Highway Traffic
Conference Proceedings

ENO FOUNDATION

FOR

HIGHWAY TRAFFIC CONTROL, INC.

ASTOR GALLERY—THE WALDORF ASTORIA

NEW YORK CITY

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10:00 a.m.—MORNING SESSION

PRESIDING—CHARLES M. UPHAM
Vice President, Eno Foundation for Highway Traffic Control, Inc.; Engineer-Director, American Road Builders' Association, Washington, D. C.

INTRODUCTORY CONFERENCE REPORT
WILLIAM PHELPS ENO
Founder and Chairman of the Board of Eno Foundation For Highway Traffic Control, Inc., Saugatuck, Connecticut.

"FUNCTIONS AND RESPONSIBILITIES OF TRAFFIC ENGINEERS"
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President, Institute of Traffic Engineers, New York, N. Y.

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L. A. HINCE
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H. G. SOURS
Director, Ohio Department of Highways, Columbus, Ohio.

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G. DONALD KENNEDY
Vice President, Automotive Safety Foundation, Washington, D. C.

"TRAFFIC TRENDS"
BURTON W. MARSH
Director, Traffic Engineering and Safety Department, American Automobile Association, Washington, D. C.

2:00 p.m.—CONFERENCE PANEL

PRESIDING—T. M. MATSON
Director, Bureau for Street Traffic Research, Yale University, New Haven, Connecticut.

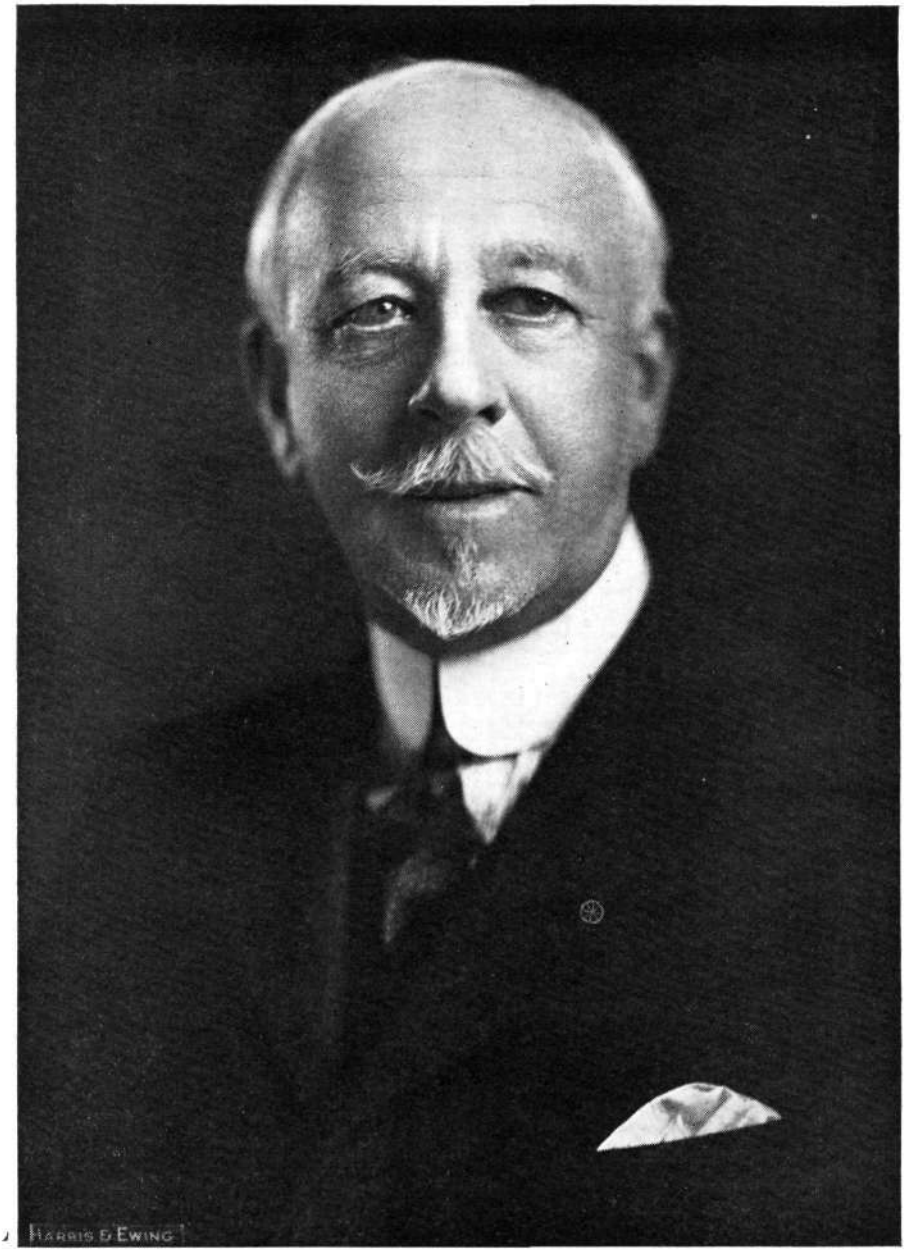
"CURRENT AND POST-WAR TRAFFIC OPERATION NEEDS IN ROAD BUILDING"
H. C. WHITEHURST
Director of Highways, District of Columbia, Washington, D. C.

"CURRENT AND POST-WAR NEEDS IN SAFETY EDUCATION"
DR. HERBERT J. STACK
Director, Center for Safety Education, New York University, New York, N. Y.

"CURRENT AND POST-WAR NEEDS IN TRAFFIC OFFICER TRAINING"
GORDON H. SHEEHE
Acting Director of Training, Northwestern University Traffic Institute, Evanston, Illinois.

"CURRENT AND POST-WAR NEEDS IN TRAFFIC ENGINEERING"
D. GRANT MICKLE
Traffic Engineer, Automotive Safety Foundation, Washington, D. C.

"CO-ORDINATING TRAFFIC SAFETY AND FACILITIES"
WILBUR S. SMITH
Bureau for Street Traffic Research, Yale University, New Haven, Connecticut.



WILLIAM P. ENO

INTRODUCTION

WILLIAM P. ENO

Founder

Eno Foundation for Highway Traffic Control, Inc.
Saugatuck, Fairfield County, Connecticut

MY MOST pleasant duty is to cordially welcome you to this conference of the Eno Foundation and to urge you to take an active part in the discussions and deliberations. By doing this you will greatly assist in solving many of the traffic problems. The solution of these problems will be of even greater importance at the close of hostilities when there is sure to be a sudden increase in the number of vehicles using our highways, which, even today, are inadequate to serve our traffic demands.

The Eno Foundation for Highway Traffic Control was founded for the purpose of producing and establishing a national traffic control code with standard rules and regulations which should be uniformly enforced and with ample provisions for the education of drivers and pedestrians, in order that there would result a saving of life, time and property and promote a more convenient and safe use of our traffic facilities.

It is appreciated that highway traffic control involves the work of the police, the traffic engineer, the highway engineer or road builder and the educator. It comprises not only mass transportation on our highways but is related to the co-ordinated movement of people and commodities by rail, water and air.

My first recollection of traffic confusion was when I was only seven years old. One day, while driving out with my mother, we were caught in a traffic jam on Broadway. It took at least half an hour to get out of it. The only traffic rule that existed in those days was "keep to the right" when meeting other vehicles. Later I visited Europe where, with the exception of England, conditions were just as bad.

Before 1899, there was little effective attempt made to control traffic anywhere except in British cities and even there, there was no printed traffic code. Consequently I felt that the practical thing to do was to draft a traffic code—short, concise and reasonable—and put it into practice. An active campaign for the adoption of this code was begun in New York City in January, 1900. It was not until October 30, 1903 that the printed code was officially adopted. I am pleased to say that this code has formed the basis of all traffic codes since then and it has gradually been improved through progressive revisions which have had the cooperation of experienced individuals and organizations.

During World War I, the French exacted that the English and American troops in France adopt the New York Code as revised for Paris in 1912. In October, 1943 word was received from the

Provost Marshall General of the North African Theater of Operations that he had been successful in getting the code adopted by the French Authorities in North Africa, with the request that it be adopted by the French Army and the civil authorities in Morocco, Algeria and Tunisia. The strange thing about this is that in the first World War it was exacted by the French that this code be followed by American and British troops in France and now, in World War II, it is exacted by the Americans that the code be followed by all the troops and civilians in the North African Theater of Operations.

Since the adoption of the first code by New York on October 30, 1903, much time and effort has been given towards improving traffic conditions. This has resulted in increased safety and convenience. However, the large number of fatalities on the highways and the many points of congestion in and adjacent to our cities indicate a great need for continued and constant study before traffic becomes as well controlled as it should be.

Many different groups have been working on these problems from many different standpoints. The traffic engineer has analyzed the movements and habits of traffic to the extent that traffic control can now be guided and regulated by proven principles. The highway engineer or road builder has improved the design and construction of highways to the end that traffic can more safely and easily use the highways. The police are progressing in the uniform enforcement of accepted traffic rules and regulations. Other highway user groups carry on educational campaigns for the vehicle driver and the pedestrian.

In the study and development of rules and regulations for traffic control there have been many developments which could be considered as milestones, such as the adoption of the code for New York City in 1903. There have been many other outstanding events that have had great effect upon the handling of traffic but there is nothing more important than making it possible for all the various groups studying traffic problems to have a common medium whereby their findings may be reported.

This conference, therefore, may be considered another milestone in the solution of our traffic problems. It has been made possible by outstanding leaders who have given so generously of their time and effort and it will make a real contribution to the solution of the many traffic problems.

It is the earnest wish of the Foundation to co-operate fully with other organizations and individuals having similar objectives.

All the books, pamphlets and records of the Eno Foundation since 1899 are carefully preserved in fireproof vaults in the Traffic Building. Many of these have been translated into foreign languages. Some of the countries have sent special representatives to Saugatuck to study our records.

For the purpose of perpetuating the efforts that have been made by us all in solving traffic problems, the Foundation was incorporated and is now housed in its new building in Sauga-

tuck, Connecticut. It is so organized and staffed as to continue studies and disseminate findings, which it is hoped, will further contribute to the solving of our traffic problems.

Constituting a part of the Eno Foundation are approximately three hundred counsellors, outstanding men in the traffic, road-building, enforcing and educational fields, located in various sections of the United States. These men furnish a great deal of information for the studies and reports of the Eno Foundation. There is also a board of consultants, serving as a board of reference and advice. The business of the Foundation is transacted by a board of directors of which the chairman is the executive head.

The Foundation building is of Georgian architecture, has several offices, reception rooms, a traffic museum, a library, a drafting room and vaults for the safe-keeping of archives. The Foundation is substantially endowed to a degree that should make it possible to perpetuate and carry on its work and disseminate its information to those who have traffic problems under their jurisdiction.

Co-ordination and Co-operation Vital Factors in Solving Traffic Problems

CHARLES M. UPHAM
Vice President
Eno Foundation for Highway Traffic Control, Inc.
Saugatuck, Connecticut
and
Engineer-Director
American Road Builder's Association
Washington, D. C.

BRINGING all branches of the highway industry and profession together, this Highway Traffic Conference, sponsored by the Eno Foundation for Highway Traffic Control, Inc., is an extremely timely effort to focus attention on traffic problems, both during the war and for the post-war period.

Only on rare occasions have representatives of all the branches of the highway engineering and safety professions been brought together. In this conference there are represented traffic and safety engineers, highway administrators and engineers, educators and enforcement officers. Through the co-operative effort of specialists, a world of good can be accomplished in achieving the objective of the Eno Foundation—the utmost safety in the operation and use of the motor vehicle.

No tribute is too great for the man who throughout the years has been a leader and inspiration to all engaged in this work. William Phelps Eno became interested in traffic safety even before many people realized that the motor vehicle would become commonly used. The vision possessed by Mr. Eno is well written in the fact that his first accomplishments date back to 1899, when in New York City he began laying the ground work for the adoption of the first traffic code in the United States. He was instrumental in establishing traffic control through adoption of the English Block System in 1902 and hiring of three mounted traffic policemen. His effort produced New York City's first traffic code, and the first in the United States in 1903.

In 1905 he fostered the adoption of one-way traffic in New York City, which was followed a few years later by similar regulations in London and Paris. The rotary system was first adopted in New York and then later in Paris and London; afterwards by practically all countries.

Throughout the years Mr. Eno maintained his vigorous interest in safety work. In 1921 Mr. Eno endowed the Foundation as a means of establishing a center for traffic study and information. In 1938 he established headquarters in the building erected for that purpose at Saugatuck, Connecticut.

Mr. Eno's work has been endorsed largely throughout the world. In 1925, he was made Chevalier of the Legion of Honor for his work in France before and after World War I, and in 1935 was promoted to Officer. New Scotland Yard and the Ministry of Transport of England have welcomed him, as have the Prefectures of Police, the Prefecture de la Seine and the Department of Public Works of France; also the Police Departments of Brussels, Berlin, Rome,

Naples and many other places.

It is interesting to note that even Japan translated three of his books and many articles. A book published in Swedish urges his methods, also one written in Spanish for Buenos Aires.

Highway administrators and engineers, traffic and safety engineers, educators and traffic enforcement officials face an unprecedented problem. That problem can only be solved by the close co-operation of the various branches of the highway industry and profession. We must not wait for the end of the war to make our post-war plans. We can see the immediate post-war problem quite clearly and by starting our co-operative work now we can be ready with a safety program and a highway construction program that will not only save people's lives and limbs but will assist materially in solving the employment and economic problems that are bound to arise.

Roads and streets will be far less adequate for post-war traffic than they were for the traffic of 1941 and unless extraordinary speed is made in rehabilitating them and in building additional modern roadways, extremely high death and accident rates will be a certainty.

After the war it will be some time before today's wornout and costly-to-operate vehicles can be replaced. Nevertheless, when rationing restrictions are lifted, traffic volumes will spurt ahead. Unless preventive action is taken, the all time high accident record of 1941 will be quickly exceeded. In that year some 40,000 people were killed on the roads and streets—almost as many as the number of American servicemen killed in the first twenty-seven months of the present World War.

Not all of those motor vehicle fatalities and the million or more yearly injuries can be attributed to road and street structures. Yet accidents don't just happen—they are caused. In a large percentage of the cases, inadequate, unsafe highway conditions have been either a major cause or a contributing factor.

As we emerge from this war, we will be faced with deteriorated road and street systems. Our highways are a casualty of the war, for today road and street construction is virtually at a standstill. Even maintenance, necessarily, is being neglected to an alarming degree. Shortages of manpower, materials and equipment have placed the highway agencies in the position of watching good highways become bad highways, of seeing highways, which with proper maintenance would last another five or ten years, disintegrate into rough and dangerous arteries.

Beyond the need for adequate highways from the safety standpoint, this nation must have a considerably improved network of roads and streets to meet economic needs. Just before the war a total of 7,000,000 people had jobs in highway transportation, which includes all highway construction, automobile manufacturing and allied activities. To reach that peak of employment again and to surpass it, highways must be built and safety work conducted on a scale never before achieved.

The nation's social and business life is built around the motor vehicle, yet, by and large, highway construction has been treated as a necessary evil. Studies of the U. S. Public Roads Administration have demonstrated beyond all doubt that before the war our highways were wearing out faster than we were building them.

The studies and recommendations presented here at this Highway Traffic Conference will constitute an invaluable contribution to the solutions of the many interrelated problems involving the safety and well being of drivers, car riders and pedestrians.

Tribute

BY MR. S. W. TAYLOR

Editor

Rider and Driver

FORTY-FIVE years ago, a gentleman of distinguished, but modest, bearing appeared at the office of The Rider and Driver in the Cumberland, since replaced by the Flatiron Building, at Broadway and Fifth Avenue, 22nd and 23rd Streets, and said he had written an article on much needed reform of street traffic, his name being William Phelps Eno. The article appeared in The Rider and Driver January 20th, 1900, the first ever published on the subject and was followed with others, by Mr. Eno, all of them copied in the daily and weekly newspapers and other magazines. This publicity aroused interest to such an extent that the New York Police Department in 1903 organized the original special traffic squad of three mounted men for its operation. The work from there on then extended rapidly throughout the world, under Mr. Eno's inspiration (adopted by the military in both World Wars), the City of Paris proclaiming his traffic code as Le Systeme Eno. The latest development of this cosmologic benefaction, signified by the motto "Ex Chao Ordo"—order out of chaos —is this Conference, under the auspices of the Eno Foundation for Highway Traffic Control, the endowment of which, as an affiliate of Yale University, 1933, is the embodiment of Mr. Eno's lifetime devotion to the public weal. The magnitude of the oak that has grown from the acorn of this undertaking and its immeasurable significance may be gleaned from the extent of the agenda as showing the importance the work has now reached.

The Functions and Responsibilities of Traffic Engineers

HAROLD F. HAMMOND
President
Institute of Traffic Engineers
and
Director
Traffic & Transportation Division National Conservation Bureau,
Accident Prevention Division of Association of Casualty & Surety Executives
New York, N. Y.

WHAT IMPORTANT SERVICES may the traffic engineer expect to contribute toward the achievement and continuance of safe and efficient transportation on streets and highways in the post-war years? In what ways will the scope and program of the traffic engineer be broadened and recognition of traffic engineering as a profession be increased?

To evaluate the future, it is well to first review the past.

TRAFFIC ENGINEERS OF YESTERDAY

In the past the majority of the time of the traffic engineer was spent in attempting to alleviate existing traffic conditions which were bad. He found himself involved in a multitude of spot investigations and work with stop signs and traffic signals. It was difficult for him to plan or put long term improvements into effect, since so much of his effort was of necessity concerned with merely catching up with existing problems which demanded immediate attention. He was literally "behind the eight-ball" most of the time.

TRAFFIC ENGINEERS OF TODAY

Today the traffic engineer is also confronted with many immediate problems. There are the unusual and urgent problems of war transportation, the conservation of existing vehicles and the staggering of hours, to mention but a few. He is overworked, since approximately 30 per cent of our traffic engineers are now in the armed services—a very high percentage. It is significant that most of these are holding commissions in the Army Transportation Corps.

Nevertheless, the traffic engineer is definitely planning for the post-war period. Both as an individual and as a member of a profession, he is going through a transition period. The overall reduction of 40 per cent in traffic movement on our streets and highways has given him a certain amount of opportunity to survey his position and to organize his thinking in regard to the future. The increasing scope of his profession is best indicated by the new definition of traffic engineering which was recently approved by the Institute of Traffic Engineers:

> "Traffic engineering is that phase of engineering which deals with the planning and geometric design of streets, highways and abutting lands and with traffic operation thereon, as their use is related to the safe, convenient and economic transportation of persons and goods."

TRAFFIC ENGINEERS OF TOMORROW

After the war, we may expect the traffic engineer to assume more and more of the responsibilities and activities of a full-fledged transportation engineer. Although he will still carry on many of his pre-war activities dealing with immediate improvements and amelioration of ex-

isting conditions, he will also look beyond the present and "patchwork" efforts, which now occupy so much of his time, and think and function on a long term basis as a highway transportation engineer. His major objectives will be to help provide maximum speed, safety and economy to the transportation of persons and goods. Absolutely essential among his qualifications will be a thorough knowledge of every ramification of the improvement of traffic operation.

The Functions and Responsibilities of Tomorrow's Traffic Engineer

Scope

The traffic engineer of tomorrow will accept responsibility for the development of sound, factual traffic data and for the proper evaluation and interpretation of such data. It will be his task to ensure that traffic engineering improvements will be in close accordance with both immediate and anticipated traffic needs.

He will assume responsibility for the problem of achieving more uniform and safe movement of traffic (for example, by reducing the usual considerable variations in speeds).

He will stress the need for and assist in the application of sound traffic engineering principles to street and highway design.

He will work for the segregation of through traffic from local traffic.

He will seek more permanent solutions to parking and terminal problems.

He will devote increased attention to providing adequate terminal and street facilities for public transit and commercial vehicle traffic.

He will encourage greater consideration of and assist in properly relating traffic movement to community planning.

He will relate his activities more closely to the work of others in one or more phases of transportation.

Specific Activities

The traffic engineer of tomorrow will focus attention on the following:

Maintenance of a more *constant measure* of traffic characteristics, increased attention to the *origin and destination* of traffic and emphasis on the *time element* in the movement of traffic.

Greater use of one-way streets.

Conversion of existing or reconstructed wide thoroughfares into limited-access streets and highways by more restriction of turning movements and the use of continuous raised medial strips.

Provision of attractive and convenient off-street parking so that more curb parking may be prohibited in congested areas.

Application of traffic control devices and measures that will function more in accordance with varying traffic demands and conditions.

Application of more pedestrian safeguards through greater use of pedestrian barricades, special walks, islands and grade separations and greater use of pedestrian signals.

Development and application of improved forms of intersection channelization to provide safer but also more rapid movement of traffic.

The Relationship of Traffic Engineers to Others in Transportation Work

Traffic Engineering, like many other professions, has many objectives in common with or closely paralleling those of related professions. In all such instances, it is advantageous to work co-operatively with others in pursuit of common objectives. Thus, the traffic engineer should give increased thought to the possibilities of effort in co-operation with highway designers, road builders, po-

lice officials and traffic safety educators, since all of these are working in some respects for the same goals.

WORK WITH THE HIGHWAY DESIGNER

The traffic engineer should seek to furnish the highway designer with more traffic facts and with thorough interpretations of such facts.

He should check highway designs from the standpoint of traffic operations, paying more attention to the fact that neglect of geometric design based on traffic demand has frequently resulted in high accident rates, congestion and inconvenience. It is true that the traffic engineer has frequently been willing to check designs with the highway designer but has sometimes met with little interest. In such instances, he should exert tact and diplomacy to insure increased co-operation and mutual understanding of objectives.

He should enlist the aid of the highway design engineer in seeking to incorporate the cost of necessary signs, signals and highway lighting into the original construction costs.

WORK WITH THE ROAD BUILDER

The traffic engineer should work in close co-operation with the road builder in furthering the application of standard and uniform traffic signs, signals and other guiding, warning or control devices to roads open to traffic but under construction. Co-operatively, they should urge suitable reconstruction of streets and highways for greater traffic facilitation and improved safety.

WORK WITH THE POLICE

The traffic engineer should supply the police with pertinent traffic facts in order that the police may first, more readily understand what the traffic engineer is attempting to do and second, be equipped with factual data on which to base the assignment of traffic officers and motorcycle squads.

The traffic engineer should also exert his influence with the police in order that the police, when called upon to perform limited traffic engineering work, will apply standard traffic engineering practices and equipment.

He should encourage the police to provide him with up to date traffic accident data and driver and pedestrian obedience facts.

WORK WITH TRAFFIC SAFETY EDUCATORS

The traffic engineer should maintain close contact with and interest in the efforts of state education, motor vehicle and highway departments, individual schools and other interested agencies and groups to develop increased driving skill through high school and public driver education. He should render assistance to educators in familiarizing students and the public in the purpose, functions and observance of traffic control devices, signs, signals and markings.

Some Important I. T. E. Objectives for 1944-1945

Considerable insight into the trends in traffic engineering may be gained from a survey of important and immediate objectives of the Institute of Traffic Engineers.

RESEARCH

Work in research will constitute a major activity. The Institute plans aggressive encouragement of original traffic research in order to increase our still limited knowledge of traffic characteristics. The need for this sort of work was indicated by the recent Traffic Engineering Work Conference held at Yale University under the joint sponsorship of the Yale Bureau for Street Traffic Research and the Institute of Traffic Engineers. As an example of needed research there should be greatly increased measure-

ment of traffic in terms of "traflow" units.

TRAFFIC ENGINEERING DEPARTMENTS

Traffic engineers should campaign for and render assistance in the establishment of effective and adequately staffed traffic engineering departments or bureaus in every state and in every city of 50,000 population or more.

It is suggested that smaller cities should maintain part time traffic engineers, call on the state traffic engineers for assistance or seek the aid of traffic engineers from consulting firms and national traffic organizations.

INCREASED CO-OPERATIVE ACTIVITY

The Institute of Traffic Engineers plans expansion of its co-operative activities to include working more closely with other national groups interested in and responsible for one or more phases of traffic and transportation. The Institute is already co-operating on various projects with such national agencies as the American Association of State Highway Officials, International Association of Chiefs of Police, American Standards Association, National Conservation Bureau, National Safety Council and others.

Conclusion

While the traffic engineering profession has no cut and dried blueprint for the future, nevertheless it is possible to anticipate general trends and to plan accordingly. It is a certainty that opportunities for constructive work and worthwhile participation in community and state planning and accomplishments will be greatly increased. The post-war era is certain to find us with far more vehicles, drivers and billions of miles driven than is generally anticipated. Although present estimates indicate fifty million drivers, fifty million vehicles and six hundred billion vehicles miles per year by 1960, these estimates may fall short of actuality. Whatever the totals may be, however, we already know that the traffic problems of the future will form an inspiring challenge to the traffic engineer, highway designer, road builder, police official and traffic educator. It is certain that the successful solution of our transportation problems calls for the best thinking and effort, on both an individual and a co-operative basis, of all these groups. Certainly if we work together we will have a better chance of conquering our traffic problems than if we continue to operate as independently as we have in the past. I strongly urge a great increase in co-operative activity as well as overall improvement in the objectives, scope and quality of the work now being carried on independently by traffic engineers and others.

Police Responsibilities in Traffic Law Enforcement

L. A. HINCE
Inspector
Federal Bureau of Investigation, United States Dept. of Justice
Washington, D. C.

IT IS A PLEASURE to participate in this conference of the Eno Foundation and to bring you the warm regards of Mr. J. Edgar Hoover, the Director of the Federal Bureau of Investigation. On his behalf I also wish to extend special greetings to Mr. Eno, a great pioneer in traffic control, and to the staff of the Eno Foundation our appreciation for the very kind and sympathetic attitude which has been shown toward those of us in law enforcement.

Though law enforcement agencies have been in existence for literally hundreds of years, the automobile is quite new. Yet it is so intimately connected with our daily lives that we do not always appreciate the tremendous adjustment in law enforcement which has been required during the last twenty years as a result of the advent of the motor car. This adjustment has involved a shift in responsibilities, in personnel assignments and equipment affecting from 30 per cent to 90 per cent of departmental activities. As in all other phases of human conduct, the law enforcement agency is responsible for the protection of the life, limb and property of those involved in traffic accidents. Here the responsibility of law enforcement is to hold the reins on a useful but highly spirited mechanical steed. Fast-changing traffic conditions, of course, necessitated drastic changes in our law enforcement agencies. We had to revise our entire conception of the responsibilities of the police executive and had to acquire far more materials, equipment and training than ever before. The development of the automobile also presented to the police a problem in enforcement entirely different from previous problems. The violator in traffic cases is an unintentional violator as a rule. He is not a criminal in the usual sense and, accordingly, enforcement procedures had to be devised and executed with this realization in mind. Here, also, because of the large number of contacts made with decent and responsible citizens, the police have the opportunity to render real service through the expediting of travel and thus act in a positive rather than a negative way in the affairs of citizens.

It is in the field of training that the greatest internal job of law enforcement organization lies. The police chief is responsible for the training of his men and for a decision as to the scope of training to be given. A primary question involves those who should be trained. Who should be trained? The obvious answer is all police officers who do the job and this means all line officers. It means that the officer on the street should be trained to handle any normal problem arising on his beat, whether it be on foot or on automobile patrol. The Federal Bureau of Investigation does not subscribe to the school of thought which says that the average police officer is too unintelligent to do traffic work. Mr. Hoover has worked with the police for twenty years as Director of the Federal Bureau of Investigation. They have surely exhibited no lack of intelligence in their prompt recognition of the need for training and its effectiveness. We have found in the police the most receptive group of governmental officers with whom we deal. In fact, it

would be extremely difficult to name any other group of similar size which has shown more ready acceptance of training or more progress in training than the police chiefs in the last nine years. It is true that when the FBI National Police Academy was founded in 1935 there were only a few police schools in operation in the United States, but in the nine years which have followed schools have been established in several hundred departments. Today, no department of appreciable size is without the services of a police school or the opportunity to give training to new personnel and to make in-service training available to experienced officers.

It has been a great privilege to cooperate with other law enforcement agencies in this advance and to observe the progress of training programs. Just a few days ago representatives of the Federal Bureau of Investigation had the opportunity of participating in the training activities of a typical large eastern city—Baltimore—where a graduate of the FBI National Police Academy is engaged in the supervision of training schools. He has inaugurated a system of in-service training which provides a three months' course for groups of fifty lieutenants and sergeants and this course is continuously in operation. It is an inspiring sight to view. There one sees police officers with an average experience approximating ten years studying new methods and old principles. Similar schools are in operation in law enforcement organizations generally.

In the past nine years the Federal Bureau of Investigation has participated in 1513 local, county and state police schools. We have provided instructors in each of these. Everywhere an effort has been made to study with officers of every rank the fundamental principles of law enforcement, the ethics and ideals of the profession and the clinical attitude so essential to the professional job. All of us in law enforcement have tried both by example and by teaching to raise our standards. The achievement of full professional status has been reached only when training has been carried to each member of the law enforcement organization on a relatively high level.

It is not enough that the best patrolman should know how to make an arrest, fill in a routine report, observe conditions on his beat, guard against disturbances and generally keep the peace. He should know how to conduct effective interviews in criminal cases, for often the most important interviews are available on the spot before the men of the Detective Bureau on special assignment can arrive at the scene. He should have a broad general background of the law of evidence, so that he may recognize, collect, identify and preserve physical evidence which to the untrained may seem unimportant. He should be versed in the psychology of human behavior, for he, more than any other man in law enforcement, needs to be able to recognize the symptoms of delinquency and crime in the individual. He should be, and he must be, the most effective practical psychologist in our community. He must know the organization of his own department so that he can refer recognized cases to the proper prevention agencies and so prevent incipient crime, delinquency and damage. In one moment, at the scene of a street robbery he must make a decision involving the law, his personal safety, the safety of the citizen, the protection of property and the "rights of the robber"— a decision which as many as nine eminent jurists may later review after a period of months and then conclude by a five to four decision. At two o'clock in the morning outside a beer tavern, he may find a problem involving an adolescent girl and a mature man which may

call for the exercise of knowledge and judgment of a high character, an understanding sympathy and the making of a decision as to action which may change the course of a girl's life. At the scene of a traffic accident, he may be called upon to decide the issue of life and death and to preserve fundamental facts available only at the time that he is at the scene.

No one can say with justification that the training of the line officer should be at a low level. Yet it is in this area that the training of traffic law enforcement officers is weakest. This weakness is due in no small part to the efforts which have been made to perpetuate specialized traffic units to the detriment of public service at the level of the line officer. It is important that we realize law enforcement agencies will not achieve professional status through the acquisition of a fund of knowledge and technique alone. It is only when knowledge and method are placed in the minds and hands of the line officers and they are properly trained that the foundation for professional status is laid. It is not enough that specialized divisions of the department have special training and assignments.

It is true that specialized divisions are necessary in some branches of law enforcement. They are often useful from the standpoint of economy in staff work and as media for the culturing of knowledge and procedure which may later spread to the entire department.

It is the common approach of the laboratory to foster and protect culture of a promising living material in a favorable medium so that it may grow and serve as the source from which reculture may be made on a wider scale and in a large medium. It is in this last use that specialization in traffic law enforcement may be most effective. Even where found unsuitable for permanent retention, specialized traffic enforcement units have served as media in which the culture of enforcement knowledge could be nurtured until strong enough to withstand the impact of line duty. And so, if on no other grounds, the establishment of specialized units may be justified because it has allowed police executives to protect the growth of knowledge and method within a narrow segment of the department until virile enough to present them by training for us on the line.

As in all culturing, however, there is the danger of overdevelopment, of mushrooming, of infection, and of eventual rot. This is the history of cultures unless handled sagaciously and submitted to prophylactic retrictions in size and wider reculture in new media. The culture does not constitute an end in itself. It must be used and transplanted and made available over a wider area than the laboratory. If it is antiseptic or antitoxic, it must be used on cases and not on research alone. If its benefits are to be available only to a few or to a clique of so-called intellegentsia responsible for its initial development, then it is a failure.

And so with specialized units in traffic law enforcement. If the knowledge and technique developed in a specialized unit are passed on and made available for use by line officers (assuming that we are right and that the line officers are not too unintelligent to use them) then the units have done a service. But if the opposite is true and the expert in charge of the specialized unit has been indoctrinated in the theory that the average police officer is not intelligent enough to handle traffic work, then one will find that the line officers have not been trained in traffic duties, that the unit is jealous of its jurisdiction, that its cars will dash halfway across a crowded city to find

line officers standing at the scene of an accident under orders that such abstruse matters may be handled only by the intelligentsia. It is fundamental that business should be handled by the man at the scene, provided that the required action is within the scope of his authority and ability. How poorly this fundamental principle has been followed is illustrated by the experience of an editor in a metropolitan southern city who, on his way to his office last week on a crowded street car, found himself and numerous war workers delayed for a long period of time awaiting the arrival of an accident investigation unit to handle a minor accident. Yet during the entire period, line officers were available and standing inactive at the scene in accordance with their instructions that such accidents be handled only by a specialized unit.

Let us emphasize the fact that traffic control will be better, more personnel time will be devoted to traffic work and the citizen better served if more officers are trained in traffic matters. No one denies the need for specialization on a staff basis at headquarters, with experts available in mobile units for hit and run and other difficult technical problems. The suggestion now made is not to lessen the emphasis on traffic work but to increase it on a broader and more effective scale.

A traffic accident is within the authority of a line officer. Is it within his ability? What is so technical about a tape measure? What esoteric significance is implied in the adjustment of a camera? What mystery lies in the measurement of a skid mark? Does the line officer lack ability to collect broken headlight fragments, administer first aid, obtain names and addresses, protect and preserve obvious evidence? It is ridiculous to say that he is incapable. There are only four categories of investigative procedure. They are: the interview, the surveillance, the making and use of records and the collection, identification and examination of physical evidence. There are many types of investigations ranking from the most simple to the extremely complex but it is submitted that traffic accident investigations are not beyond the ability of the average officer who is properly trained. These investigations are normally not complicated because the wrongdoer is known and identified immediately in 95 per cent of the cases, without any involved investigation whatsoever, because the corpus delicti is always present and because the physical evidence is of the most obvious type and extremely susceptible to identification and examination. To claim that these investigations are so complicated, so difficult or so specialized that the average law enforcement officer cannot learn how to handle them seems strange when we realize that some of those who have been teaching them for years never had any substantial investigative experience outside this field. Do not misunderstand! Investigation work generally is not simple. An investigative problem involving the location and recovery of an individual who disappears on his way home from the office and the detection and apprehension of the criminal who may have assaulted, robbed or kidnapped him may require as much mental ingenuity as any scientific research problem and as much education and training as is needed for proper performance on the part of a lawyer, doctor or engineer. The same is true of many hit and run cases. But the great preponderance of traffic accident investigations are obviously not of such a nature. It is submitted that any aura of mystery about traffic enforcement should be lifted and that the police responsibility be interpreted to make available to the public the services of a total police personnel who are of the

ability to handle the day-to-day work.

Let us consider also the question of police responsibility in the assignment of personnel and the acquisition of equipment. All of us have seen evidences of pressure brought to bear upon police executives to devote high percentages of police personnel and equipment to traffic enforcement work. It is admitted that initially there was a need for a generous allocation to traffic enforcement work but we must now be careful to see that emphasis placed on this phase of law enforcement does not extend unnecessarily. It is the responsibility of the police executive to make allocations on the basis of the facts existing in his community and not as a result of someone's preconceived notion of what should be done in his community without a consideration of all local factors. A survey report frequently bears all the earmarks of a compilation of extracts from a mimeographed report which might as well apply to any other community in the country without a consideration of the specific problems of the community under examination. The use of such reports to intimidate the police executive and to bring pressure to bear upon him is inimical to the best interests of the community and is definitely prejudicial to the law enforcement organization.

Based on 1943 statistics, since we have been here this morning there have been five deaths in traffic accidents, three deaths by industrial accidents, five deaths in home accidents, one murder, two rapes, eight robberies, forty-five burglaries and three death casualties in the armed forces. All these are startling facts and traffic deaths and injuries are obviously so significant that no law enforcement executive will ignore them. Traffic is important and deserving of full attention and the statistics emphasize the need for adequate attention to the traffic duties as well as other police duties. Perhaps we should be careful, however, that we do not seek this attention by overreaching or by pressure tactics. Otherwise we will hamper the advancement of traffic control rather than aid in the advance which we all desire. Much more will be gained by a calm, scientific approach, by asking the co-operation of law enforcement officers, by appreciating the right of the law enforcement executive to make decisions for his own department, by respecting the responsibility and function of the law enforcement agency and by sound educational efforts.

The FBI has tried to co-operate with law enforcement executives and to assist them in carrying out their responsibilities in the training field through the establishment of the FBI National Police Academy. We have tried to give proper emphasis and attention to the training of police officials in traffic law enforcement duties. A substantial portion of the fourteen week course of the Academy has been devoted to a concentrated study of traffic control procedures. In addition to instruction in the handling of specific duties in traffic cases, we also stress the importance of traffic functions, the relationship of traffic work to other police duties and the administrative aspects of traffic control. The FBI has recognized the fact that traffic control cannot be successful unless there is intelligent understanding and effective application of traffic control procedures on the part of the police. It has also been realized that the police officer must be well trained. It is in the interest of gaining these objectives that traffic law enforcement training is being made such an important phase of the National Police Academy course.

It is the responsibility of the police executive to improve traffic law en-

forcement through the achievement of professional status by the men of his organization. Progressive training based upon fact and scientific research can accomplish this. It is the responsibility of the police executive to achieve professional status for the men on the line so that all may truthfully say that they live according to the precepts of the Law Enforcement Officers' Pledge, a pledge which Mr. John Edgar Hoover made to every law enforcement officer of the country and which every law enforcement officer should make to his local chief, community and his country:

"Humbly recognizing the responsibilities entrusted to me, I do vow that I shall always consider the high calling of law enforcement to be an honorable profession, the duties of which are recognized by me as both an art and a science. I recognize fully my responsibilities to defend the right, to protect the weak, to aid the distressed and to uphold the law in public duty and in private living. I accept the obligation in connection with my assignments to report facts and to testify without bias or display of emotion and to consider the information, coming to my knowledge by virtue of my position, as a sacred trust, to be used solely for official purposes. To the responsibilities entrusted to me of seeking to prevent crime, or finding the facts of law violations and of apprehending fugitives and criminals, I shall give my loyal and faithful attention and shall be equally alert in striving to acquit the innocent and to convict the guilty. In the performance of my duties and assignments, I shall not engage in unlawful and unethical practices but shall perform the functions of my office without fear, without favor and without prejudice. At no time shall I disclose to an unauthorized person any fact, testimony or information in any pending matter coming to my official knowledge which may be calculated to prejudice the minds of existing or prospective judicial bodies either to favor or to disfavor any person or issue. While occupying the status of a law enforcement office or at any other time subsequent thereto, I shall not seek to benefit personally because of my knowledge of any confidential matter which has come to my attention. I am aware of the serious responsibilities of my office and in the performance of my duties I shall, as a minister, seek to supply comfort, advice and aid to those who may be in need of such benefits; as a soldier, I shall wage vigorous warfare against the enemies of my country, of its principles; and as a physician, I shall seek to eliminate the criminal parasite which preys upon our social order and to strengthen the lawful processes of our body politic. I shall strive to be both a teacher and a pupil in the art and science of law enforcement. As a lawyer, I shall acquire due knowledge of the laws of my domain and seek to preserve and maintain the majesty and dignity of the law; as a scientist, it will be my endeavor to learn all pertinent truth about accusations and complaints which come to my lawful knowledge; as an artist, I shall seek to use my skill for the purpose of making each assignment a masterpiece; as a neighbor, I shall bear an attitude of true friendship and courteous respect to all citizens; and as an officer, I shall always be loyal to my duty, my organization and my country. I will support and defend the Constitution of the United States against all enemies, foreign and domestic; I will bear true faith and allegiance to the same and will constantly strive to co-operate with and promote co-operation between all regularly constituted law enforcement agencies and officers in the performance of duties of mutual interest and obligation."

Responsibility of Highway Engineers and Road Builders For Traffic Operations

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For a number of years, students of highway safety have recognized three prescribed treatments, education, enforcement and engineering, sometimes referred to as the "three E's." Each of these treatments has a definite field in which to operate and each has made important contributions to highway safety.

I shall not attempt to discuss education and enforcement. In fact, I shall limit my discussion principally to one part of engineering as applied to highway safety. My assigned subject is "Responsibility of Highway Engineers and Road Builders for Traffic Operations". This subject can be resolved principally to the developing of safety in the engineering design of highways. Some reference will also be made to maintenance. I shall not, in this paper, discuss traffic engineering as applied to the direction of traffic flow under existing conditions, street intersections, channelizing, parking, signs, signals, marking, etc.

It must be remembered that the faults and lack of skill and responsibility of the motor vehicle operators on the highway are more pronounced than in the operators of any other type of transportation vehicles. The railroad locomotive engineer, the helmsman of the ship and the pilot of the aeroplane are all highly skilled operators. There are few amateurs. There are, of course, many skilled operators of trucks, buses and motor cars, but there are also many who are neither skilled nor responsible. Hence, more than ever, safety must be built into our highways in order that they may be safer for all the users of the roads.

It will be impossible to go into design details in this report except in a general way. A great amount of attention has been given to the design of structurally sound pavements. The proper compaction and treatment of subgrades has been carefully explored. The selection and inspection of paving materials, the design of sufficient slab thickness to carry anticipated loads and the durability of the pavement structure have been carefully considered. We have also paid attention to smooth-riding and skid-proof surfaces. The latter two are definitely a contribution to safety.

We also have been careful in working to safe sight distances, both horizontal and vertical. These items have been reasonably well established with the highway designer. More recently we have turned our attention to the divided multiple lane types and now are turning to the development of the limited access or expressway type.

The highway department should have a separate bureau of traffic and safety. Most state highway departments have made good progress in this direction. The functions of a traffic and safety bureau are many. To handle safety design there should be specialists in this type of work who should review and prescribe safety treatment on all projects when they are in the preliminary stage of design. While a progressive design bureau will always have some well trained engineers in safety features

of design, special treatment and special problems can best be prescribed and handled by those who specialize in this field. It is always well to have a skilled traffic engineer check plans before being completed.

The following is intended to cover briefly some of the major items to be incorporated in designing safety in a highway.

Lane Widths

The progress made by the designer of motor vehicles in the past fifteen years has been almost phenomenal. Speeds and load carrying capacities have progressed more rapidly than highway design. It might be said that the public has been more willing to buy and pay for new models of motor vehicles than to pay for new and improved highways over which to operate the vehicles. The increase in volume of traffic has probably been even greater than the development in the perfection of motor cars.

Speed, widths of vehicles and volumes of traffic have progressively changed standards of lane width from eight to nine to ten feet and now on the main highways to eleven and twelve feet. High speeds require more width to pass safely. On heavily travelled roads, excessive shoulder maintenance costs can be reduced by wider pavement lanes. Many old pavements are now being salvaged by widening to standard lane widths and resurfacing. The value of such a program, from both a safety and an economic standpoint, is enormous. A narrow and rough pavement is dangerous. Widening and resurfacing with some grade and line correction and curve super-elevation makes a much safer road and at a nominal cost preserves the investment for many years.

Multiple Lanes

The three and four-lane pavement came as a simple outgrowth of the need for more traffic capacity. For slow moving traffic, the three and four-lane undivided type served reasonably well and still does where the abutting property is developed and there is need for access at many and closely spaced intervals.

Where high speeds prevail on heavy traffic roads, the divided type providing for separation of opposing traffic is unquestionably the proper design, from both a capacity and a safety standpoint. A four-lane divided highway with eleven or twelve foot lanes is the generally accepted standard. The width of the median strip may vary with conditions, cost of right-of-way and damages, topography, etc., being some of the factors which must be considered in determining lane widths. Three lanes in each direction are used in a number of urban areas and in a few cases more. Generally, not more than three lanes each way is recommended.

The need for multiple lanes oftentimes can be more intelligently determined on the peak load traffic information than on the average daily traffic. The highway with a reasonably good hourly distribution of traffic may be much safer and more satisfactory to travel than one with a smaller average daily traffic but subject to high peak loads at certain hours.

The three-lane road still meets with some favor in certain places, principally where the directional flow of the heavy volume of traffic is reversed at certain peak hours. It is a dangerous type for high speed traffic, especially where the sight distances are short.

Under certain conditions, a third or passing lane may be added to a two-lane pavement. A road carrying a considerable number of mixed fast and slow moving vehicles is dangerous. The worst condition exists on long grades where trucks naturally slow down. A third lane added to the

outside and ascending side of the two lanes is a decided addition to safety and convenience, provided the slow vehicles observe the rules of the road. The same treatment can be recommended at intervals on flat grades where mixed traffic is up about to the limit of a two-lane road.

Sight Distance

Speed is the controlling factor in determining safe sight distance. Topography in many cases makes it difficult to design for safe passing at all points on a highway. The proper marking of non-passing sections greatly increases the safety to the driver. Safe sight distance for high speeds ranges usually from one thousand to three thousand feet, depending on whether opposing traffic is on adjacent or separated lanes.

Shoulders

Shoulders should be all weather and sufficiently wide to permit vehicles to leave the pavement completely when necessary to stop. In some cases, shoulder treatment is desirable, particularly where traffic uses the shoulders, but it should be of a type contrasting with the pavement. Grass shoulders, where they are not used to considerable extent except in emergencies, add greatly to the appearance of a highway, prevent erosion and reduce maintenance.

Limited Access

The most urgent problem today and in the immediate future in many states is that of providing adequate traffic facilities in the urban areas, particularly those of metropolitan character. We need in these areas highways which will collect, carry and distribute large volumes of traffic quickly and safely. The peak hour problem in many such areas has almost hopelessly snarled traffic on the existing facilities. Limited access or express ways provide the logical solution. The progressive highway engineer, planner and designer will waste little time in the future in trying to solve major urban arterial problems through the means of street widening. Major street widening projects usually involve disproportionately high right-of-way and damage costs and the functional advantages gained are often disappointing. We still have the interruption of traffic by intersecting streets; we merely increase the number of lanes but not to any great extent the speed or even the safety.

Express ways entering cities should be located either on blighted or on undeveloped property as much as possible, leaving the existing streets to serve local traffic. Intersections and interchanges should be limited to the principal collection and distribution points. Grade crossings, both railroad and highway, should be separated.

Ribbon development can be avoided through limited access. Merely relocating a main highway through undeveloped areas only defers local traffic interference, if roadside or ribbon development is permitted to spring up along the new location.

The highway planner must not only bring the traffic into the city on an express route, but he must so plan that the express way can be unloaded and the traffic properly distributed without congestion when it reaches its destination. Careful origin and destination studies provide the necessary information to make the proper decisions on this question. Express routes between major centers of population or the so-called rural trunk roads involve the same general principals as in the urban areas. However, modifications can be considered, such as strict limitation of access, grade separations, etc., when the cost and the need are carefully weighed against each other. In many cases, as in urban improvement, the

highway can be more satisfactorily and economically located on all new location, leaving the old road to serve local traffic and existing developed property.

In some cases the existing road, if in good condition and reasonably well located, can be preserved and used for one-way traffic. Right-of-way can then be acquired parallel and adjacent to the old road for a new pair of lanes. The median strip under such conditions may vary considerably in width and the grades may differ. This is especially true in rough country where the topography does not readily lend itself to wide graded sections on the same level. In some cases bypass routes should be planned to siphon off the through traffic approaching the large cities. In some respects bypassing of the smaller cities is even more important due to a higher percentage of through traffic. In closing the discussion on limited access development, it might be said that the highway engineer and road builder should interest himself in promoting in the various states legislation which will provide for the acquiring of right-of-way with limited access provisions. This legislation should be broad enough so as to permit not only the state but the city and county to operate under it.

So much for the highway engineer's and road builder's contribution to planning and designing of safe highways. Now a few remarks about highway maintenance from the safety standpoint. Pavement surfaces must be kept smooth and in good repair. The same is true of shoulders. Careful patrolling will do much to prevent these items from being neglected.

Blind spots and sharp, horizontal and vertical curves should be given special treatment and carefully marked if they cannot be corrected. Sight obstructions at intersections, curves and railroad and highway crossings can often be corrected or improved and make these locations safer. Guard rails on embankments, bridge approaches, curves, etc. are of much help. Center line markings, luminous signs, etc. all add to safety. Slippery surfaces can be deslicked and bad skidding accidents often prevented.

Snow and ice control is very important. The travelling public expects to be able to use the highways at all times and all hours day and night. Proper equipment and materials, trained personnel and a system permitting quick action in emergencies are all necessary. Definite assignments of sections of highway to certain employees should be made. Operators of snow and ice control equipment should be under standing orders to get out on the road at any hour of the day or night when needed without being ordered out from headquarters and to keep going until their job is completed or they are relieved.

A system of reporting road conditions during winter months so that early morning and evening radio broadcasts over the regular stations can be made, is a service of great value and much appreciated.

The highway engineer and the road builder is making and can make greater real and lasting contributions to the safety of our highways. The work of the enforcement and educational agencies must and will go on regardless of what the highway engineer does. The engineer and road builder, through proper design and maintenance, can and does contribute mightily to the elimination of the physical causes of accidents on the highway.

The Education of Road Users

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The subject of education of highway users is a difficult assignment and a subject upon which I do not feel qualified to speak.

My approach to the problem of highway use has been one of being taught by the public as a result of study of traffic habits. Great progress has been made in determining the characteristics of motorists' travel not only through volume counts at given locations at given periods of time but more particularly through the study of origin and destination habits of individuals and groups.

It is the study of this information that permits roads to be built safely and efficiently and to serve the road user.

Behind the state-wide highway planning surveys that have been carried on since 1935 lies the fundamental purpose of obtaining the necessary information on motorists' habits to permit proper design, construction and maintenance of our highway facilities. Thanks to the highway planning surveys, we know know a little more of what the highway user wants when he gets behind the wheel of his motor car.

I would like to congratulate the Eno Foundation on the type of meeting that is being held today. It will help further the co-ordination efforts being made by all public officials who carry the heavy responsibility for these activities.

I think that we can take considerable encouragement from the progress that has been made by highway officials in recent years in meeting modern motor transportation demands on a co-ordinated basis.

The standard highway safety program for states was first developed in 1937 and has now been endorsed by fifty great national organizations. This program contains specific recommendations for the establishment of a co-ordinating body in each state to bring together in close administrative harmony the official departments having jurisdiction.

For the duration there has been established the war time highway traffic program which is an emergency charter having the endorsement of thirty of these national organizations and containing similar provisions, so it can be seen the principle of co-ordination has had vigorous and widespread support.

Examples of this activity are to be found in such state safety commissions as one established in Michigan, the war time activity established by the governor of New York, and in many municipalities there has been established the pattern for municipal adherence to these principles. Among notable examples that have come to my own close attention during the years is the pattern established in Detroit and particularly the organization known as the South Bend Traffic Commission.

The most significant and tremendous stride forward that has been given to this effort at co-ordination has been the work of the Highway Traffic Advisory Committee to the War Department under the chairmanship of Thomas H. MacDonald. The national committee and the

forty-eight state committees have made an outstanding contribution to the war effort. I am sure that when the entire story of the war highway program is told, great credit will go to this organization.

The work has been quietly done on a decentralized basis but the fact remains that the movement of material and workers in this national emergency has been a brilliant chapter in the history of highway transportation. It has created an administrative pattern of co-ordination which should carry into the future.

I would like to compliment the speakers who have appeared on the program this morning for the forward looking attitude they have taken for approaching these problems. I refer to the address of Mr. L. A. Hince, Inspector, Federal Bureau of Investigation, on behalf of J. Edgar Hoover; Mr. Harold F. Hammond, President, Institute of Traffic Engineers; Mr. Hal Sours, Director, Ohio Department of Highways, for the state highway engineers of the country; and Mr. Burton W. Marsh, Director of Traffic Engineering and Safety Department of the American Automobile Association, who represented the motorists.

In the broad field of highway safety we have for many years referred to the triumverate of engineering, enforcement and education. Because the accomplishment of safety objectives in these fields involves the molding of public opinion, a related phase of our subject today is what is known as the science of public relations.

No short definition is adequate to tell the scope and worth-whileness of an adequate public relations program, but the work consists essentially of telling the public about the official job. It appears to be one of the most important elements of a proper administrative program today and is in every sense a field for professional attention.

More than ever before we have a job of public education to sell a modern conception of highway needs to the public if we expect to build them after the war. By this modern concept I, of course, refer to the need for improvement of roads within the classifications into which they are properly arranged.

Since there obviously is not enough money available to improve our roads equally in time or quality, it becomes a requirement that we study the needs within the several classifications of roads and provide improvement programs within each classification to care for the most important needs of the system.

This applies to the system which as yet has to be officially designated and is known as the interregional highway system. It applies to our primary Federal-aid highway system and the elements of the state highway systems in addition thereto. It includes the needs of our secondary roads in rural areas, and to our urban streets.

The tools which are used in an adequate public relations program include the use of radio and the press together with the liberal use of literature and illustrations to carry the story directly to the people themselves. These are the tools that will carry out the intention indicated in the topic that had been assigned to me this morning.

Traffic Trends

BURTON W. MARSH
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It gives me a great deal of pleasure to participate in this program of the first foundation in the field of highway traffic. Its founder, William Phelps Eno, was the pioneer in highway traffic control. Mr. Eno should derive deep satisfaction from noting the trends in traffic regulation and control toward a more and more widespread use of the principles and policies which he advocated so early.

I refer to such matters as much more widespread use of the one-way principle and of rotary traffic; to the development of simple, short statements of rules which should govern the actions of drivers and pedestrians in contrast to the long, legalistic acts and ordinances which once were published and placed in the hands of the public for their consideration. Mr. Eno, decades ago, saw that what drivers and pedestrians should be guided by, should be very simple, terse, direct rules and not too many of them. It has taken a long time to get around to that concept, but it is now becoming universally used.

I refer also to the simplification and improvement of traffic signs. Mr. Eno gave leadership to the reduction of the number of words on traffic signs to a minimum and to the use of effective symbols. Over a period of years the trend has been very positively toward the lines of Mr. Eno's original concepts on simplicity and symbols.

One more example: Mr. Eno pioneered in the idea of studying the reasons for traffic problems and determining the solutions in light of the facts. The creation of the Eno Foundation showed his convictions on that matter and on importance of much greater attention to traffic problems. So it is fitting that a discussion of traffic trends should be opened with the giving of laurels to this man who, decades ago, had so much vision and who pointed the way on so many matters in the field of highway transportation and traffic control. I regret very much that he cannot be here as I would like to urge a round of applause in recognition of his valuable contributions.

It is now my purpose to discuss a number of more recent trends in the field of traffic and highway transportation.

TRAFFIC ACCIDENTS

There is a sobering trend in traffic accidents. The traffic death toll is on the increase again. Beginning in October, 1943 there has been a greater death toll each month for which reports have been summarized by the National Safety Council than for the same month of the preceding year. In fact, the January toll was 30 per cent above that of the year before.

This is particularly sobering because there is nothing like a comparable increase in highway travel. There is very real danger that many officials and many of the public will have been lulled into ignoring the traffic accident threat because of the reduced figures resulting from wartime decreases in travel and wartime travel restrictions.

It should be emphasized that the threat of sharp increases in traffic fatalities is exceedingly real. Among

the bad factors are: the psychology of the people in celebrating victory and reacting to relaxation of restrictions, very severe losses of traffic police and other traffic control personnel, poorer condition of vehicles, much poorer condition of traffic signs, markings, etc., bad road conditions in some places, and reduced lighting both from depreciated headlights and from reductions in street and highway lighting.

What the future trend in traffic accidents will be, will be dependent principally upon what the highway traffic and safety forces of this country do in the near future, and on the public attitude.

Traffic Speeds

The long-range trend in open road speeds has been distinctly upward. As Harold Hammond brought out in his recent interesting paper, average driving speeds for cars on two-lane rural roads increased from about 33 m.p.h. in 1920 to about 41 m.p.h in 1930, and about 48 m.p.h. in 1940. Thus, at the time of Pearl Harbor, the average open road speed was nearly 50 miles per hour.

Public Roads Administration studies show that the average speed was reduced from about 48 m.p.h. to about 37 m.p.h. in the period from Pearl Harbor to October, 1942, just after the ODT order for a 35 m.p.h. limit had been imposed. It is interesting to note that the biggest drop in speed occurred when that order was issued.

Now the most interesting thing from that point on is that average speeds have steadily been inching their way up again until at the end of 1943 they were at 41 m.p.h. Likewise, the percentage of all vehicles exceeding 40 m.p.h., according to the same studies, rose from 28 per cent just after the ODT order to 48 per cent at the end of 1943.

It would appear that the public is apparently not convinced of the necessity of the 35 mile speed limit and it apparently is becoming less convinced as time goes by. This is in part due to the encouraging reports on the production of synthetic rubber tires. Unfortunately, those best informed say that we are not out of the woods yet and strongly urge continuation of careful conservation programs by the public. But the trouble is that their voices are not being heard or their reasoning is not being accepted by very large proportions of the public.

One lesson we, as a people, should learn from this failure to give proper attention to conservation of now irreplacable passenger cars which are so essential to the American war effort and civilian economy is that support can only be obtained (1) if there is general agreement on the facts of the situation and the needs, (2) vigorous statement of those facts and needs by a spokesman of proper stature in the public mind, (3) clear-cut and positive statements as to just what it is desired the public do and why, (4) general co-operation by officials everywhere in the maintenance of discipline in line with the needs, (5) forthrightness with the public in announcing modifications in what the public should do as these become possible or necessary, (6) a public educational program consistent with the importance of the objective. I think it will be generally agreed that in the matter of tires, gasoline, speeds, car conservation, etc. there has been failure to meet many of these essential requirements.

As things are now, it is reasonable to predict that speeds will continue to inch up unless some very vigorous forthright action is taken—and frankly, it will be quite hard to get the situation back in hand as it should be, after the confusion, lack

of understanding and mishandling that have occurred to date.

As restrictions are relaxed, the tendency will be for speeds to jump up, certainly to pre-war levels if not beyond. Especially in the period of release and jubilation when victory comes, it is all too likely that there will be a speed splurge, in part induced by psychological exhilaration and sense of release from restraints. That would be a period of great danger because along with increased speed there would be a tendency toward more drinking and driving, toward a more calloused, carefree and careless attitude, toward ignoring the poorer vehicle conditions which will exist, toward making "whoopee" for a while. Herein is a tremendously serious challenge to those who are working for highway safety. Let us hope that sensible measures will be taken, for in the balance are hundreds if not thousands of lives and serious or permanent disabilities.

Looking further ahead, speeds can be expected to vary considerably according to the type of highway, traffic, car, etc. On the modern freeway a higher speed is obviously much safer than on a crooked old country road. There are two points, however, which I would like to emphasize against the idea of terrifically high open road speeds anywhere. The one is that 85 per cent of all passenger car trips are less than 20 miles in length. There isn't very much merit in terrifically high speed for short trips. The other point is that the driver himself imposes very definite limitations as to top speed.

City speeds is another important subject for which time is not now available.

Traffic Volume

Analyses by the Public Roads Administration for rural roads show a peak in highway travel in August, 1941 and a low point in January, 1943. The 1943 average rural highway travel is about 60 per cent of the 1941 average. Rural travel volumes have been increasing slightly in recent months but this may be due to mild weather conditions. It is not expected that this year's travel will exceed that of last year considering gasoline and tire restrictions—that is assuming that the black market on gasoline doesn't further increase considerably. Neither is it likely that the volume will decrease much more.

When restrictions are removed, volumes will, of course, increase but they cannot be expected to return to the immediate pre-war peak because so many cars will be no longer in service. However, it is said that automobile production can be resumed within six months after peace and the removal of restrictions. This will of course be with what are basically the 1942 models.

Potential capacity is such, as a result of war expansion, that it is said that as many as six million passenger cars can be produced within a year following resumption of full production. The minimum number of passenger cars is not likely to fall below twenty million. That means that within three to five years after peace we *can* get back to pre-war registration.

As to the long range trend, the Public Roads Administration estimated some time ago that by 1960 vehicle mileages would be double those of 1940. This estimate is based on an increased vehicle registration and an increased mileage of travel per year per car.

Some have thought that air travel would replace a large part of highway transportation. While air travel will naturally increase, it is not likely that it will have a large effect on vehicle mileages of highway travel. Eighty-five per cent of all automobile trips are less than twenty miles in

length. Obviously, the airplane is not going to supersede that kind of travel. It is logical to expect that it will replace a substantial amount of the long distance travel but this constitutes but a small percentage of the total annual vehicle mileage. Futhermore, airplane travel will cause certain increases in highway travel.

Wartime Personnel Losses

Other wartime trends include extremely serious losses in personnel dealing with highway transportation problems—including traffic police, traffic engineers, accident record analysts, highway engineers, highway maintenance people, etc. These losses are both to the armed services and to war industries. The drain is extremely serious and the effects are being felt and will continue to be felt in increasing severity unless correctives are instituted.

For example, one reason for the increase in accidents is that there aren't enough police patrolling the road, checking violations, investigating accidents, etc. There is a serious deterioration in the condition of traffic signs, signals and markings. Many a traffic sign gets out of place or broken and isn't given proper, prompt attention.

Much of the road surface marking which was so useful is not being continued. Signal lenses are not kept as clean as they ought to be in many places. Lights are sometimes out. Signal timings are not kept up-to-date. Adult crossing guards for school children are not available in many places.

Naturally these bad conditions are cumulative and they will have their effects on the accident record more and more until proper corrections are made. One of the challenging questions which is going to arise as to replacements is whether the salaries offered are adequate to attract the type of personnel needed.

Trends in Road Conditions

Recently observations made in a large number of cities in many states of the country by representatives of our Association indicate that by and large rural roads are standing up rather well under the impact of wartime traffic and difficuties as to maintenance. In a great many cities, however, streets are in bad shape—principally for reasons which have been presented above.

Fortunately it now appears that the War Production Board may lift restrictions in order to permit more highway repair work this summer. Thus, instead of the present limit of $200 on any repair work or new construction without a special application, there are indications that repairs may be permitted as long as they don't exceed $5,000 per mile, and more liberal provisions for the replacement or repair of bridges may be made.

The bad condition of city streets ties in with a trend of long duration which warrants great emphasis. For years cities have been neglected as to their fair share of highway improvements. The principal reason is that necessary funds have not been available from municipal resources and the states in general have been returning very little, if any, of the special highway user taxes for city improvements. The result is that the places where motorists find the bottlenecks today are in cities. Major emphasis in highway improvement programs in the years ahead should be devoted to urban areas. Fortunately, there is a very definite trend toward acceptance of this responsibility and it is at last reasonable to expect that the cities are going to get their turn for substantial parts of the motorist taxes for modern-type highway facilities.

Trends in Highway Types

Highly important trends are developing as to types of highways which are receiving emphasis. Thus, it is highly encouraging to note that freeways with controlled access only, parkways and other special expressways, are receiving increased emphasis. The recently issued report on Interregional Highways, prepared by a distinguished national committee under the chairmanship of Public Roads Administrator, Thomas H. MacDonald, and presented in turn to the President and by the President to the Congress, will undoubtedly provide the basis for the most significant new road developments since the first days of the automobile.

This report strongly advocates new high-type highways of the freeway type where they are warranted. It goes further, however, and sets up standards for such new high-type road construction. Thus the trend is toward fitting the road to traffic requirements and it is a most encouraging trend.

Central Business District Parking

Another trend which is beginning to be seen is toward general realization that very much better provisions must be made for parking cars in central business districts. Curb parking simply cannot provide the answer and fortunately this is beginning to be rather widely realized. The trend is, of course, toward off-street parking.

Certain new developments in types of parking structures are significant, particularly the recent development known as an "open deck" garage which consists of a series of floors, interconnected by ramps but without walls (except for a parapet). In some instances the appearance has been improved by installation of inexpensive grills to break up the open-deck appearance. These structures can be built and operated much more cheaply than the more traditional type of garage structure. They represent an important trend in type of garage development and will have an important place in meeting the parking problem.

Decentralization

A development of tremendous importance to the future of our cities and to the traffic problems thereof, is the serious decentralization of residences and business which has been going on. The automobile has permitted decentralization of place of residence. This is a problem which warrants the best thinking and efforts of the best minds in our metropolitan communities. The health of central districts is seriously threatened. The tax resources of the municipal government are often very greatly reduced by decentralization, especially when the residences and businesses relocate beyond city limits, as is often the case.

There are many factors involved. Traffic is only one of them. It is, however, an important one. Considering the limited time available, I shall only say further on this point that it needs to be given very serious consideration in most American communities and that the part which highway transportation, including public transportation, can play in preventing excessive decentralization and in rehabilitating blighted areas, should receive much emphasis.

Research

One of the most significant trends in the traffic field is toward greater emphasis on basic research. Traffic researches under way are of many types. There are, for example, important studies now being made on improving the effectiveness of traffic signs. This involves design and spacing of letters, letter sizes, night visability, etc.

Other exceedingly fundamental researches of great magnitude have been in progress by the Public Roads Administration and the state highway officials for years. Results are beginning to come and they will have increasing effects on such matters as highway design, design and use of traffic signs, signals and markings, driver licensing techniques, education of drivers and pedestrians, etc.

It is highly encouraging that developments in the highway transportation field are being more and more based on sound studies and factual analysis.

Personnel Training

In recent years, the trend toward providing specialized training for persons engaged in various parts of the traffic field has been one of the most encouraging developments. In part, this is an outgrowth of a realization that it was necessary to have a much greater degree of specialization in highway transportation. Thus, for example, the traffic engineer is a relatively new specialist. So, too, are the police accident investigators, the traffic accident analysts, the specialists in dealing with driver licensing, and the specialists in the field of traffic education.

Training of these specialists has been receiving increased attention, both through relatively long training courses such as those given at Northwestern University Traffic Institute for police, Yale Bureau for Street Traffic Research for traffic engineers, New York University Center for Safety Education for educators, and through short courses usually for persons already doing specialized work but desiring to improve its quality and to advance. In June of this year, at Northwestern University was held the Seventh National Institute for Wartime Traffic Training, with special one and two week courses for traffic police, traffic engineers, high school teachers of driver training, instructors of school bus drivers, accident record analysts, etc.

Other Trends

Time does not permit discussion of a number of other important trends. It does seem warranted, however, merely to state what some of these trends are:

1. The concept that people should be trained to drive automobiles is being more and more generally accepted and high schools are increasingly setting up driver training programs.

2. The long neglected pedestrian is at last beginning to receive more of the attention which his plight warrants. Last year, for example, every state and 1,059 cities (49 per cent more than in 1942) entered the AAA National Pedestrian Protection Contest.

3. There is a healthy trend toward greater uniformity in the basic features of traffic legislation which affect the driver and pedestrian.

4. Increasing use of one-way movement is a definite and highly desirable trend. Not only is its use in cities on the increase, but many of the modern high-type suburban and rural highways will consist of two one-way roads, sometimes separated by a small distance and at other places separated by rather considerable distances, depending on topographical and other conditions.

5. There are some indications of a trend toward great improvement in the adjudication of traffic cases. The idea of a separate traffic court, or of separate consideration of traffic cases, is gaining ground. In a good many places increasing consideration is being given to the qualifications of judges who handle traffic cases. Courtroom conditions are being improved. These are a few examples.

There are a number of other interesting and significant trends. Because

of time limitations I shall stop with mention of one other of great importance. It is a very broad trend and one which will inevitably have much to do with future highway and traffic developments in America. I refer to a trend in the thinking of our people and officials to a much greater realization of the great importance of highway transportation to the American way of life.

This is another trend which has been greatly accelerated by wartime experience. Early in the war, one of the leading war emergency officials in Washington stated that it would probably be necessary to keep seven or eight million automobiles going, but that it wouldn't make much difference what happened to the other twenty odd million.

It wasn't long after that statement was made that it was found that a large percentage of war workers were using automobiles as their means of transportation to and from work. Moreover, analysis showed that our war effort simply could not continue at the proper scale unless most of our automobile transportation was maintained. To the credit of the official to whom I have just referred, it should be said that he later publicly stated that highway transportation was vital to war production and that it would be hard to place too great emphasis upon its importance.

Highway transportation will undoubtedly continue to be vital to the American way of life. Hence, we face the need for greater and greater effectiveness in our traffic and highway transportation programs.

Except for wartime restrictions, most of the trends are very encouraging.

The Problems of Highway Traffic

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Thirty years ago there were registered, for the first time in this nation, a million motor vehicles. Since that time over a half-million people have been killed in traffic and probably over fifteen million persons have been injured in the traffic stream. Under normal peacetime conditions, the economic loss from these motor vehicle accidents alone amounts to nearly two billion dollars annually. Various estimates of astronomical proportions indicate the economic losses which are evolved from traffic congestion and its many ramifications. All problems of highway traffic are concerned with these two major objectives:— the reduction of accidents and the elimination of congestion.

BASIC NATURE OF TRAFFIC MOVEMENT

While accidents and congestion are the undesirable manifestations of traffic movement, there are four basic characteristics of traffic which require full analysis and understanding if traffic problems are to be dealt with intelligently. These elements of traffic are quality, volume, location and time. The study and analysis of these four basic characteristics is a prime function of traffic engineering.

The *first* concern involves inquiry into the quality or character of that which is to be moved in the traffic stream. Here, immediately, are two broad classifications of traffic movement, that is, passenger movement and freight movement.

In the handling of passengers an understanding must be gained as to the requirements of the persons to be moved from point A to point B, that is, what class of conveyance is desired, what percentage wish individual transportation, what percentage would seek mass transportation and, still further, what minor modifications and desires are manifest in these broad classifications of passenger travel. Naturally, this involves studies as to the comfort and safety features which not only influence vehicle design and specifications but which also modify the quality of the traffic routes and terminals as well as the regulations imposed.

Again, in this broad classification of traffic movements a rather full knowledge must be had as to the character of freight which is to be moved. The physical nature of the freight, the value of the goods to be moved and the protective measures needed again influence not only the design of the freight vehicles themselves but also the character of traffic control imposed, as is aptly illustrated under wartime conditions by the protective measures needed in the handling of explosives.

The *second* major consideration is concerned with the quantity or volume of movements. Volumes need to be studied from two aspects, particularly for freight movements. All traffic facilities and all traffic regulations are concerned with the amount of persons and goods to be moved as well as the concentration which can be imposed. For example, large movements of bulky materials or large movements of persons by individual carrier will require quite different facilities and regulations than is necessary for small or minor move-

ments or movements which can be concentrated into relatively small bulk. The factor of concentration is particularly significant in freight handling. Thus, to handle loose cotton or hay would require quite different traffic arrangements than would be necessary to handle the same goods if they were baled. During these emergency war times, developments have gone forward on the dehydration of foods, etc., so that it is but a matter of imagination as to how much certain goods may be concentrated into small enough packages of such value that they could be moved by air instead of by highway. Indeed, the volume characteristics of traffic movements, not only from the viewpoint of amount but also from the viewpoint of concentration, are basic qualities which need to be fully understood in providing for the movement which is desired.

A *third* basic characteristic of traffic movement which must be fully understood before proper traffic handling can be attained in an efficient manner is to be found in the location values of traffic movement. It is the location values that are of profound significance in arriving at the most efficient mode of transportation as well as the routes of transportation. In fact, the origin and destination of traffic must be reckoned with in every single movement of either persons or goods.

Analysis of the origin and destination features of traffic movements soon develops two major properties. These are the distance of movement and the site values that are involved. Thus, the distance of travel is at once a rough measure of the mode of transportation which would be most satisfactory. Long-distance movements of passengers will probably go more and more by way of air, whereas the short distance type of passenger movements is particularly a road-form of transportation. This is equally true in freight movements. The long-haul type of freight movement requires a different mode of transportation than does the short-local-haul type.

The other location quality which is of particular significance to road movement is the site values of origin and destination. For example, an extremely high concentration of movements of persons into a highly localized area demands quite different methods of traffic handling than does the smaller load which has a variety of origins or destinations. Site values are of particular significance in our central business district problems in that they deal with a fixed site of high density. While probably higher densities are found at football stadia, we find that football crowds are not fixed and while the crowd may be in one stadium on one week-end, another location may be chosen on another week-end. Thinking from the viewpoint of freight handling, quite different traffic facilities will be required for, let us say, the hauling of materials to a shifting location such as the end of a road which is under construction as compared with the handling of coal to a harbor colliery.

The *fourth* quality of traffic movement which must be fully understood before intelligent handling of traffic can take place involves the factor of time. Analysis of the time values in traffic movement again develops two primary qualities. These relate to when movements take place and to the urgency of such movements. Thus the daily, seasonal and secular trends of traffic movements are of tremendous importance in providing traffic facilities and in designing traffic regulations. And, again, the casual type of movement requires different methods of handling than the commuter or regular type of movement. Still further, time values in traffic demonstrate their significance in the urgency of the movements. Goods

which need to be rushed can be handled in quite different ways than goods which may be moved at convenience. In this connection, it may be said that practically all passenger traffic comes under the immediate urgency class and from this quality stems the speed problem and all of the regulations and facilities designed to cope with this quality of traffic movement.

Thus, in summary, we see that the four basic characteristics of traffic movement, which must be reckoned with by all agencies which deal with traffic, are the *quality* or characteristics of that which is to be moved, the *volume* of traffic which is to be moved, not only relative but absolute, the *location values* of that which is to be moved, which involves route and terminal location as well as the mode of transportation, and finally, the *time values* which are involved. A thorough and complete understanding of these four basic qualities of traffic movement is necessary to the efficient handling of traffic.

Traffic Restriction or Construction?

Throughout all of the foregoing remarks, it is obvious that there are two basic ways of approaching the traffic problem. On the one hand, *restrictive measures* may be applied to reduce accidents or to reduce congestion. On the other hand, *constructive measures* may be applied for exactly the same purpose.

Today there are endless restrictive measures which have been applied to the character or quality of that which is to be moved. Thus, through gasoline rationing restrictions certain passenger movements are permitted whereas other movements are prohibited. Again, in matters of freight handling, war shipments take precedence over civilian supplies. These restrictive measures have also had their influence on the volume of traffic which is to be moved and hence we find that the volume of freight movement has generally increased, whereas the volume of passenger movement by individual auto has decreased generally, and has been replaced by the common carrier form of transportation. Wartime regulations too have had a definite effect upon the location of traffic movement, as well as upon the time values involved. Practically the entire gamut of restriction and regulation brought on by war conditions have virtually influenced the traffic problem.

Restrictive measures which may be applied to traffic in peacetime again can influence the four basic factors of character, volume, location and time. Thus the character of traffic movement on parkways is restricted to passenger movements and in many instances trucks are prohibited from traveling on certain streets. Volume characteristics of traffic movement are influenced by restrictive measures in normal times in that the size, weight and bulk of loads are prescribed by law but we find very few restrictive measures which will affect the amount of demand or movement. The time values of traffic movements are affected by regulation, as is illustrated by certain ordinances which prohibit the delivery of goods in certain areas at certain times. Practically all parking regulations are restrictive measures concerned with the time values of traffic flow. Thus, it is seen that in wartimes as well as in peacetimes restrictive and regulative measures can be employed to vitally influence the traffic problem.

The second major class of traffic improvements is arrived at by constructive measures. All vehicle route and terminal design and construction is involved in this kind of measures. This type of relief usually involves large capital expenditures, but it is most satisfying to the public demand

and indeed there is under way at present a tremendous amount of post-war planning and design to improve traffic conditions through constructive measures.

The Co-ordination of Traffic Agencies

All traffic improvement measures must be carried on by agencies delegated with responsibilities for restriction or for construction. There is the eternal problem in traffic handling of striving for a balance between the amount of restriction and the amount of construction which is desirable. On the one hand, in normal times restrictions could be carried even farther than they have been to date under wartime conditions but it is probably safe to say that the public would not accept this as desirable. On the other hand, constructive measures could go so far that every man would have a "royal route" to travel as fast as he chose regardless of his origin or destination. Either extreme might be attained but always there is the striving for the neat balance in construction and regulation.

In the carrying out of these restrictive and constructive measures we find that the police, the courts and the legislature are designed as the responsible agencies for policies and programs of restriction, and the legislature and the engineers are responsible for the policies and programs of construction.

But these agencies can go no farther than public opinion will permit and hence there is a third agency of vital significance to the traffic problem. It is concerned with the education of the public not only in matters involving the skills and techniques of driving or use of the road but also in matters involving the shaping of public opinion.

As we turn attention to police work we find that the police are concerned with the nature of regulations to be enforced. It must be recognized that the police cannot enforce regulations that the majority does not want enforced. Voluntary acceptance of rules by the public may be promoted, however, through educational means. But, in the final analysis, all traffic regulations must have the approval of the courts and no traffic regulation is stronger than the support given it by the courts. Furthermore, it is generally recognized that the problem of enforcing any traffic regulation is vitally affected by public understanding of the regulation to be enforced and hence police are concerned with gaining a public approval and acceptance of traffic measures. Thus, it is seen that there must be a close relationship between police work and enforcement work with the aid and guidance of educational effort. Even the police themselves require training, at least if they are to do their job intelligently, and if they are to do it well certain members of the police would require a full, thorough understanding of traffic work. It then becomes necessary to train policemen in the skills or traffic handling by correct methods. This work is being carried on by police departments throughout the country.

The entire job of regulation and restriction is greatly modified by the type and character of facilities which are available. It is a far simpler job to handle traffic, from the police point of view, if there is an adequate facility properly designed so that a minimum of restriction is necessary and so that a minimum of accident occurrence takes place. Certainly the first persons to know of sore spots in traffic systems are the police through their daily work in expediting traffic movements over the diverse routes and through the terminal areas. The police are the first to know where congestion is chronic or where the accident situation is becoming acute.

Also, through their daily intimate contacts with traffic handling, the alert police officers will have made many observations of extreme significance in arriving at the final design and construction of new traffic facilities. Thus, we see that there should be a very close understanding between the police and engineering branches.

As previously pointed out, all constructive measures designed to reduce the traffic problem require engineering skill and knowledge. Hence, through state highway departments and public work agencies, responsibilities have been placed and power has been delegated to plan, design, build and maintain traffic facilities. It is at this point, too, that we must recognize the tremendous amount of engineering ingenuity, skill and knowledge utilized in improvement of the traffic problem through the engineering staffs employed by the manufacturers of motor vehicles. Throughout the years, they have done a tremendous and most excellent job in constantly improving the motor vehicle so that its performance, durability and safety features have aided in producing a smooth flow of traffic. Their skills, too, have lessened the number of traffic fatalities which have occurred and have made our existing traffic handling facilities more productive.

But the job of providing routes has been recognized as a public responsibility and it is to those engineers in the public employ that we must look for improvements in traffic facilities. This group of officials is constantly concerned with the problem of where to build traffic routes and the priority of developing such routes. They are deeply concerned with the character or design of routes to be built and with the most efficient employment of public funds in route construction. While this group has, in the past had little responsibility for the operating characteristics of routes, in more recent years they have had a growing concern for the influence of new construction on its traffic performance ability. It is now generally recognized that traffic operational characteristics must be given the closest scrutiny and proper weight in designing and locating traffic facilities. As a result, there is growing attention today directed to the nature of traffic movements and their influence on road building.

The character and volume of traffic to be handled, the origin and destination of the traffic and the speed of movement and fluctuation in demand are all vital questions in locating and designing new routes or improving old routes. This duty of evaluating the quality and character of traffic and interpreting its influence on the location and character of design of routes is the function of a relatively new branch in engineering, "traffic engineering." Traffic engineers primary responsibility is for the operational characteristics of routes and traffic flow and for the correlation and co-ordination of factual data needed in developing the most efficient functional designs.

Throughout all engineering work on these constructive measures for traffic relief public acceptance must be promoted on the basis of the appearance and functional qualities of a route, on the one hand, and the costs involved, on the other. However, we understand very little about the economic *benefits* of motor vehicle transportation and have only the most meager knowledge of the economic advantages to be derived from traffic relief, so it is not possible to accurately measure economic gains which will accrue after improvements are completed.

There is today growing attention to the importance of providing satisfactory terminals in addition to more adequate roadways, particularly in

central business districts and other points of high traffic concentration. It is necessary, therefore, that public policy and opinion be formulated and that technical plans be prepared for terminal facilities. In the post-war era, the problem of providing such facilities will assume major proportions because of the tremendous interests involved in central business district holdings and the implications of these values, and their maintenance, on the urban community.

Another phase of traffic improvements, the work of educational groups, is also important. Their problem, one of deciding what to teach school children, the public, the drivers and the diverse classes of persons which use our streets, must be considered and methods agreed upon by themselves, the police, the engineer and other traffic agencies. However, as previously emphasized, technical knowledge alone is not sufficient. There is also an educational responsibility on the part of all persons in the shaping of a sound public opinion and attitude in traffic matters which will make for a reduction in accidents and a minimum of congestion.

Current and Post-War Traffic Operation Needs in Road Building

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I was assigned as a subject for this meeting "Current and Post-War Operation Needs in Road Building." Not being quite sure of the exact meaning of these words I went on an exploring expedition and finally concluded that "Coordinating Highway Engineering and Traffic Engineering, Control and Operation" would better express the idea of my subject. It is necessary that my remarks be from the standpoint of a municipal official as differentiated from one who has had extended experience in the state field. My work has dealt almost entirely with problems that are common to a metropolitan area. It is quite apparent that the problems encountered in a metropolitan area and those encountered in the rural sections of a state are quite different. Organizational requirements are likewise different. In a state, traffic engineering and kindred subjects are handled as an integral part or responsibility of the highway organization. In a municipality, various organizational setups are in operation, for instance, traffic engineering is handled by a bureau of the police department in some cases and in others by a bureau or division of the highway or street department. In many cases, entirely separate departments are assigned the responsibility for the three phases necessary for providing highway facilities and controlling traffic, namely, highway, traffic, police. This is the organizational setup in the District of Columbia, the activities of the three main component phases being coordinated through a traffic coordinating committee. I shall talk more concerning this method or scheme of operation later. I should state, however, that the Department of Vehicles and Traffic in the District is also responsible for motor vehicle registration permits and the like, comparable to the duties of a state motor vehicle administrator.

It was only a comparatively few years ago that engineering traffic bureaus were established in cities. These bureaus dealt mainly with traffic regulations, signal lights, signs and parking problems. The police were enjoined to enforce the regulations. The paving engineer went merrily on his way building streets or replacing those that had outlived their usefulness—each working independently of the other, endeavoring to accomplish his assigned task in spite of the fact that the ultimate goal of each was the same, namely, to provide a highway transportation system for the good of the whole. This situation, for many years following extensive use of the automotive vehicle, was allowed to develop even though it did not permit of the co-ordination of plans, operation procedure or other essential features of the work which is so necessary to the proper design and operation of a highway system.

The automobile has provided a new personal freedom for the people of our nation. Before this means of transportation was available, our populace was of necessity confined to close quarters so that they could be convenient to the business centers. It is true that this freedom of movement provided by the automobile has been temporarily restricted by our war effort. However, when hostilities

have ceased motor vehicles will return to the highways in ever increasing numbers and our populace will once more become travelers. With the cost of motor transportation now within the budget of practically every family, the American people have the opportunity to escape from these congested areas in the city and develop our outlying areas, where much more attractive and suitable living facilities are available.

This shift in our general living conditions has brought about an enormous increase and change in our traffic and transportation problems. The increase and improvement in the carrying capacity of our highways and streets has become one of the salient problems of the highway and traffic engineer. The public is entitled to the maximum consideration of its engineering department in an endeavor to eliminate unsafe conditions, reduce delays caused by traffic congestion and provide facilities for the proper functioning of the transportation system.

Motor vehicle transportation is here to stay. The sooner we realize it the better, and the sooner we take control of the situation and provide better and safer facilities, the less it will cost us. The amazing thing about highway transportation and traffic control of the highway is that the very users are not only willing to pay for the facilities and service but anxious to do so. This is not so amazing after all, it is just good sound judgment. The users know that expeditious travel with safety pays a dividend while congestion and potential hazards are a liability and that he pays in the end anyway.

General traffic and transportation problems are subjects in which we are all interested, whether we are motor vehicle operators, transit line riders or pedestrians, Few, however, ever seem to think much of safety—highway safety. These main factors enter into highway safety—the highway, the human element (driver and pedestrian) and the vehicle. The three factors of this triangle must be brought into proper relationship if we are to provide safety and for the free flow of traffic on our highways. The highway side of this triangle, including traffic appurtenances and special facilities, can and should be solved through sound engineering with the aid of adequate funds. The human element factor must be reached through education and enforcement; the vehicle through inspection, with control of its use.

It is realized that many changes in street and highway layout materially affect the surrounding landscapes. We must, however, approach the problem with a broad viewpoint of new and changed conditions that will result in the greatest benefit to all. While planning for the future and studying existing conditions is an important phase of our problem, this alone will not provide the cure. We must, after satisfying ourselves of the diagnosis, go forward—perform the major operation. Someone once said, "A capacity for thinking (planning) is of little value unless it is accompanied by a capacity for action."

In recent years municipal officials have come to the full realization that traffic problems of a metropolitan area demand the full and complete co-operation of all agencies to provide a transportation system of proper design with facilities that will insure safety and the expeditious movement of traffic in all of its phases.

While the police have the very definite function of enforcement, they likewise have the responsibility, with the traffic engineer, of education. The objectives of the highway engineer and the traffic engineer are the same: they are both interested in the safe, economical and expeditious transportation of persons and commodi-

ties. Close co-operation and collaboration of all of these groups in their work is essential to success particularly that of the traffic and highway engineers. We realize this more every day. The problem must be approached with a broader aspect of this situation to be conquered. New features are always present. I believe the problem is much more difficult in the metropolitan area than in the areas outside, due primarily to the concentration of traffic and the divided authority that is often present. To meet this latter situation we must meet the issue squarely and depend upon a co-ordinated and co-operative spirit of working for the good of the whole.

Another problem that is present in metropolitan areas involving highway design and traffic engineering is that of mass transportation. Too little attention has been given to this important phase of our transportation system. After all, the requirements of mass transportation must be met. All of us can't travel in private cars. Still another problem is that of terminal facilities for both the private car and the mass transportation vehicle.

As before stated, highway and traffic problems in the District of Columbia involve in the main three separate departments, namely, the Department of Highways, the Department of Vehicles and Traffic and the Police Department, primarily the Traffic Bureau of the latter. Although each department is specifically charged with appropriate functions, a co-ordination and close co-operation is essential to attaining the desired objective, that of providing for and insuring adequate transportation facilities with reasonable operating control.

The governing body of the District long since recognized the necessity for the co-ordination of the work of highway and traffic agencies and as well the work of those in the mass transportation field. To promote the necessary co-operation to the fullest extent, they established within the framework of the municipal government a "Traffic Co-ordinating Committee," consisting of the Director of Highways, the Director of Vehicles and Traffic, Inspector in Charge of Traffic in the Police Department, the Chief Engineer of the Public Utilities Commission and one or two other related officials of the city government. This committee was organized for the primary purpose of co-ordinating the activities of the various interests of all of those concerned in any manner with highway transportation and traffic. It has worked fairly well. Its interest and scope of activity has been too confined. To achieve greater success the work must be broadened.

There also exists in the District of Columbia a "Traffic Advisory Council." This council is composed of some twenty members drawn from the citizenry of the District who are appointed by the commissioners. In addition to the regular members appointed by the commissioners all members of the "Traffic Co-ordinating Committee" are ex officio members. As an advisory group to the commissioners this group could be of considerable value, or I should say of considerably more value than they have been in the past, if they would deal with the bigger aspects of the problem and not confine their deliberations to more or less minor details. They have rendered a highly worthwhile service in the field of traffic safety education.

The time has definitely arrived when we must view the whole problem of transportation, including terminal facilities, from a broader viewpoint and not from our individual fields of engineering. After all, we are striving to provide not a system of

highways or streets but a system of transportation by highway.

The Highway Department of the District of Columbia has an approved program of development for the post-war period of considerable magnitude for an area of Washington's size. Working drawings covering new bridges, grade separation structures, a section of elevated highway and two sections of depressed highways are well advanced, in fact several projects are complete and ready for bidders. Working drawings for other highway improvements involving roadway widening, major thoroughfare paving and replacements are well advanced. The construction of projects included in the program are estimated to cost in the neighborhood of twenty-seven million dollars. Plans for more than 50 per cent of the program will be ready for bidders by the end of the year.

In connection with the post-war program there has also been initiated, in co-operation with Public Roads Administration, several projects covering preliminary surveys and engineering investigations, the most important of which is a transportation survey of the central area of Washington. The survey will cover, among other things traffic studies of all forms of transportation, including mass transportation and terminal facilities for all forms.

The consulting engineers engaged to work with our own engineers have associated engineers from the transit field in their service. Engineers from the local transit company will also co-operate in the project.

It is hoped that the results of the transportation survey will bring forth answers to at least the partial relief of traffic congestion and safety in the downtown area and further lead to a solution of some of the many complicated problems. From the engineering investigation it is hoped to develop a plan of future improvements that will be beneficial to all concerned.

The Department of Vehicles and Traffic, as well as others, is co-operating with the Department of Highways in all of the post-war plans. They are initiating an independent project to provide for a centralized light control system that will permit the accomplishment of time cycle changes where necessary, as well as other essential features to insure flexible control of the entire signal system.

A highway transportation system of the future requires that it be designed, built, operated and controlled so as to deliver the maximum of traffic mobility; so designed and built as to insure insofar as practical, safety to both the vehicle and the pedestrian—the latter, another important highway user of metropolitan areas that must be provided for to a greater degree in our plans of the future.

The greatest need in "Current and Post-War Operation Needs in Road Building" is the complete co-operation and co-ordination of the work of highway, traffic and police officials. Let's lay aside petty jealousies, pride of authoriship and work for the good of the whole "A Transportation System by Highway in Every Area."

Planning for Traffic Safety Education During the War and Post-War Periods

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In almost every discussion among traffic engineers the driver bobs up as the bottleneck. Vehicles that are safe can be constructed. Highways can be built incorporating all the safety features—multiple lanes, medial strips, cloverleafs, rotaries and the like—theoretically a foolproof roadway. Yet we continue to have accidents. Why? Because the driver is a human personality. He isn't a machine. He's an individual, possessed of good or bad attitudes and practices with an intelligence ranging from 50 to 150, with physical abilities from 20 to 100, with visual acuity from 20/10 to 20/100. He is unpredictable, variable. And we could say much the same about the pedestrian. Both make mistakes, take chances, follow wrong driving practices, use poor judgment in emergency situations and through these wrong practices contribute to well over 80 per cent of the traffic accidents.

But the fact that drivers and pedestrians are human personalities is very much in our favor. Cars and highways can be changed, but they can't be educated. Drivers and pedestrians, both the old and the young, can be. Their driving practices, it has been clearly demonstrated, can be improved. Their attitudes and skills can be changed. I should like, in the few minutes available to me this afternoon, to present to you certain methods that lie within our power to effect these changes. These will be considered from two viewpoints; first, for the wartime period and second, for post-war stress.

First let us consider driver education and the work of schools and colleges. What needs to be done here?

1. Continue the work that has been started in high school and college driver education and in the post-war period move to extend this to all high schools in the country. We have barely scratched the surface in this field. Even in the peak year there were hardly more than 6,000 high schools offering classroom instruction and comparatively few giving road instruction. Not more than a quarter of a million youngsters received this training each year, yet many more reach legal driving age each year. What, then, should be done?

a. Train teachers in all high schools to give this instruction through state and regional institutes and college courses. Twenty-two such institutes will be held this summer in twenty-one states.

b. Actual driving instruction, as well as classroom instruction should be provided as soon as facilities can be made available. Unfortunately, because of gasoline rationing and the tire shortage, several million youngsters who will arrive at legal driving age this year will receive little or no instruction. As a matter of fact, it is almost necessary to join the army or navy these days to receive actual instruction in driving.

c. All students should be required, before graduation, to complete a course. This is entirely possible as

a goal to work for. As an example, two years ago, North Carolina had not more than twenty schools offering this instruction. Today the number has jumped to four hundred, with more than six hundred planning such work for the fall term. Other states have done equally well. Still others, however, are in the doldrums. They have accomplished but little.

d. Continue the work being done through safety patrols and bicycle clubs in the schools and in the post-war period, extend it to all schools. Traffic safety education should be given in all grades of the elementary school. Here is where pedestrian practices are formed.

2. ADULT DRIVER EDUCATION.

a. Extend the driver selection and training courses for commercial vehicle fleets. Steps are already underway for the organization of training institutes for fleet supervisors this summer, in six centers. These should be extended to other centers as the need arises.

b. Continue the work of school bus driver training that has been started during the past year under the leadership of the American Automobile Association.

c. Provide driving instruction for adults in evening schools.

d. Encourage the starting of driver-violators' schools in the cities. Properly organized these have proved to be worthwhile.

e. Provide opportunities in the post-war period for voluntary drivers' schools similar to the OCD Drivers Schools that have been active in many states. As a matter of interest, during the past year one state trained well over 5,000 members of drivers' corps.

3. EXTENSION OF THE DRIVER AND PEDESTRIAN EDUCATION ACTIVITIES OF OFFICIAL STATE AND CITY TRAFFIC AGENCIES.

Some states have well organized traffic safety education activities, with staffs of from four to six full-time people. Others have no one assuming responsibility for this work. Motor vehicle departments can do much to educate drivers and pedestrians through educational methods: releases to newspapers, exhibits, high school driver education, posters, lesson plans, the radio, motion pictures, conferences and other methods. This work should be encouraged and each department should have one or more staff members directly assigned to this particular task.

In some cases this work will be administered by the motor vehicle department, in others by the State police.

It should be clearly emphasized at this time that while private safety agencies can do much to stimulate the work being done in states through training and consultant services, the job of educating drivers is primarily a state or municipal function, just as is the job of training mechanics, electricians, and others.

Best results are being secured in city police departments where one or more officers are assigned to safety educational work, supervising patrols, bicycle safety, giving talks in schools, etc. This work should be continued and expanded in the post-war period.

4. THE EXTENSION OF RESEARCH IN THE FIELD.

It is not necessary to point out that much of the work being done in the field is based on unsound premises. There are many unanswered problems and many of our programs are based on guesswork or propaganda. During the war period it is difficult, of course, to get such studies started

because of the shortage of manpower. At present however, two interesting doctorate studies are under way at the University, Milton D. Kramer is working on "Present Procedures in the States for the Licensing of Disabled Drivers, with Recommendations." Joseph Elkow is engaged in another remarkably interesting study, "Testing Methods and Techniques for the Licensing of Drivers with Physical Disabilities." Both of these studies already show promise of being noteworthy contributions, but there are dozens of other subjects that would bear investigation. At the present time the Center is sponsoring ten research studies in the rehabilitation of disabled industrial workers and returning service men but only two are concerned with traffic safety. We need more research and, therefore, more manpower, to conduct some of the more necessary studies.

5. EXPANSION OF THE WORK OF PRIVATE AGENCIES IN TRAFFIC SAFETY EDUCATION.

When we consider the staffs of private safety agencies devoting time to the promotion of driver and pedestrian education, the list is pitifully small. How can so few men accomplish as much as they do? There should be more capable educators working with these private agencies. For the most part, with this limited staff, about all that can be done is to build patterns or signposts that may help states and cities organize their programs. These agencies may help a few states. They can only scratch the surface in the forty-eight states. The post-war period should give these organizations more manpower to carry on this work.

6. NEED FOR PEDESTRIAN REGULATION.

While the points that have been covered in the preceding discussion are also applicable to pedestrians, there remains an important additional job to be done in the field of pedestrian education. Clearly, the job of pedestrian safety will have to be a combination of education, engineering and enforcement and the attack on the problem will necessarily have to be a combination attack. Without going into detail on the educational phase of this attack, we believe that one of the first steps should be the provision of city and state codes for the regulation of pedestrian movement. While there are some cities that have been unusually successful in pedestrian control without such regulation, the success would undoubtedly be greater if the pedestrian could be held responsible for improper practices.

7. THE NEED FOR AN IMPROVED DRIVER'S LICENSE EXAMINATION.

In this brief discussion I have not been able to take up several educational features in traffic safety. There is one however, the improvement of the driver's license examination, which I consider very important. Until we have an improved license examination in the various states, so that the test will be held in higher esteem and motorists will take steps to prepare for it, much of the work in driver education will be minimized. If, for example, a high school spends forty-five hours in the instruction of younger drivers and at the end of that period the actual time allotment for the test is seven minutes, while the test itself is entirely perfunctory and does not compare in difficulty with tests given at the end of other courses, you can readily see the attitude which the youngsters are going to take toward it. To my mind, it is a curious thing that in certain of our more progressive states the time allotment for the driver's license examination is from seven to ten minutes, while the allotment for the state examination for hairdressers is

two hours; for plumbers, one hour; for motion picture operators, two hours; and so on. The driver's license test, while a regulatory measure, is essentially an educational measure and, as such, an adequate test should be the culmination of the learning, study, road training and effort put into the subject by the prospective licensee. The time allotment for these state examinations should certainly be increased in the post-war period by the employment of more examiners so that a much more complete examination can be given. I believe many of the licensing departments of the states will heartily agree with this proposal. They feel that the test is inadequate but the problem is entirely one of manpower and insufficient time for the examination. This subject of the driver's examination can, of course only be touched on at this time. In reality it is a matter for an entire conference in itself.

Current and Post-War Needs in Traffic Officer Training

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Before discussing the needs of traffic policing, it might be well to consider why police training is necessary. Although the answer to this question may seem obvious, let's briefly examine the job and determine the kind of worker traffic policing requires. Perhaps this inquiry will help us in determining the needs and it may reveal some that are not quite so obvious.

WHY IS TRAFFIC POLICE TRAINING NECESSARY?

We find first of all that the job of traffic policing is dangerous, complex, physically and mentally discomforting and usually thankless. The range of work in traffic policing varies widely—from helping school children across streets to chasing violators at breakneck speed; from tracking down hit-and-run drivers through clever scientific investigation, to making safety talks before parent-teacher associations; from checking the infractions of parking laws to rendering first aid. These and many other diverse and difficult activities are performed daily by traffic police. Ordinary schooling or the general knowledge and experience which a man has when he starts policing is not enough to enable him to do properly some of the tasks the traffic officer must perform. In fact, policemen, even with considerable experience, usually do not perform properly unless they have been trained.

It is unnecessary to go into detail in describing the technical aspects of police work and the considerable knowledge, skill and ability a policeman must have to do his job. It is important however, to examine and discuss briefly the factor of human relationship which complicate his task tremendously. A police officer's work brings him into contact with every strata of society, with people of varying degrees of wealth, intelligence and culture, with quick tempered, hot headed people who are accustomed to dictating, with genteel women and in the next minute with hardened criminals.

Traffic policing is usually a misunderstood service. Most people rarely accept enforcement and other methods of traffic control as things done for their good. They are inclined to regard the traffic officer as a nuisance or a bully rather than a public servant who is doing a tough job to make their walking, riding and driving safer, more rapid and efficient. When the average citizen hears the police siren he thinks or says, "There goes that so-and-so cop after some poor devil." But when the same citizen hears the siren of the fire truck he thinks and may say, "Brave fellows—right on the job—on the way to save someone's life, no doubt, and to put out the fire which is destroying property." But does the average citizen ever think or say, "That-a-boy officer! Catch that so-and-so speeder and let's hope you don't get hurt doing it. Stop him and prosecute him so our lives and property may be protected." No, we never hear this because traffic policing is misunderstood.

Another aspect of the job of traffic policing which makes the job

more difficult is the public's seeming impression that traffic law enforcement is a sort of game. Their insistence that traffic law enforcement be conducted on a sporting basis (no hiding on side streets, use of white cars, etc.) makes it necessary for officers to develop and exercise ingenuity and skill in apprehending wily violators—especially repeater violators.

This insistence upon sportsmanlike enforcement methods, of course, reveals a fundamental condition which handicaps traffic officers. The American driving public does not have a sincere respect for law and order—at least for traffic laws. It's considered smart to beat the law and its representatives. If, by political pull or other pressure, a violator can avoid the consequences of his violations, he brags about it. This attitude makes traffic policing difficult, for it increases the work of the police who, in a sense, must substitute for each driver's conscience.

As long as this thinking prevails among citizens, the officer must prepare his cases with great care to forestall the alibis and plug the legal loopholes the defense may attempt to use. The police cannot expect much help from witnesses and jurors. As witnesses and as jurors they should be indignant that the law has been violated and eager to help the officer maintain the standards of driving and living intended by the people who enacted the laws. Instead, they are frequently indifferent and of little help.

Traffic policing, when honestly and effectively done, results in apprehensions and prosecutions of drivers and pedestrians. Many of the violators, because of social or political prominence, feel that they are exempt from the rules although for generations they have lauded the police for their fine work in suppressing crime and controlling the criminal element. Whatever methods the police saw fit to use were approved, condoned or ignored by this group. They did not seem to mind the appearance, manners and conduct of the police, even when very bad, as long as the police didn't bother them, protected their homes and persons and held in check the criminal minority.

When the automobile became popular, those who bought cars were of this group. Soon these leaders had accidents and killed one another—and found need to pass laws to control their own conduct. Soon they found they had exposed themselves to enforcement and to the kind of treatment they had always supposed was only for the confirmed criminals. They were in a predicament. But rather than blame themselves for the type of police they had hired and the enforcement methods they had long condoned, they tried to blame the police who were enforcing the law and enforcing it in the same way as they had for years.

This group—powerful and heretofore untouched by the law—couldn't actually blame the police for their predicament, because it was obviously of their own doing. To divert attention they often fired officers, they had the traffic cases fixed, they hired the best counsel money could buy to defeat the charges brought against them when they knew they were guilty, they made use of every loophole in the law. Last, but not least, they publicly criticized the police officer.

And, unfortunately, in many instances criticism of the police was justified. This condition was not entirely the fault of the police but in part that of influential citizens who had wanted only husky fellows capable enough to handle the pre-motor age type of lawbreaker, who would work cheaply and who wouldn't ask too many questions.

This story is now old but the sel-

fish, powerful citizens are still here and still resent policemen. If you don't believe it, just arrest one of their children. But now members of this group are gradually acknowledging that the laws are made for all the people and that enforcement machinery must operate against them, too, if they are apprehended. They will not accept or permit, however, the kind of treatment which they once approved for criminals. They insist they are not criminals. They are just traffic violators and they must be treated like honorable citizens and must not be herded in with criminals. Enforcement, they insist, must be clean, courteous, convenient and as private as possible.

Consequently good judgment and restraint must be constantly exercised to allow less opportunity for criticism, less chance to belittle the traffic police officer. Since his errors and shortcomings are high-lighted, his only recourse is to eliminate shortcomings and prevent errors.

Well, that's the kind of job a policeman takes on. To do the job of traffic policing properly and at the same time fully satisfy the American public, a policeman must be an unusually capable person. He needs:

1. The intelligence and insight of a scholar.
2. A prosecutor's knowledge of criminal law and evidence.
3. The skill of a defense attorney in interrogating witnesses and suspects and in forestalling alibis.
4. A judge's acumen and logic in deciding what to do—sometimes in a split second—in matters involving life and death.
5. A psychologist's understanding of human nature.
6. An undertaker's solicitude.
7. The tact of a diplomat.
8. A saleman's geniality.
9. A bulldog's persistence and fearlessness.
10. A saint's moral courage in the face of temptation.
11. The missionary's unselfish interest in his fellow man.
12. The health, physique and appearance of the ideal American man.

Such supermen do not exist but reasonable facsimiles are found in many REAL traffic policemen and more can be developed by attracting to the police profession good men who have some of the qualities needed, by carefully selecting those applicants who have the most aptitude and interest in a career of policing, and by thoroughly indoctrinating and training those selected and those now in the police service.

To develop the kind of traffic police officer needed today and for the post-war traffic turmoil, good personnel selection methods are needed and the best possible training programs are essential.

The need and value of police training has been agreed upon by both police and laymen. Almost every department has devoted some time and effort to giving its officers something which is termed training. But here the agreement and uniformity of practice ends.

It is necessary that among police administrators an understanding be reached as to what training is, what are its purposes, how much time should be devoted to it, what manner and means are most effective and what different kinds or levels of police training are essential to fill the needs of police—especially traffic policemen—in most departments.

If a well planned training program is not provided, police officers must learn how to do their jobs and endeavor to improve their performance in a hit-or-miss fashion on their own initiative. They must resort to doing

the best they can and profiting from their mistakes, or watching how others do the job and imitating what seems to be effective. Learning in this way extends over a long period of trial and error experience and in many instances is akin to the blind leading the blind. It is costly in many ways to the department. The public doesn't get the efficient police service it pays for and citizens are likely to be victims of the mistakes of well meaning but ignorant policemen.

Since no one wants this sort of police performance, real police training must be provided. And before this can be done, better understanding of what real police training is and should accomplish must be reached.

So let's discuss what traffic police training involves.

What Is Traffic Police Training?

A well planned traffic police training program collects, sorts and organizes the good experience of thousands of officers gained over a period of years and passes this organized body of knowledge on to other new or old officers. The mistakes commonly made in the past can be prevented in the future by pointing out the pitfalls to less experienced officers or recruits. In this way, training improves the performance of police generally and prevents many mistakes or failures so detrimental to the department's welfare.

Training does much more than prevent repetition of errors. *It defines duties, instills enthusiasm, develops proper skills, habits and attitudes* and inspires devotion to the job and loyalty to the leaders.

Police training involves the development of individual police officers. *It prepares the individual to do a job better.* It equips the individual with the "know whats," "know hows" and "know whys" which will enable him to do his job better. It develops attitudes and beliefs which will result in his being a better worker. *Unless there is improvement* in the worker and the performance of his work there has been no training. Much instruction could be given which would not contribute to the improvement of the officer's work. However valuable the instruction might be for the individual from an educational standpoint it would not necessarily constitute training as it is defined in the police field. To cite an extreme example, let us assume that a two-hour session in a police training school was devoted to a discussion of the Russo-Japanese situation. This would not constitute training since it would not conceivably result in improvement of the student's police performance, though it might be very valuable to him in other respects.

Training must fulfill the needs of the job for which the student is being trained. Improved performance cannot be expected unless the students' needs are met. The needs of the job must be analyzed carefully, fully accounted for and listed. This process is the fundamental basis of a training program and is called a job analysis. When it is determined what the learner does in doing his work, what he needs to know and what he must be able to do, then training can be supplied which may be effective.

Police training involves getting the student to want to learn. It involves providing that atmosphere, lending that enthusiasm and giving that inspiration which will develop that receptiveness, that interest and that urge to think and study which is essential to learning. Just as you can lead a horse to water but you can't make him drink, so you can bring the student to the classroom but you can't make him think—or learn.

When the student is receptive and ready to learn, police training then helps him learn and develop. That is

as much as training can do. The student must do the learning and the developing, the teacher can't do it for him. And no matter how eloquent the lecturing or how costly the training aids, if they do not result in *learning* there has been no *training*. The measure of the training is results, not outlay.

Any activity by which police officers are helped and prepared to do their jobs better constitutes training. Police training is not confined to the classroom or to the lecture method. Discussions, observations, practicing an activity, reading and problem solving are excellent *methods* of learning and therefore of training. Conferences, exhibits, departmental bulletins, library service and correspondence courses are other *means* of proving police training in addition to classroom work. Supervised experience is another excellent means of training. Even after formal training is completed, continued on-the-job training is important. This may be likened to coaching—one function of supervision. Diversification of experience, too, is important. The value of officers is increased if they are assigned, for a time, to the different types of police activity carried on by the department. This means of acquainting each officer with the wide range of policing is a valuable device for improving performance and a great aid to administrators in overcoming the tendency of workers in one division to ignore police problems supposedly the more direct concern of other divisions.

Different means and methods are effective in various types of training. For example, the discussion method at a conference is often a better means of training commanding officers than is the lecture method in a classroom.

The wider the range of methods and means employed in police training, the more likely is the training to be effective, other things being equal.

General Objectives in Basic Training

The foregoing discussion of what police training is can be summed up as follows: It is the process of aiding employees to gain effectiveness in their present or future work through the development of appropriate habits of thought and action, skills, knowledge and attitudes. It has been emphasized that training is a two-way process, that only the learner can do the learning and that one of the heaviest responsibilities of the training heads and instructors is to develop that interest and secure that co-operation of the student which will result in his applying himself to the extent that he will learn.

To describe more clearly what police training is, it may be helpful to analyze the general objectives in one type of police training, for example, recruit training. A job analysis of the needs of a recruit reveal the specific objectives of a training program for recruits. Lacking the space here to develop such a job analysis, some basic broad objectives applicable particularly to recruit training are listed:

1. To determine and eliminate erroneous beliefs the officer may have as to what his job is and what his attitude toward the public should be.
2. To indoctrinate the officer with the *REAL* policeman's philosophy and the spirit of serving in an honorable and respectable way.
3. To develop his respect for authority and discipline as well as his ability to discipline himself and maintain his own morale.
4. To develop the officer's confidence in his own ability, giving

him the knowledge and developing in him the skill which will justify that confidence.

5. To convince each officer of the need and rightness of his work and of the true position and responsibility of the police in the life of the community or state.

6. To develop each officer's pride in his organization and comradeship and loyalty to each member of the organization.

7. To aid each officer to *learn* the basic information about his job, such as the tactics and procedures which he will need immediately.

8. To develop the skills and abilities that will be needed, such as how to shoot, how to render first aid, how to defend himself, how to swim and rescue people, how to drive a car, how to ride a motorcycle, how to take pictures, how to service his equipment, how to transport prisoners, etc.

9. To acquaint the officer with departmental procedures and regulations.

10. To inform the officer about departmental policies, both those governing the operation of the department as well as enforcement policies, so that uniformity of action among all members of the force will be developed.

11. To acquaint the officer with all departmental forms which he will have to use. To teach him not only how to make out the forms but the purpose and value of such records.

12. To develop the student's background, especially about such matters as the history and points of interest in his city and state, the structure of his government and the relation of his department to other branches of the government, the history of his department and of policing generally, the background of the accident and crime problems, etc.

13. To prepare the officer to feel at ease in the presence of strangers or groups. To develop poise, especially in the presence of crowds or in emergency situations.

14. To interest the officer in studying human nature.

15. To develop the health and physique of the officer, to aid him in maintaining a hygenic standard of living and developing conservative appetites.

16. To develop in the officer a desire for more knowledge and provide him with reference suggestions and sources of that knowledge.

Even this brief analysis of the objectives in recruit training reveals that police officers, especially recruits, need much more than lectures on police tactics and procedures, laws, departmental regulations and so forth, which have long been the bulk of the training program content. So much of the effectiveness of an officer's work is dependent upon his general attitude, his beliefs, viewpoints, morale and knowledge of the problem and what has to be done about it that a training program must be designed to develop attitudes and an ability to think equally as much as it is designed to supply certain information and develop skills. Because this is so the atmosphere which pervades the training program is of vital importance to the subsequent effectiveness of the officer's performance. The spirit of the class and the

attitude of the instructors must be conducive to the development of the spirit and attitude desired in the officers. The director of training and the instructors must be leaders, must inspire the students, in addition to supplying the information necessary and helping to develop the abilities the officers will need.

Current and Post-War Needs in Traffic Officer Training

In light of what has been said and in consideration of what is now being done in police training, I maintain that the most urgent need in traffic officer training is clear understanding of what training is. Once the conception of training, as outlined earlier in the discussion, is understood and accepted by all concerned with police training, then real training—productive training—can be provided whenever time, money and effort are expended for that purpose.

When this primary need is attained, then the many other essentials for a good training program must be obtained. Let's discuss some of them.

1. The active support of officials is the first one. Without it the other essentials may not be obtainable or may be insufficient. It is necessary that the chief administrator, the commanding officers and the government officials in the city or state be so well informed about the need for good police training and the essentials of such a program that they will endorse it fully and provide the essentials.

2. Second, good training takes time. There is much difference of opinion among administrators as to the amount of time which should be devoted to each type of training. For example, some administrators regard three weeks as adequate time in which to conduct recruit training. Others realize that three months is not adequate. When those responsible finally agree that half the working time of a new policeman during the first year of his employment should be devoted to training, and that at least five per cent and possibly ten per cent of his time during each year thereafter should be devoted to training, then the time essential to a good police training program will be provided.

3. Money is another essential of a good police training program. Adequate training cannot be provided on a shoestring. Capable instructors cannot be retained at a patrolman's pay. Good training aids must be purchased. The salary of the director of training and instructors, as well as the time and possibly meals and lodging of the students, has to be considered as an item of expense in a good police training program. Police administrators and other officials have yet to prove to themselves that it is good business to spend money for police training, just as the armed forces and big business organizations have proved that large scale spending for training is the soundest sort of investment. The production of well trained police officers is so far superior to that of untrained or poorly trained men that ample expenditures for training can easily be justified.

4. A director of training qualified to organize and administer a training program is necessary to the success of the training activity. It is his responsibility to make job analysis, plan the course, procure instructors and provide for the handling of all details involved in the operation of a training program, as well as

serve as instructor if the administration of the training program does not require his full time.

5. A general job analysis of the training needs of the rank and file officers whose activities vary from that of the general all around officers are also essential.

6. Other essentials are well organized courses of study on the job analyses, set up to meet the needs of:

   (a) Recruits
   (b) In-service police officers
   (c) Specialists
   (d) Commanding officers
   (e) Training school instructors

   The police department whose training program does not provide for ample training above the recruit level is inviting the same degree of inefficient performance among its administrative officers, specialists and supervisory officers as would be expected among the rank and file policemen if no recruit training be provided all workers in the department. There is no level of activity, no kind of police work, from the recruit to the chief's position, which could not be substantially improved by training. The training and experience which make an officer a good patrolman or sergeant will not fully meet the needs of his work as a captain of police. The captain should have certain activities above and beyond those of subordinate officers. These special activities require special training if good performance is to be expected.

7. Enthusiastic, well qualified instructors capable of inspiring students, providing leadership, developing good habits and necessary skills and imparting the information needed by a student are part of the list of essentials.

8. Equally necessary are interested and ambitious students as well as incentives and good classroom morale. Morale depressives must be eliminated from the classroom and the training situation. For example, if men are required to attend training classes on their own time after having done an eight hour tour of duty, good class morale can not be expected, and it would be folly to expect that much learning would be accomplished.

9. Adequate training facilities must be available. Many a training effort has failed because of an over-crowded, poorly lighted, badly ventilated room. It is essential that students be comfortable in a learning process. The classroom should be large enough, well lighted and ventilated and be equipped with training equipment such as blackboards, projection equipment, chairs with writing arm or desk and so forth.

10. Good texts, films, exhibits and other training aids improve the training program in proportion to how well they fit the training needs for the students. It is agreed that suitable training aids not only make the training more effective but enable it to be done in less time. Time and money spent on developing proper training aids is good economy. For example, if the full time of one instructor over a period of a year would result in the development of training aids which would make it possible to shorten the training program of 50 officers by two weeks, it is evident that about 100 man

weeks would be gained for the expenditure of 50 during the first use of those training aids, not to mention the gains which would accumulate over repeated uses of the prepared training aids.

11. Capable, consistent administration of the training program is another essential. A continuity of training policy consistent with the needs and policies of the police department should be maintained. The planning of the courses and the development of training schedules must be sound. The training head must prepare time and cost budgets. He must select and possibly develop instructors. He must supervise and clear the scope of instructors' presentation. He must be responsible for examining the students to determine progress and maintain records. He must settle controversies, maintain discipline and make decisions pertinent to the best operation of the training function. He must do these and many other things to administer the training program effectively.

How Good Police Training May Be Obtained

It is a difficult matter to provide the many essentials outlined above. It is difficult, because a good training program requires a certain minimum overhead expense which many departments cannot afford. Unless the number of persons to be trained is sufficient, the cost of training each individual becomes excessive, in fact, prohibitive. There are comparatively few police departments, either city or state, which are large enough to support their own full scale training program. And even they, in most instances, have yet to secure the essentials outlined and will have difficulty in doing so.

Small departments, and this includes some state highway patrols and state police departments, cannot justify a training program for their own department if they support it alone. They do not have enough men to be trained in the different levels of activity and types of work to justify economically the staff, facilities, time and other requisites. These departments far outnumber the departments which can provide their own training. The smaller departments must resort to consolidating their training programs with those of other departments in a similar predicament. They may do this in any one of a number of ways:

1. One way is by joining in group training programs centered at the headquarters of one of the departments. For example, in every state there are many departments with no more than 25 men. No one department of this size can operate a full fledged, training program. If 20 of these departments could work together, one full scale training program could be operated for the 20 departments providing the training needs of all of the departments were similar.

2. Another way is by participating in a state-wide training program to which all police agencies within the state would resort. This state-wide training agency might be under the auspices of a university conducted by the vocational division of the state department of education, by the state police, by the police association of the state or by a group representing all of these interests.

3. A third way to obtain training for members of small departments is by sending men to regional and national schools. This opportunity does not, of course,

provide training for every man in the department but does fill the need for the training of specialists and possibly commanding officers.

4. Another way is to obtain instructors from outside sources for periodic classes held in each department's headquarters and using each department's facilities. Combined with the state-wide training program, classes could be held in a department's headquarters when most expedient. Otherwise, students could go to a central point within the state to be trained.
5. Informal police training may also be given by such means as departmental bulletins, conferences and possibly correspondence courses. The potentialities of these means of training are limited but have a definite place in training the personnel of any department. If they were the sole means of training they would be inadequate unless there is considerable improvement over those now used.

When the problem of *how* it is to be obtained is solved and a training program is so organized that the expense of training the police officers of each department can be economically justified, other problems then must be considered. Some of the most obvious ones are procuring or training instructors, the development of training directors, the preparation of texts and other training aids and obtaining enough money to make a worthy program possible.

To start with the last of these problems first, it is well to mention the money available through the George-Dean Act funds provided for vocational training and available to all state departments of vocational education for the training of policemen. When the need for police training is given due recognition and a state-wide training program is organized, the logical and desirable means of financing it would be by state appropriation. Better police training can be provided at less cost when police training is consolidated, so long as it still meets the needs of the individual departments within the state. Suggestions have been made and drafts of legislation have been prepared with a view to making police training compulsory. If such legislation is ever enacted it will immediately become necessary for some state-wide training program to be developed to make it possible for the small department to fulfill the requirements. A police academy in almost every state is not fantastic, in fact, it would be good business!

The texts and training aids which are available in the police training field are quite limited as yet. Furthermore, each department at present is, to a certain degree, duplicating the efforts of others in preparing basic materials. There is no reason why basic texts could not be prepared for general use or at least for general use within any one state. The sooner a clearing house either on a state or national basis collects and distributes basic text material and other police training aids the sooner these essentials of police training will be available to all police and will cover more nearly the wide scope needed in police training. The advantage of consolidating the efforts of the many who are dabbling in the preparation of training aids and materials is obvious. If some state-wide training organization were to effect a co-ordination of effort only in this phase of the training job, it would be a big step forward, even though the actual training had to be on a decentralized basis.

Probably the most critical need in any police training program is capable instructors. Teaching is an art and a profession. A police officer, no mat-

ter how capable he may be as a policeman, will not be a good instructor unless he is trained in that activity. There are some police officers whose temperament, educational background, interests, enthusiasm and general attitude make them ideally suited for the work of police training. These men would require but a limited amount of instruction in teaching methods and the philosophy and psychology of education to equip them to do fine training. Other very capable police officers who do not have an aptitude for teaching would never become capable instructors even if given the same teacher training instruction.

Where and how will police instructors be selected and trained? Even the largest departments can hardly afford a full fledged police instructor training program. Regional, state or national schools for the training of police instructors are necessary. Careful selection of the police officers to be sent to these schools is necessary in order that a fair proportion of those so trained may develop into qualified instructors.

Many police training directors procure judges, prosecutors and other persons outside of the police field as instructors. These people, too, should be selected not only on the basis of their knowledge of their subject but for their teaching ability as well.

One of the early steps in improving police training will be through the improvement of police instructors. The Division of Vocational Education in each state department of education can perform an invaluable service to the police profession by holding conferences or training courses for all police instructors within the state. When this and other opportunities for improving and training police instructors are available then standards can be established and certification of police instructors begun.

Let's Get Going

Though this discussion of the essentials needed in police training and the difficulties in getting them may seem discouraging all those interested in the field should take heart in the rapid progress made in recent years. A few years ago, police training was scoffed at in some quarters. Recently, the armed forces and industry have conditioned the thinking of all people to the importance and value of training. The selling job necessary in securing the essentials for police training is becoming easier each year. More information on police training is now available. It remains now for interested people to press the attack home. The police should accept their responsibility for developing police training and should recognize that only insofar as they do will their hope of professionalizing the service be realized. Other agencies who are interested in good government generally and in the improvement of police work in particular may be relied upon to help the police in their efforts to provide full fledged training which will bring about wholesale improvement in the performance of all police.

Let's recognize that real police training is necessary.

Let's bear in mind what real training is and involves.

Let's advocate more and better police training.

Let's work for the establishment of state-wide police training schools.

Let's urge consolidation of effort, not only state-wide but, in some matters, on a national basis.

Let's provide more regional and national schools and courses for the specialists and police instructors.

Let's advocate and develop a good first rate training program for the bosses of these policemen we hope one day to have fully trained.

Current and Post-War Traffic Engineering Problems

D. GRANT MICKLE
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As we plan for a better world in which we may all enjoy the fifth freedom—freedom of movement—we must also recognize and solve the day-to-day problems immediately before us. Therefore, there are two problems to consider. First, those problems which are facing us now—problems directly attributable to the wartime activity—and second, problems in connection with post-war activity. Both of these subjects are of immediate concern and in order to fulfill our responsibilities we must engage now in serious pre-post-war planning.

IMMEDIATE PROBLEMS

All of the facts point to the urgent need for conservation. There are a number of things which traffic engineers can do—or can assist in doing—which will help to reduce the number of traffic accidents, conserve vital highway transportation, and help speed the war effort. Among these are:

(1) Urge the elimination of non-essential driving.

(2) Organize and promote car-sharing or group-riding for essential trips.

(3) Plan and carry out additional staggering of school, factory and business hours to provide maximum use of mass transportation facilities where needed.

(4) Encourage observance of the war emergency speed limit to conserve tires and vehicles.

(5) Help to organize pooling of truck and delivery loads.

(6) Urge frequent inspection of tires.

(7) Encourage regular inspection and maintenance of vehicles.

(8) Enforce strict adherence to safe-driving practices to prevent accidents and consequent loss of manpower and means of transportation.

(9) Adapt traffic rules, signals and regulations to war conditions.

Because this last measure is one which traffic authorities can apply most directly, there is merit in giving it special emphasis. Although many of the other conservation measures require public participation and co-operation, there is equal need for a vigorous action program to make them effective.

The criteria upon which the uses of traffic control devices are based are no different in wartime than in peace. Traffic control, whether it be signals, signs or restrictions, is a regulatory measure upon traffic for the safety of all pedestrians and motorists and for the elimination of traffic congestion and hazard. As traffic volumes change, regulations must be adjusted on all streets where traffic intersects at grade, where curb space is utilized by parked vehicles, where traffic contains both commercial and passenger vehicles with varying speeds and interests, and where pedestrians cross.

The traffic conditions at each individual location establish the need

for a particular type of control. Each type of control should meet warrants and standards specified in the Manual of Uniform Traffic Control Devices and now during wartime in the War Emergency Edition of that Manual.

A summary of these provisions is contained in the O.D.T. Policy Statement on Wartime Traffic Control. Those of interest to traffic engineers are:

1. ELIMINATE UNNECESSARY SIGNALS

The operation of traffic signals should be discontinued where traffic falls below accepted minimum standards.

2. Traffic signals should be placed on flashing operation when volumes fall below certain minimums.

3. Signal cycles should be as short as possible.

4. The proportion of the cycle devoted to the green period should conform to the relative volume of traffic per lane on each street.

5. Where traffic volume fluctuates widely during the day, cycle length or the division of the cycle should be altered at the appropriate time to fit the changed conditions.

6. Fixed signals within one-quarter mile of one another, and controlling the same roadway, should be coordinated to provide progressive traffic movement and reduce the number of vehicle stops.

7. ELIMINATE UNNECESSARY STOP SIGNS

8. Traffic regulations, such as those governing turning restrictions, through streets and parking should be reviewed and revised to expedite vehicle movements where the war has either increased or decreased traffic.

9. A system of primary war transportation routes, to which preferred traffic control treatment would be given, should be designated in every municipality. Such routes should consider the needs of both workers and vehicles carrying war materials.

Although traffic volumes are down in many areas and on a nationwide basis, there are critical war production centers in which traffic congestion and accidents are at all-time peaks. Thus, with widely varying conditions there is real need for a reappraisal of traffic control measures in all areas, if the present system of streets and highways is to operate at full efficiency and with maximum safety. This job requires action *now*.

POST-WAR TRAFFIC PLANNING

The Program for Post-war Traffic Safety now being sponsored by a number of national organizations includes certain traffic engineering measures designed to cope with those problems which may arise during the transition from war to peace, and those which will face us in the years following the war.

Some of the immediate problems are: sub-normal condition of vehicles and tires; the tendency of pedestrians and motorists to relax and "let down the bars" when wartime restrictions are lifted; sub-standard condition of streets and highways, traffic control measures and organizations due to deferred attention to these matters; and the relaxing of wartime restrictions and gasoline and speed.

Among the long-term problems are listed:

> Increase in traffic volumes and vehicle miles of travel.
> Changes in land use, traffic and parking patterns.
> New developments in the automobile.
> Increased night traffic hazards, due to increased volumes and relaxing of speed restrictions.

A part of the Post-war Traffic Safety Program is concerned specifically with traffic engineering. Attention is directed to three principal objectives, (1) improved design standards for new road construction; (2) improved safety and efficiency of existing streets and highways; and (3)

improved and expanded traffic engineering administration in cities and states.

The traffic engineering elements are being activated as a part of a program of the Institute of Traffic Engineers who approved a "blueprint" for the application of traffic engineering in the post-war era at its 14th annual meeting in Chicago on October 3d, 1943. Only the physical problems and objectives of the practicing engineer were set forth at that time. However, careful study is now being given to (a) the best means of furnishing better and more comprehensive traffic engineering training and (b) ways to improve traffic engineering administration.

This "blueprint," designed to give a broad viewpoint in programming post-war traffic engineering activities, is now serving as a working guide to the Institute of Traffic Engineers' Post-war Traffic Engineering Planning Committee in the development of a more detailed program for cities and states.

The Institute program is stated in four parts:

1. PROBLEMS—POST-WAR PLUS PRE-WAR

A. Post-war traffic engineering problems will include:

1. More vehicle-miles of highway travel.
2. New planning and changing land utilization in communities.
3. Old vehicles in poor condition mixed in traffic with new vehicles of improved design.
4. Increased terminal and parking problems.
5. Expansion of transport facilities and services.
6. Increased emphasis on time values of travel.

B. Pre-war and current deficiencies in traffic operations must be dealt with. They include:

1. Critical parking and terminal facilities.
2. Inadequate and unsafe street facilities.
3. Improper geometric designs for traffic demands.
4. Improper application or non-uniform signs, signals, and markings.

These have resulted in high accident rates, congestion, inconvenience, and uneconomic highway service.

2. OBJECTIVES

The traffic engineering profession, realizing the impact that post-war conditions will have on the transport service which should be provided the highway user, is now restating its objectives in the light of the immediate post-war needs. Achievement of these objectives will assure a full dividend in efficiency, safety, and convenience in the movement of persons and goods. These objectives are:

A. To "de-congest" urban centers and other critical locations to achieve:

1. More rapid, uninterrupted flow.
2. Attractive, convenient parking.
3. Through roads for through traffic.
4. Reduction of conflict between commercial and other traffic.

B. To "accident-proof" streets and highways for vehicles and pedestrians to the maximum degree.

C. To co-ordinate highway traffic plans and operation with:

1. Highway planning and design.
2. Related means of travel.
3. Community planning.

3. MEANS OF ACHIEVING OBJECTIVES

A. Major Construction Projects. Post-war Public Works construction plans should fit new roadway layouts to anticipated type and volume of traffic use.

1. All new projects should fit into a street and highway plan for the entire area. Many wide urban streets should also be divided.

2. Rural roadways four lanes or more in width and all freeways should be divided.
3. Streets should be widened only where intersections are infrequent and where additional full width lanes for moving traffic are provided. Widening of a short narrow section to provide a uniform street width may also be justified.
4. Sidewalks and other pedestrian facilities should be built into the street systems of urban and suburban areas.
5. New roadways should be so designed as to provide efficient traffic operation even at sacrifice of mileage of new construction.
6. Off-street parking facilities should be provided from congested roadways.

B. Other Projects.

1. Efficiency, safety, and flexibility of traffic movement should be increased by such projects as: modernizing traffic control devices; establishing one-way street systems in existing street patterns where justified; installing "no-left turn" regulations on major two-way streets; and applying "semi-limited access" principles on arterial streets.
2. Pedestrian protection should be increased through such projects as: refuge islands, barricades, lighting, regulatory measures, and grade separations.

C. Factual investigation by competent technical authorities should be made as the basis for all post-war traffic improvements or changes in regulations to be sure that they are fitted to actual traffic needs.

4. Action Needed Now

If these objectives are to be achieved, careful and detailed plans must be ready for the moment war ends. This means action now! Therefore, the members of the Institute of Traffic Engineers pledge their immediate and complete effort in the preparation of a post-war program, in co-operation with planning agencies, public works authorities, and other groups involved.

Co-ordinating Traffic Functions and Facilities

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In the field of street and highway traffic control the problems are so frequent and complex that it is doubtful as to whether or not they can be solved, even with our very best, co-ordinated efforts. Break down the various problems into their basic components and attempt to handle them independently and it is likely that no reasonable solution could ever be effected.

TRENDS TOWARD CO-ORDINATION

The co-ordination of functions in a common field of endeavor is usually a very natural thing. This is as it should be. A hasty review of developments in the field of traffic control indicates that such a trend has been under way for a number of years—almost since the problems were first recognized.

When it was realized that motor vehicle accidents and congestion were becoming critical, when people were beginning to use and purchase motor vehicles in very large quantities, and at the calling of the first National Conference on Street and Highway Safety in 1924, the need for co-operation was perhaps being generally recognized for the first time. The complete lack of uniformity in traffic rules and regulations between the various states, the absence of properly organized and administered agencies for dealing with problems of traffic control, completely different techniques in handling quite similar situations, and many other conditions of traffic control reflected a strong need for close co-ordination of the various activities that were already under way, as well as the necessity for developing new ones. The accomplishments of this first meeting and subsequent meetings of the National Conference on Street and Highway Safety are common knowledge to all persons working in the street and highway traffic field. The five Uniform Motor Vehicle Codes and The Model Municipal Ordinance have been directly responsible for a great advancement in traffic laws and regulations. Plans are now under way, it is reported, for the holding of another meeting of the Conference at some time in the near future to consider revisions and changes that are necessary as a result of new problems and new activities in motor vehicle transportation.

It may be contended that the principal good of the National Conference was the development of *uniformity* in traffic regulations. It is apparent that what makes for uniformity also makes for co-ordination. In this case considerable advancement has been made towards co-ordinating safety in traffic control activities through a very loosely knit organization that functioned at a federal level without any intent at any time of promulgating traffic control by federal authorities.

A need for co-ordination of activities in traffic signing and marking was recognized at the first meeting of the National Conference. As a result, work was begun then on the first Manual on Uniform Traffic Control Devices. Later editions of the Manual were not prepared entirely by the National Conference and again co-ordination and uniformity were accomplished by bringing in a

number of other groups and organizations. Agencies which worked on the last edition of the Manual included the Institute of Traffic Engineers, American Association of State Highway Officials, the National Conference on Street and Highway Safety and the U. S. Public Roads Administration. Perhaps no better procedure could have been devised for co-ordinating the aims and activities of these various groups on the subject of traffic control devices than through the development of such a manual.

Applications of trucks to freight movements developed a need for uniformity and co-ordination in interstate commerce involving motor vehicles. To obtain the proper level of control and uniformity it was first necessary to co-ordinate activities of the various groups and agencies involved in interstate shipments. Co-ordination was directed by the Interstate Commerce Commission.

State line problems, which were numerous in the early days of highway construction and development, have been overcome through federal regulations and through the development of a co-ordinated program of road building. Even in its early stages of development it was recognized that the motor vehicle would not be restricted to a small area, such as had the horse-drawn vehicles. The need for a co-ordinated road building program between the various states was obvious. It has not only been necessary to plan the locations of the highways so that those constructed in one state would join those constructed in another, but also to develop roadway design, construction and maintenance standards that would make driving as uniform and safe as possible. The matter of co-ordinating highway transport facilities has been handled effectively by the U. S. Public Roads Administration.

The fact that one agency in the country assigns U. S. Route numbers is a further indication that functions of highway transport are being co-ordinated. This agency, the American Association of State Highway Officials, has taken an active and important part in the development of highway standards and has been instrumental in bringing about the co-ordination of highway department activities between the various states. So outstanding has been this work that there is now an almost united highway department front on important matters involving highway transportation.

Traffic safety education has been closely tied in with education in other fields of safety. In traffic safety education programs, it was found unwise to segregate them from other safety training activities in the public schools. State laws requiring the teaching of safety in schools normally are very broad and require training in all phases of safety, not in just those pertaining to motor vehicle uses.

Enforcement agencies of the country have developed a highly co-ordinated plan for traffic enforcement. While it cannot be said that the co-ordination is as good as that which has been achieved in criminal fields through such scientific aids as finger prints and crime records, it is obvious that enforcement work in traffic has been co-ordinated to a high degree in view of the limitations and peculiarities pertinent to it.

Driver licensing, vehicle registration, financial responsibility, reciprocity agreements and many other matters of motor vehicle operation have been co-ordinated by motor vehicle administrators.

Motor vehicle manufacturers have co-ordinated their activities, working toward common goals in vehicle design and manufacture. Functionally there is no great difference between

a Ford and a Buick. Public demands, economy and common sense have dictated needs in vehicle design and perhaps did much to force co-ordination.

There have been several very outstanding cases of co-ordination of highway facilities. The Port of New York Authority is one. Starting primarily as a harbor and rail agency, this Authority has developed almost entirely into a traffic operations agency. Excellent co-ordination of traffic facilities has been achieved in an area where traffic demands are as heavy as in any area in the country. It is significant, too, that it is now common practice to develop some type of traffic authority or commission wherever highway toll facilities are constructed.

Other cases could be developed showing how co-ordination of traffic functions has taken place as a very normal development within the various fields of activity in street and highway transportation. What is needed now is a plan whereby the work of *each* of these groups, which is common to that of the others, can be closely co-ordinated.

Working Relationships

It is apparent that while the importance of co-ordination is usually recognized, it cannot be forced. It must be allowed to develop naturally. What should be attempted is to accelerate co-ordination wherever possible. Highway transportation is relatively so new that it is natural that some mistakes have been made which undoubtedly retarded some co-ordination activities. Many of the agencies working in this field have been guilty of caching their work in mysterious, confusing terms which caused resentment on the part of some individuals and agencies already working in highway transportation. Others have been guilty of undertaking too broad a scope of activity and have been accused of usurping inherent functions and activities of others. There is no need, however, to go into a discussion of the errors that have been made and why they were detrimental. Only those mistakes that will enable the accomplishment of a better job in the future are significant.

Needs for planned and sustained co-ordination are obvious. Road structures must be built for utility. To accomplish this, it is necessary to give full consideration to factors of traffic operations and traffic control. These factors must be determined, considered and applied. To accomplish this, the road builders must seek and use the assistance of other agencies working in, and responsible for, traffic control and regulation. Operational characteristics of vehicles, driver limitations, enforcement attitudes and policies, statistical records revealing accident and congestion experience and other such information are valuable in the design, planning, construction and maintenance of highways. Such tremendous investments are involved in most highway facilities that it is not possible to junk them, many years before the expiration of their normal life, to construct new ones of higher functional utility.

Similar parallels can be drawn in traffic engineering, enforcement, legislation and all other activities in highway transport, to show that co-ordination of action and purpose is necessary. To provide the best and most fool-proof traffic controls, necessary to prevent delays and to reduce traffic accidents, it is necessary for traffic engineers to use not only the findings and results of their own investigations and studies but also to use the information that is available from enforcement agencies, road builders and others. To develop regulations that are firm, adequate and modern, the police must seek out and utilize the assistance of the other agencies.

Regulations established solely on the basis of *enforcement* experiences of the police would likely be unreasonable and would have little public support and backing. Engineering, education and enforcement are all dependent upon modern and adequate legislation. Perhaps no other phase of traffic control illustrates more obviously the need for co-ordinated activities than legislation. Traffic codes and traffic ordinances must take into account all of the functional responsibilities in the field and not those of any particular function. Working independently for legislation that fits only the needs of a single function will do little to advance the overall work of highway transport.

Achieving Co-ordination

All of the groups dealing with highway transportation have been able to co-ordinate their independent functions satisfactorily but have the inter-related and common functions of the agencies been co-ordinated?

To meet the needs of wartime highway transportation, the National Highway Traffic Advisory Committee to the War Department was created, RTAC organizations, at a state level, brought together the work of highway departments, motor vehicle commissions, state enforcement agencies and military officials on matters of war transport. Each state organized a committee for the primary purpose of co-ordinating military and civilian traffic needs. Their purpose was to handle selectively a problem which developed with military uses of highways and to arrive at solutions which involved the policies and attitudes of all agencies within the state having responsibility in traffic. It was not necessary for the Army to go to the highway department to ascertain load limits of bridges on a roadway over which a convoy was routed, then to the motor vehicle commissioner to ascertain state driving rules and regulations or driving practices and, further, to the police to seek aid or escorts. Such situations were handled simply, at one place, by a common committee. In practice it was even simpler, because the committee invariably appointed a director or an executive secretary who was empowered with the authority to act on most matters without a full meeting or special consideration by the individual committee members. This latter procedure was found necessary in order to obtain immediate action that could only have been accomplished over a long period of time by a committee or by contacting each individual agency separately.

While the utility of the Highway Traffic Advisory Committee has not been established for peacetime problems of highway use, it seems logical that they at least represent one very feasible method for achieving the desired co-ordination between the various agencies concerned with problems of highway transportation at a state level. In fact, they closely parallel organizations which have already proved their value in a number of states, state traffic commissions and state traffic authorities. Frequently the state traffic commissions have not been delegated with sufficient administrative authority to deal, in an efficient manner, with individual problems as they arose. They were perhaps most important because of work they did in connection with policy forming matters aimed at overall programs for dealing with state problems of traffic control and with long range planning for handling such problems. This, of course, was not true for all the traffic commissions and with the Highway Traffic Advisory Committees it was never the case. A balanced activity, taking into account both administrative and policy forming functions, would

necessarily have to be developed for satisfactory operation in normal times.

It is expected that at the conclusion of the war the problems of highway transportation will become most severe in urban and metropolitan areas. Increased vehicle registrations and increased uses of vehicles in city areas are apt to create problems of congestion and accidents without precedent. In the vicinity of most large cities there are usually a number of smaller incorporated places. From a standpoint of traffic control and regulation there should be no difference between the policies established in one of these government jurisdictions and those in the others nearby. Again, the need for co-ordination of traffic functions and facilities is evident. Why should this not best be achieved through the establishment of a metropolitan traffic commission?

In each governmental jurisdiction of the metropolitan area there will normally be found a "functional agency" responsible for substantially the same matters as the agencies representing, or constituting, a state commission. It would be exceedingly unwieldly, therefore, in the average metropolitan district to form a commission or committee with representatives of each of the highway transportation agencies of each of the jurisdictions. Dissension and disagreement might develop between the representatives of the same jurisdiction. It seems, therefore, that the only logical solution would be to have the metropolitan commission or committee made up of a single representative from each of the individual cities forming the metropolitan district.

What about a plan of organization within independent cities? In cities it would be possible to form co-ordinating committees on exactly the same pattern as the state committees. They would have official status and could not necessarily require citizens' representation or the appointment of full time personnel (executive secretaries or directors). Conditions would vary with the size and magnitude of traffic problems of a particular city. It would be logical to have a city commission consist of the heads of public works, police, legislative and educational departments. Such a city traffic commission could function with equal effectiveness in independent cities and in metropolitan organizations.

It would seem feasible to have each of the city commissions delegate one representative on the metropolitan commission. This means that all matters of policy could be agreed upon first by the individual city commissions and then collectively by the metropolitan commission. After such co-ordinated action a definite and effective progam would usually follow.

It is important that all such co-ordinating agencies, whether at a state, metropolitan or city level, be given official standing and powers through legislation and ordinances. They should not be confused with the official or unofficial groups, such as safety councils, which have as their primary aim general safety promotional activities. However, there will be many opportunities for the two types of agencies to work together and to benefit from the work of each other. This joint activity should be encouraged in every way practical.

General Considerations

To achieve proper co-ordination of the work of the various groups and individuals dealing with matters of highway transportation, considerable planning and careful administration are needed. It will be necessary to place highway traffic in its rightful broad and important place, for which the more correct and descriptive title is "Highway Transportation."

Petty jealousies and personal differences must be put aside. It is only natural that some of these will develop and must be contended with as in all public work. At least they should be kept at a minimum and plans made from the beginning to cope with them in as satisfactory a manner as possible, so that if not eliminated they will at least be mitigated.

A confusion of "titles" should be avoided. For some time it will be necessary, in the field of highway transportation, to use general titles which are descriptive of the work rather than indicative of a limited professional group. It must be kept in mind that *all* of the activities commonly dealt with in this field are in the category of *public* work and for this reason alone it is necessary to avoid high sounding and confusing terminology.

It is a well known fact that the railroads, the transit companies and the airways have carefully co-ordinated their inter-departmental work and activities. Administration, construction and maintenance groups closely tie in their work with the operations department. The same procedure must develop in highway transportation. While it will be more difficult because it is public work it should, nevertheless, be attempted through some such plan as has been suggested.

It is in order to mention again the fact that most of the work in highway transportation is relatively new. Long experiences and precedents are almost completely lacking. New situations develop overnight. Conditions which now exist may not be typical of those which will follow the war. Regardless of the magnitude of the new problems it is recognized and agreed that a tremendous post-war road building program is apt to develop and that automotive transportation is still in its infancy. The general aim is an old one—to provide streets and highways, as well as traffic controls—that will make it difficult for people to have accidents and which will reduce delays. The highway transportation elements are variable. Little is known about some of the elements and *many* are difficult to control. Traffic functions and facilities must be adjusted and co-ordinated so that *they* will function smoothly and effectively together.

Mr. William P. Eno and the Eno Foundation for Highway Traffic Control have set an excellent pattern in this conference for co-ordinating activities of all agencies concerned with matters of highway traffic control.

Questions and Answers

Mr. Matson to *Mr. H. G. Sours*: Have you any particular reactions or suggestions to make concerning closer co-ordination of city and state work where roads cross political boundary lines?

Mr. Sours: I might say one of the things that should be done in metropolitan areas is to try to obtain some sort of what might be called "regional authority." I believe that one of the biggest barriers we will have in the metropolitan areas is that of attempting to get a uniformity of thinking and action on the part of various municipalities or agencies that are affected by metropolitan work. It usually happens that a large city is surrounded by a number of smaller municipalities, each under a separate municipal government; and in planning major arterial highways which may naturally approach from the outside into the heart of the met-

ropolitan area, it becomes necessary to slice through a number of different municipalities under separate authorities. It is not always an easy matter to accomplish the best solution in cases of this kind. In order that we may expedite that type of work, it would be well for us to work toward the end of trying to get our various state legislatures to establish at least some kind of metropolitan or regional authority to act on matters of this kind. That, I think, has been done in a few cases. And, of course, it worked quite effectively. It is quite likely that the states will combine with the local agencies in the financing and planning of trunkline improvements. It is to the public's advantage, I believe, if this work in the various states is accomplished under the direction of the state. They have, perhaps, a better opportunity of coming into the metropolitan areas and disposing of some of the local differences of opinion. Of course, it is desirable if a local metropolitan agency can be established to handle that type of work, but where that is not the case it can be better accomplished through the general direction of the state and through the federal government wherever they are participating.

Mr. Matson to *Mr. E. P. Goodrich,* Consulting Traffic Engineer, New York City. I am sure you must have some observations?

Mr. Goodrich: I can only give one example of what was just discussed. When in China, in the planning of the City of Wuangpo near Canton, there was a connection with the city, the state and the national government and the officials in Canton were given power by each of these governmental groups to carry out the plans that were made. This is simply an example showing that it can be done.

Lt. James McGarvey, 17 Division Traffic, New York City Police Department, 240 Centre Street, New York 13, New York. Is there any possibility of getting the automobile manufacturers to reduce the glare of automobile headlights and thereby make night driving on the public highways safer? It is impossible for a driver, meeting a car at night equipped with the present type of sealed beam headlights, to see the road. This makes driving at night extremely hazardous.

Mr. Matson: After quite a bit of research the motor industry did come out with the sealed beam. I have heard similar criticisms before and will ask Mr. Marsh to comment on this matter.

Mr. Marsh: It was my privilege to work with the motor manufacturers group and the motor vehicle administrators representing the National Conference on Street and Highway Safety. I think the gentleman has a point of much merit, but I am afraid that the problem is much more complicated than is generally realized. The greater danger in driving at night is believed to be through inadequate lighting and although much more disagreeable, the glare effect is probably much the less serious hazard factor. The main problem was to produce sufficient light out in front of the driver. For effective seeing, the headlamps must be pointed just right and must be kept so pointed. A slight error in pointing will cause trouble—either glare if too high or the illumination of too short a distance if pointed too low. The headlamp must be very accurately constructed too for proper effiicency. Sealed beam headlamps are precision-made, which is one reason why they can produce excellent illumination if properly pointed and used. Efficient use of sealed beam headlamps and the avoidance of objectionable glare is based on one point, which you are going to say will not work—that the driver shall depress his beams when oncoming traffic gets close. This is where we have fallen

down in not selling that practice to the American public. There are two reasons why drivers should want to do it: (1) they should want to be fair to the other fellow and (2) they themselves would see much better. Thus as they approach this other car if they will depress their own headlamps they will get extra light where they need it, namely, on the right hand edge of the road and in their more immediate foreground. The major weakness exists in the failure to put across this proper use of sealed beam headlamps and not in the failure to produce a very much superior headlamp. Education and enforcement of proper use are necessary. In cities, where street light is good or traffic is heavy so that other cars help light the roadway, the lowered beam pattern should be used exclusively.

Lt. McGarvey: I do not believe that any policeman can give testimony that will satisfy a magistrate that an automobile is displaying dazzling headlights. It seems to me that the safest time for driving at night we had in the City of New York was when the headlights were shielded 1/2 or 2/3 from the top because of dim out restrictions. It was possible then for a driver going in the opposite direction to see the road and the automobile he was meeting. There should be some standard set by a national body that would reduce the glare caused by the sealed beam headlights.

Gordon H. Sheehe: I am interested in the Lieutenant's problem and remarks for I am a sufferer from glare and am concerned with difficulties of enforcement. I think much of the difficulty is due, as Mr. Marsh says, to the fact that motorists do not show ordinary decency and courtesy by depressing the beam of their headlights. In some places failure to do this has been remedied by the action of police officers. Another aspect of the problem is the glare from headlight beams even when depressed. Headlights get out of adjustment. Overloaded vehicles also cause the direction of the headlamp beams to be higher than desirable. These difficulties can be remedied by inspection, combining period inspection with on-the-road equipment check up. Many states having regular inspection require that the headlights be adjusted so that when drivers do depress their beams the glaring light will be out of the oncoming motorists' eyes. So, if a little bit of courtesy is combined with inspection, education and enforcement perhaps the desired end can be reached.

Another point which is worth mentioning is the dual system of headlight beams, one for city driving and one for country driving. I mention them because Lieutenant McGarvey suggested applying the shielded headlight similar to those used during the dim out in order to control the glare encountered in city driving. The dual beam headlight has all of the nonglare advantages of the shielded headlight without the disadvantage of eliminating a substantial part of the illumination which resulted from the screening of the headlight for dim out driving.

In cities, because driving speed is less than on rural highways, it is not necessary to have the way ahead illuminated as far in advance of the car as is desirable on rural roads. For this reason two bright beams should be provided and on some cars this has been done. One beam would be for country driving and would be much nearer a horizontal beam than the other beam for city driving. The country beam would illuminate the roadway farther ahead of the car than the city driving beam. Both beams could be, can be and should be depressed when meeting oncoming vehicles. Depressing the beam would not necessarily require a reduction in

the illumination but would throw the direction of the beam slightly down and to the right resulting in continued illumination of the shoulder of the highway for about the same distance in advance of the car but removing the danger of glare.

As Mr. Marsh pointed out, one of the great hazards in night driving is the inability of a night driver to see pedestrians or objects on the edge of the highway in sufficient time to avoid hitting them. We should therefore improve the control of the direction of the beam without sacrificing illumination.

Mr. Goodrich: In one of the large cities in China it was required that you must shut off your headlights entirely. It was very effective as everybody slowed down. Obviously if we all had one way streets or if the lanes were so widely separated that there would be no glare from opposing traffic the answer to this question would be obvious. Better lighting on highways would help. Poloroid glass has been effective.

Mr. Edgar F. Copell, Traffic Engineer, Massachusetts Dept. of Public Works, to *Dr. Stack*: What is the trend of pedestrian regulation? We are making recommendations for post-war roads. And we are confronted with anti-feeling toward the project. I am thinking of requiring people to use overpasses, fencing them off. Can we do anything to prohibit them on the highway?

Dr. Stack: I think this is a difficult subject but I know that the American Association of Motor Vehicle Administrators under the influence of Commissioner Magee of New Jersey has been stressing this point more and more. You can accomplish a great deal through education. As many cities have demonstrated, they try education and enforcement together. I think Commissioner Magee and many others feel that we have to go one more step in the post-war period. It is going to be a difficult step, because the pedestrian does not like to be controlled; but pedestrian regulation may be the final solution.

Jerome D. Finkel, Newark, N. J. to *Dr. Stack*: Do you feel that student driver education should be restricted to those of legal driving age? I was not of legal driving age in high school and therefore I was restricted from classes which had driving instruction.

Dr. Stack: We recommend something like this; that instructions be given just preceding legal driving age. Then, if the state license requires a beginner's permit, of course, the youngster in order to drive a car on the highway must have such permit, so the point is clear that unless the youngster can be licensed to drive or have a learner's permit we should not start him off driving contrary to the regulations of the state where he lives.

Mr. Sheehe: I would like to give Mr. Finkel the result of a survey made by Captain Musick of the Texas Highway Patrol. I think it bears on the point he has raised. Captain Musick made a study in his travels throughout the state visiting high schools and even grammar schools. He asked the children and the young men and women to honestly and anonymously tell at what age they had actually started driving —not when they obtained a license or when the police found them driving. Many of these children indicated they had been driving since they were nine or ten years of age. Now driving at this early age may not be as common in many places as it seemed to be in Texas. But wherever it is done, the need for driver training at a very early age is apparent. If it can be determined at what age the children actually begin to drive, it should be done. Then driver training should be provided before the children reach that age even though

it may be three or four years before they reach the legal driving age.

Lt. (jg) D. H. Luria: What are you going to do with the people who now have licenses who should not be driving? I raise that question because in the Fourth Naval District, where I am located, we have a driver testing and training program on operators of Navy owned vehicles under the direction of the Fourth Naval District Domestic Transportation Officer, Lt. Comdr. J. F. Gallagher, who was formerly Assistant Chief of Traffic Engineer for the City of Philadelphia, Pa. Under this program, visual acuity, muscular reaction tests, eye, hand and foot co-ordination tests, driving tests and motor laws are given to each operator in order to receive a Navy license permitting him to operate a Navy owned vehicle. Many of the drivers are licensed by states, however, and many of these operators cannot receive an official Navy license because they have forgotten, since taking their first examinations to obtain an operator's permit, their knowledge of motor laws, have forgotten what a stop sign looks like or their eyes have become bad in the meantime. From our point of view, we could not allow them to drive Navy vehicles because they are not safe drivers. They had not been re-educated in traffic signs, markings and so on. What is the answer?

Dr. Stack: Coming home from the war are going to be millions of young men. Many of these service men will have a great deal of experience in driving. The states have been doing just as much as they can in giving driver's license examinations with their present staff of examiners. The staff of examiners must be increased if we wish to get better examinations and re-examinations. Driver's license departments in the states already know of many ways in which they can improve the examination if they had more time available for each test. I believe that your point about the lack of ability of drivers indicates the need for periodic re-examination. Voluntary drivers' schools held in connection with evening schools in our communities would help improve individual driving skills and practices.

Mr. Matson: What would you have to say, Mr. Marsh? You asked for a chance to speak at this time.

Mr. Marsh: I recited this morning a couple of instances where it seemed to me crystal clear that the public had not been sold on what has to be done. Take the policy of rationing, for example. I have no conflict with what Mr. Stack has said. But here again my point is that in addition to having more examiners and more time for examination and to having much higher standards than we now have, that there has to be a fundamental job of convincing the public that these things need to be done. What that means is that some demonstration or factual studies are going to have to be worked out and placed before the public in a fashion which will convince the public that these re-examinations are necessary and under what conditions they should be instituted. For example, with people over a certain age, re-examination must be shown to be desirable. We have been a nation of young and middle aged drivers. We are now coming into an era when we shall have large numbers of elderly drivers. For the most part they will be persons who have been driving and who will wish to continue to drive. Our elderly driver problem is going to increase in severity and is going to demand more and more attention and it behooves all of us to work for better understanding of this probem.

Mr. Firmbach to Dr. Stack: Dr. Stack said, and I agree, that more than 80 per cent of our accidents is caused by the pedestrian and/or the driver. Less than 20 per cent is caused by the vehicle and/or the highway

and the major portion of the 20 per cent is caused by mechanical defects in the vehicle. We have a number of state laws requiring a vehicle to be examined annually or semi-annually. The greater proportion of accidents is caused by the driver, yet we have no state regulations calling for driver re-examination. Today I take my license test and pass it from a physical and operational standpoint, yet, in a year or two I may "run down." There is nothing in any of our state regulations which requires me to be re-examined. When the vehicle is inspected, mechanical defects must be corrected, but no check is made on my physical or operational deficiencies so that they may be corrected. At present we are trying to bring up this question in the way of study in the Interstate Commerce Commission, Bureau of Motor Carriers. In line with this, just as a thought which might be acted upon, is the subject of the return of service men driving motor vehicles. This is a great hazard today and we have had a lot of disastrous experiences in the material and passenger carrying class when such men were discharged because of mental or nervous disorders. We have started a tremendous research with this question with all the facilities at our command.

Mr. Matson: Inspector Leggett—Do you have many traffic problems in Canada?

Inspector T. O. Leggett, in charge of Traffic, Police Department, City of Montreal, Canada: I was going to bring up the question of lights on motor vehicles. Mr. Marsh answered it. One question that was bothering us was the sealed beam light and I believe that the sealed beam light is a bad thing for traffic. It helps along accidents.

Question: Do you think that the increase in accidents is due to the inefficiency of the drivers that are left who have not been called up in the armed services? Are these men, even though they have licenses, inefficient or incapable of operating motor vehicles, but doing so because of the shortage of manpower?

Daniel G. Reynolds, Director Field Service, I.A.C.P. 1827 Orrington Avenue, Evanston, Illinois. I think you are right. I think that is part of it. Increase of accidents is due to a whole series of things, including war psychology. Older cars are another angle, tires wearing out another. All of these things enter into it and another thing we have to consider—and here engineers will agree—less traffic on the road provides more room to jockey around and do the things that lead to accidents. We had that experience in Seattle in 1941. I was working out there before any staggering of hours went into effect. And they had such a traffic jam near the airplane plant that cars moved along about two or three miles an hour. They put the staggered hours plan into effect. That plan had been in effect but a week when they had killed six people on the stretch of road in front of the plant because traffic was lighter and drivers could jockey around. Where congestion held them down previously the accidents were slight.

Thomas Newton, Greenwich, Connecticut: Is there any tendency on the part of manufacturers to decrease the possibility of the speed of a vehicle toward a safety angle, of less speed and thus greater safety? My thought is this: in future most driving will be in small areas while long distance transportation will go into the air. There will be no need for costly haste and there will be less driving on the open road.

Harold F. Hammond: I do not think the manufacturer is going to put as much speed into the post-war car as in the pre-war car. Indications are that the public is not primarily

interested in high speeds. One hundred miles per hour seems to be rather out of order. The average motorist does not care to go much more than 50 or 60 miles per hour, so there is no reason for building high speed into the vehicle. I have heard several manufacturers say that there are many other things the public would rather have than speed. According to public opinion polls, speed comes about fourth, fifth or sixth down the line of preference of what they want in a post-war vehicle, so I do not think we have to worry about the manufacturer building a car with 100-125 miles per hour speed. Their publicity departments should stop trying to use speed as a selling point. In fact, in the past, the average reasonably priced car had top speed of only about 86 miles per hour, yet I think in many cases the advertiser gave the impression that the top speed was greater than that. The advertiser, instead of over-stating the top speed of the car, should emphasize other features that the public may want, such as economic operation, comfort and flexibility.

Lt. J. G. Hanna, Traffic Bureau, Richmond, Virginia. As an enforcement officer I am interested in the problem we are faced with today. We have, in Richmond, Virginia, just completed a course of training for 55 reserve police officers. They are volunteers from all walks of life and have met several physical requirements. They are in uniform and have been trained. They serve two to four hours of duty a week. I am wondering if anyone has had experience with reserve officers of this type. They work with experienced officers until they have had enough experience and can go alone.

L. A. Hince: There is a great deal of thought being given to that right now and some little action. Of course, this is the very beginning of anything of the kind because the problem has just arisen during the past several months. Yesterday, I was talking with a captain of the Oklahoma State Police who is formulating a plan to use citizens on a part-time basis to replace part of the station and clerical personnel and some ofcers who do not go out on the road, so as to release many of the experienced officers for work on the road. Police departments generally have not yet put this into practice so far as I know and the first signs of that trend that came to my attention were in a discussion of ways and means of meeting the situation caused by selective service operations affecting police personnel. This is a very serious problem, of course, and some organizations—Virginia State Police for example—have lost a large number of their personnel. It is so difficult in that respect that the Superintendent of the State Police has been inducted. This is an example of difficulty of staffing. They have met that of course to some extent by using women in the driver testing program but it is probably going to be necessary to use reserve police to a greater extent in the future in police work. The only suggestion I have is that the auxiliary work or the work of supplementing officers on a part-time basis should be made real paid employment, with the officers under discipline, under direction of the head of the organization and not running around the community as voluntary vigilantes enforcing the law. I think that is most important.

Lt. J. G. Hanna: This group is entirely out of the old auxiliary police. We have several hundred auxiliary policemen not in uniform. These are reserve officers in uniform and under the direction of the department.

Mr. Matson: You are apparently pioneering and police administrators will look to you for experience.

Lt. James McGarvey, New York City Police Department: The Police

Commissioner of the City of New York has appointed about one hundred temporary policemen on a paid basis for the duration of the war, the salary to be $2,000 a year. The temporary policemen appointed will be under the same discipline and have the same authority as members of the regular force but will not be entitled to any pension rights. There is in the City of New York a unit known as the New York City Patrol Corps consisting of special policemen who work on a part time voluntary basis without compensation. Its members assist the regular police department at parades, large assemblages and in guarding vital locations. This unit is under the direct supervision of a commanding officer of their own organization appointed by the mayor.

Mr. Hince: There was quite general agreement among the particular group of officers including eleven chiefs of police that, where the age registers for employment have been fixed so low as to impair the recruitment of personnel, it be raised so as to get in a lot of people in good physical condition even though beyond the age limit of the employment policy.

Lt. McGarvey: In the City of New York the regular members of the police department have a pension system and it is not practical to take older men into the regular department for the reason that the pension system is paid for on a twenty year or a twenty-five year retirement basis and it is doubtful whether such men could remain on active duty for that length of time. If the army did not draft men over 26 years of age, it would be possible to recruit men for the regular force between the ages of 26 and 29, as 29 years of age is the limit at which regular members are eligible to take the civil service examination to enter the department.

Question: I have a question on education which Mr. Marsh might be able to answer. How to get old and young to make use of overpasses and underpasses. I had experiences which leads me to ask that question. When in London some years ago, I went over to what is called the White Elephant intersection, where about eight streets come together, with a large number of bus and street cars and where the authorities had built a good series of underpasses. I was quite interested to see how they were were being used. When I arrived at the White Elephant, I found people walking straight across the intersection. I went down below with considerable interest and found that the underpass was being used by children on roller skates. At an intersection in downtown New York, there was an overpass many years ago. I spent many hours watching this location and never saw anybody using the overpass. Underpasses in various parts of the city have been discontinued. How are you going to take the step to use these things?

Dr. Stack: This is a fair question. It goes right back to the human personality. When engineers build these underpasses and overpasses, they expect them to be used. But the fact is that a good deal of additional work will be necessary to *get* people to use them. If they are located near schools, we can see that the children do to a certain extent but for the most part adults are in a hurry and won't take the time unless the traffic is so heavy that it is difficult for them to cross on the street level. If a fence is erected on a medial strip of 50 to 100 feet, it will tend to force pedestrians to use the passes.

Edgar F. Copell, Dept. Public Works, Boston, Mass.: I understand that Ohio uses the American Association of State Highway Officials' standards for their traffic lines. Do you use the barrier type line?

Mr. Sours: We use the medial barrier lines for non-passing uses. They

work out very well. In a number of cases, particularly where the vision is not good or in certain areas where we are subject to fogs, we have considerable success using luminous types of paint for center lining.

Mr. Copell: In Massachusetts, we tried that but there was such public objection we had to use solid barrier lines. We had to go back to the old manner of doing things.

Mr. Sheehe: One of the speakers this morning advocated that all states and those cities, the population of which exceeded 50,000, maintain a traffic engineering bureau staffed by at least one full time traffic engineer. This is excellent. But I am concerned about the many cities, the population of which is under 50,000. They outnumber many times those over 50,000 population. In many of the smaller cities, even those of 5,000 or 6,000 population, there is a great need for a limited amount of traffic engineering. In these places there is usually no traffic engineer or source of traffic engineering counsel. The police usually inherit the job of doing the traffic engineering work and do the best they can without traffic engineering knowledge. My question addressed to Mr. Sours is two-fold: Is any move under way to assist these small communities with their traffic engineering problems? And if not, do you believe it would be a good idea and a practical one for the state highway department's traffic engineering bureau to send field men into a small community to work and give needed assistance?

Mr. Sours: This is our experience in Ohio. Originally our Bureau of Traffic Safety was under the Maintenance Bureau of the Highway Department but some five years ago we separated them into two bureaus and created a Bureau of Traffic Safety headed by Harry Neal. The next step was to set up headquarters in each of the twelve divisions of the twelve different sections of the state. In each of the divisions we placed, as we were able to find them and train them, a district traffic engineer. That personnel has been reduced somewhat in the last couple of years because of the loss of some of our men. In some cases we now have two divisions under one man. These men are authorized to lend assistance to the smaller municipalities on traffic problems. We do not attempt to force our attention on them but we have made it known to these municipalities that our men are available to them for consultation service. In many cases they have gone before the municipal councils, service departments and safety departments of the various smaller municipalities and have given them considerable help. It has worked out nicely. We hope after the war is over, when we can restore our personnel, that we can further increase that service.

Mr. Sheehe: Do you know if the American Association of State Highway Officials contemplates recommending that such service be instituted or increased to the extent that more small communities would have the benefit of traffic engineering service?

Mr. Sours: I do not know that it has been discussed among administrative groups. Possibly it has been among traffic engineering groups of state highway official groups. I do think all available service should be extended to the smaller municipalities. We thoroughly promote highway safety and also make a contribution toward standardization.

Mr. L. A. Maeder, Asst. Secy. New York State Traffic Commission: I would like to add a word. The New York State Traffic Commission, since its formation, has available a traffic engineer in each of the various highway districts and a traffic supervisor in each of the state police troops throughout the state and these men

are available to cities for any assistance they might need. Furthermore, in the villages on the state system of highways we have complete control of all signalling devices, signs, etc. In the smaller communities off the state highway system the State Traffic Commission is the only authority which has power to restrict speed within state speed limit. Signs, however, are posted and maintained by the local authorities at their expense. We tried to project that by legislative amendments to include parking but so far we have not been successful.

Mr. Copell: We in Massachusetts go further than Ohio or New York in that our Act provides no sign or traffic device is legal unless it is approved in writing by the Massachusetts Department of Public Works. Before I can submit to my board any recommendation as to timing of signals, our district traffic men who are always in the field check these recommendations. All such matters must be referred to the state. We have control. We work on standards, timing of signals etc. If they ask for traffic service we have to give it to them. We work with the town attorney. We know what each town is planning for traffic etc. We lay out programs for five or six years for each town.

Mr. Paul L. Green, Sales Manager, Automatic Signal Corp., E. Norwalk, Conn.: Although Mr. Sours did not choose to refer to it, I think he might well have mentioned that very fine Manual of Traffic Control Devices of the Ohio State Highway Department, quite evidently written with an eye to the many small communities which do not have traffic engineering facilities in the towns. It is an excellent job and I think that the revision and preparation of state manuals of this general type can well be considered as post-war projects.

Mr. Matson: Mr. Neal has certainly turned out a most excellent manual on control equipment.

Mr. Upham: Some figures were brought up by the representative of the Interstate Commerce Commission. He referred to statistics that indicate 80 per cent of accidents are due to the driver. I recall a few years ago when I was collecting data for the Road that 85 per cent of accidents were caused by the driver, 3 per cent by the machine or vehicle and 12 per cent by the highway. I think these statistics might possibly be misleading because they should have written into them "under present conditions." Railroad crossing accidents should be segregated. While Captain Whitehurst was president of the American Road Builders' Association, we tried to contribute to highway safety by carrying on a campaign to remove hazards of the highway and build safety into the highway and we feel that that has a much more important place in the safety program than those statistics might indicate. So I am delighted that this co-operative conference was held whereby all of these groups might get together and the highway engineer might remove hazards and build safety into the highway.

Mr. Goodrich: I move a vote of appreciation to Mr. William Phelps Eno for the opportunity to get together in this way and for his luncheon hospitality and we wish him all success and a hundred years more if he can continue with us.

Mr. Matson: I say this has been a thoroughly fine conference and the reports which have been presented offering views of enforcement people, engineering and education have been most excellent. We are certainly all obligated to Mr. Eno, who could not be with us, for calling this conference. I am wondering if Mrs. Eno would care to say something to the group at this time.

Mrs. Eno: I can only thank you in

Mr. Eno's name for the pleasure it was to me to attend your meeting and I will carry back to him an account of my experience.

Mr. Matson: We are apparently unanimous in that regard. Mrs. Eno, will you please express to Mr. Eno our deeply felt appreciation for his generosity in making this meeting possible.

If there is nothing further the meeting is adjourned.

The Registration List

The registration list of those who attended the conference is as follows:

JOHN H. AVERY, Traffic Investigator, Nassau County, Dept. Public Works, Mineola, New York
W. R. BELLIS, N. J. State Highway Department, Trenton, N. J.
ETHEL A. BIRCHLAND, Asst. Secy. American Road Builders' Assn. 1319 F. Street, N.W. Washington, D. C.
T. LEDYARD BLAKEMAN, Planning Engineer, N. J. State Planning Board, Trenton, New Jersey
V. T. BOUGHTON, Associate Editor, Engineering News Record, 330 W. 42nd St., New York
HAL M. BOURLAND, Secretary Street & Traffic Safety Lighting Bureau, 155 E. 74th St., New York City
WALLACE L. BRAUN, Traffic Engineer, Baltimore Police Department, Baltimore 2, Maryland
MARY S. BRIODY, Asst. Sec'y-Treasurer Eno Foundation, Saugatuck, Conn.
CAPTAIN HARRY BROWN, Traffic Division, Norwalk Police Department, Ponus Avenue, Norwalk, Conn.
T. CASANOVA, 320 E. 57th St., New York City
ANTHONY CELIORSKI, Patrol Traffic Division, New York City Police Department, 240 Centre Street, New York 13, N. Y.
NATHAN CHERNIACK, Economist, 111 8th Avenue, New York City
W. F. CHILDS, JR., Director—Traffic Division, Maryland State Roads Commission, 108 E. Lexington St., Baltimore, Md.
W. GRAHAM COLE, Asst. Secretary Metropolitan Life Insurance Co., 1 Madison Avenue, New York
THOMAS E. COLLINS, City Engineer, Elizabeth, New Jersey
J. W. CONE, Commissioner of Public Works, Town Hall, Greenwich, Conn.
EDGAR F. COPELL, Traffic Engineer, Mass. Dept. Public Works, 100 Nashua St., Boston, Mass.
GEORGE PARMLY DAY, President, Yale University Press, Yale University, New Haven, Conn.
GEORGE CONRAD DIEHL, President, Automobile Old Timers, 500 5th Avenue, New York 18, New York
GEORGE C. DIEHL, JR., 1200 Niagara St., Buffalo, New York
E. E. DUFFY, Director of Public Relations, American Road Builders' Assn., 1319 F. Street, N.W. Washington, D. C.
JAMES T. DUKE, Special Agent, Federal Bureau of Investigation, Foley Square, New York
FREDERICK H. ELLIOTT, Secretary, Automobile Old Timers Inc., Hotel Roosevelt, New York 17, N. Y.
JAMES A. EMERY, Lt. (jg) U.S.N.R., Captain of the Yard's Office, Navy Yard, Philadelphia, Pa.
ALBERTA A. ENO, Saugatuck, Conn.
HENRY K. EVANS, Traffic Engineer, National Conservation Bureau, 60 John St., New York City

DEWITT H. FESSENDEN, Advertising Director, 160 North 4th St., Brooklyn, New York

JEROME D. FINKEL, student, Newark College of Engineering, Newark, N. J.

CHARLES J. FIRMBACH, Safety Engineer-Inspector, U. S. Interstate Commerce Commission, Bureau of Motor Carriers, 641 Washington St., New York

PIERRE A. FRUCHT, student, 329 Prospect St., East Orange, N. J.

ERNEST P. GOODRICH, Consulting Engineer, 175 Fifth Avenue, New York City

BERNARD E. GRAY, General Manager, The Asphalt Institute, 801 Second Ave., New York City

JOHN C. GRAY, Inventor, President Hydrogas Corp., 11 Park Place, New York 7, New York

PAUL L. GREEN, Sales Manager, Automatic Signal Corporation, E. Norwalk, Conn.

BRUCE D. GREENSHIELDS, Asso. Prof. of Highway Engineering, Brooklyn Polytechnic Institute, 85-99 Livingston Street, Brooklyn, New York

HAROLD F. HAMMOND, President, Institute of Traffic Engineers, 60 John St., New York City

LT. J. G. HANNA, Traffic Bureau, 11th and Broad St., Richmond, Virginia

FREDERICK W. HAUCH, Location Design Engineer, R. I. Dept. of Public Works, State Office Building, Providence, R. I.

STUART C. HAWLEY, Traffic Engineer, The Texas Company, 135 E. 42nd St., New York 17, New York

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LAWRENCE A. HINCE, Inspector, Federal Bureau of Investigation, Washington, D. C.

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G. DONALD KENNEDY, Tower Building, Washington, D. C.

N. T. LANDERS, Traffic Supervisor, N. Y. State Police Troop "L", Babylon, New York

WILLIAM H. LEEMAN, Traffic Engineer, State Office Building, Providence, Rhode Island

T. O. LEGGETT, Police Department, Montreal, Canada

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JOSEPHINE MACLEOD, Barbizon Plaza, New York City

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