be done, a special committee appointed by President Pettibone has analyzed what has been done in the past to encourage some definite attention to home safety. I haven't had a chance even to go over it myself, but it goes back to 1918 at least. Here is an abstract from the minutes of November 15, 1918, a resolution from the floor on home safety.

Dr. Little spoke about the relative number of deaths in the home as against those in industry and on the street. We have, of course been trying to encourage greater interest in home safety. I made this statement, that most of the readers of the newspaper today, realize that we have a very heavy toll in automobile accidents, but how many of the general public realize that not disregarding the exposure, that we have approximately 24,000 deaths in the home?

I think we are getting nearer and nearer to a solution. We have always felt that the way to go; our home safety started is to get those in the homes interested, and they are the women.

I am very glad to endorse the appeal that has been made by Dr. Little, and I want you to know that the National Safety Council has felt that responsibility, but we have to promote our work, we have to pay as we go, and as yet we have not devised any practical revenue from the home safety side of accident prevention. It has to pay its own way. We can't take the money that we have coming from industry and turn it all over to home safety, but industry and the insurance people are sold on the fact that it isn't just home safety, that it is industrial safety as well.

We must teach the younger people to be safe and as they grow up they will be safer workers.

MISS ALICE L. EDWARDS (Executive Secretary, American Home Economic Association, Washington): I think there is a very interesting parallelism in safety work to some of the health work. We began trying to develop health habits in children who were in the schools, and we found that too many of the habits were already formed, and we kept going back farther and farther, until we began thinking more definitely about the health of the infant and even the prenatal program, than we did to begin with.

The health habit has gone back into the home as it is taught by the schools, and I think it is the same way, when we think about safety habits, we are going to have to go back and form the safety habits. Let them begin and develop from a very early period, so that the child begins thinking safety.

I think, as regards support for the home safety program, that it would not be a misuse of funds even to use some of your industrial funds on this cause of safety habits that might well be developed in these children who are going to go ultimately into industry.

Then there is one other thing that I haven't heard referred to at all this morning, and I think it should be conceded at least by those who are behind the scenes. No reference has been made to the President's conference on home financing, home ownership. I believe it will be a mistake if that conference goes on with the plans developed for it without taking into consideration the safety elements as well as the others. I would like to have you think very definitely about that.

G. A. DOELLER (Engineering and Management Corp., Dayton, Ohio): I should like to read into the record this excerpt from the report by Miss Esther Rockey, Chairman, Sub-committee on Safety, Women's Committee, N. E. L. A.:

Safety in the Home: For years we have studied and presented classes in first aid and resuscitation, and we urge that every utility woman become proficient in these methods, but there is something more. There are those who hold to the theory that the future of medical science lies not in the surgical wards where miracles are performed—healing and mending men's bodies—but in the research laboratory where men will learn how to prevent disease. The same is true of accidents. Every year thousands and hundreds of thousands of dollars are spent by organizations and industries in posters, signs, magazines, but sometimes it appears that we have eyes and see not, ears and hear not. 23,000 fatal accidents in the home in 1929, indicate there is something sadly lacking.

There should be a systematic study of home safety on the part of utility women with the idea to carry the message to women outside the industry.

The Accident Prevention committee of the National Electric Light Association believes that the electrical energy entering our homes is not hazardous when used with common sense. To that end, this committee prepared a pamphlet, "Common Sense and Electricity", which makes a fine piece of material for distribution to organizations, stuffers for envelopes or for employees themselves.

CHAIRMAN LITTLE: If you good ladies who are present, and others in the parent-teacher associations and in the clubs, will take hold of this idea and nurse it along, with facts, and information, and persuasion, there can be a great movement developed in the homes of the American people. There isn't any idea that you can take before all types of audiences and get more interest and more coordinated effort than you can on the subject of safety today. It beats religion, or politics, or education, or anything else, as a subject of universal interest and appeal, and is universally needed.

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