

DEPARTMENT OF THE INTERIOR
BUREAU OF EDUCATION

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EDUCATION FOR
HIGHWAY ENGINEERING AND
HIGHWAY TRANSPORT

REPORT OF THE REGIONAL CONFERENCE
HELD AT UNIVERSITY OF PITTSBURGH
FRIDAY, NOVEMBER 26, 1920

By

PYKE JOHNSON AND WALTON C. JOHN



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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,

Washington, D. C., October 16, 1919.

SIR: As a result of the national conference on education for highway engineering and highway transport called in Washington by the Bureau of Education on May 15, 1920, a regional conference was called at the University of Pittsburgh on November 26, 1920, under the direction of the highway and highway transport education committee.

At this conference were discussed matters of importance to engineering educators, to economists, and to the officers and teachers of elementary and high schools, both urban and rural.

In order that the proceedings of this conference may be more widely known, I recommend the publication of this report.

Respectfully submitted,

JNO. J. TIGERT,
Commissioner.

THE SECRETARY OF THE INTERIOR.

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- Paul C. Wolff, Secretary Pennsylvania Motor Federation, Pittsburgh, Pa.
- L. C. McCandless, Assistant Professor of Civil Engineering, University of Pittsburgh, Pittsburgh, Pa.

EDUCATION FOR HIGHWAY ENGINEERING AND HIGHWAY TRANSPORT.

INTRODUCTION.

At the meeting of the first national conference on highway and highway-transport education called in Washington, D. C., on May 15, 1920, by the former Commissioner of Education, Dr. P. P. Claxton, it was voted by the conference committee on highway transport/education:

This conference strongly recommends that universities and colleges offer courses in highway transport as their facilities will permit, and that at least 10 universities, located in different geographical sections of the United States, offer short-period advanced courses covering the various phases of highway transport, and 4-year courses in highway transport engineering or highway transport options in 4-year collegiate courses.

That the underlying principles of highways and highway transport, as well as the rules of the road, be taught in the grammar schools and high schools of the Nation.

Among the first institutions to respond to the call of the Washington conference was the University of Pittsburgh, which at that time was completing a special highway-transport laboratory, in which the work in both highway engineering and highway transport is carried on under the same roof.

Among those invited to participate in this conference were the members of the Educational Association of Western Pennsylvania and the Pittsburgh Teachers' Institute, and about 2,000 teachers were present from these organizations.

The purpose of this report is twofold: First, to stimulate greater interest of colleges and schools of engineering in the studies of education for highway engineering and highway transport; second, to assist teachers in the grammar grades and high schools in teaching safety as well as the relation of our highways to the economic development of the country; and, third, to encourage rural school development by means of improved methods of transportation of students.

RELATION OF HIGHWAY CONSTRUCTION TO CIVILIZATION.

By ROY D. CHAPIN, *Vice President National Automobile Chamber of Commerce.*

Our duty to civilization to-day is to encourage the construction and use of the best and largest possible number of roads and highways in this country, so that we may encourage the highest type of civilization attainable in America. We should make these routes useful and easy to travel, so that our people can move from one section to another easily and frequently, and so that every citizen may come to think not in terms of his own locality, but in terms of the Nation. As we develop highways we shall break down sectionalism.

There are 8,000,000 passenger motor cars in this country to-day, and figuring on a basis of a little less than 4 people per car, a little over 30,000,000 people ride over the highways to-day, so that highways touch close home to many people. The passenger-car mileage in automobiles is somewhere between 40 and 50 per cent higher than the passenger mileage of the railroad companies.

One point is preeminent in highway and highway-transport engineering, and that is the economic side of the matter. We are concerned not only with expenditure of vast sums of money on the highways but also with the vehicles that pass over the highways, and it is our duty to see that money appropriated for highways is wisely expended. The largest sum that is appropriated for public improvement is annually going to highways; it touches your pocketbook and the pocketbook of your family, and it is our duty to see that our boys understand better than we do what a good highway means and whether they are going to get a good highway when the various authorities build it.

In Detroit, for example, we are spending millions of dollars in trying to open arteries of traffic through the downtown centers. If we do not help others to get a true vision of this great development, the cost of millions to-day will be turned into tens of millions in a few years.

We must also show the effect of highways on the cost of housing. Living has been cheaper in Detroit during the last two or three years because a cheap car enables a man to own a home in the suburbs, where rent is cheaper.

Again, highway transport has created consolidated schools. The little one or two room schoolhouse was usually situated at a crossroads, and the attendance was variable, depending upon the weather and the roads. To-day many States are building consolidated schools, with motor busses bringing children in and taking them back.

We must have highway systems. These must be laid out intelligently, years ahead of time. Through routes in one State must connect with routes of other States; county routes must connect with other county routes; and township routes with other township routes, so that in the end we shall have a network of highways, not as we have now in almost every State of the Union, isolated pieces of highway and great stretches of bad road or a good road connecting with a bad road or stretches of bad road connecting good roads.

Next to the home, our biggest daily contact is with the highway. We follow it to work. It is impossible to escape it. The average citizen complains about his road, yet he little understands his relationship to it. It is the duty of education to interpret that relationship. The Nation has a great duty in the expenditure of millions of dollars for highway transport, and it will be much more difficult to get funds in the next 5 or 10 years to construct these roads if our educators do not interpret that relationship.

Then, as to traffic rules: The teachers in lower grades can teach the meaning of the rules. If there is any one thing that every man wants to do, it is to save life. A true inculcation of those rules into the minds of the children as they come to school is going to cut down very measurably the number of accidents on the streets. Traffic games and highway games in the schools will bring the children to a realization of what highway transport really means and their relation to it. In the high schools it seems wise to teach the economic value of the highways and highway transport. Every high-school student to-day is a potential voter. The students of to-day are going to vote to-morrow for many miles of highway construction at an expenditure of many millions of dollars. They should know the subject so that they can vote these sums intelligently. Colleges should train highway engineers as well as highway-transport engineers.

DEVELOPMENT AND USE OF AMERICAN HIGHWAYS.

By S. B. McCormick, *Chancellor, University of Pittsburgh.*

It is interesting to consider the development of highways in America, and particularly in our Commonwealth of Pennsylvania. The people of Pennsylvania have watched the progress of highways, canals, and railroads. The canals

came after the highway between Philadelphia and Pittsburgh, and shortly after the canal the railroad came on, reaching Pittsburgh in 1852. About 1817 the pike was completed, and it was a busy highway from Philadelphia to Pittsburgh, the national pike also following its route to Washington. Now we have reached a period in our highway construction when it is to be looked upon not as a method of solving an immediate problem, but as the most prominent thing in America.

This, therefore, is a matter which demands the greatest study and the best intellect that we have, and it is a hopeful sign that you are going about it so as to ascertain just what traffic must be carried over these highways in order to find out just exactly what highways you have to construct. And after you determine what highways you have to construct, you may have to decide upon the other question, as to what kind of vehicles, in weight, and so forth, are to go over it.

It is a good thing, as Mr. Chapin has indicated, to enlist all kinds of people in the highway problem. It is a disgrace that so many people are injured and killed in developing this new instrument of transportation. This evil must be remedied. People do not realize that we have in this country just as many engineers as there are automobiles, running not upon a track like a locomotive, but upon highways. The drivers do not realize the tremendous power of the thing they are attempting to control.

In our schools and colleges, and everywhere that people can be brought together, this should be taught, because all of this is a part of one great plan; and when the time comes when from the Atlantic to the Pacific and from Canada to the Gulf we shall have good roads, roads that will be built in such a way as to endure, we shall bring about that which will guarantee more effectively than anything else the greatness and prosperity of our Nation.

Again, if you have highways and automobile trucks, you have a guaranty that no group of men can stand up before the American people and threaten to starve them unless their demands are granted. I am speaking altogether without any bias, for sometimes men have grievances which ought to be righted, and sometimes they have not, but whether they have or not the power of killing people by starvation is too much for any group of men, and we guarantee the safety and security of the Nation itself just in the measure in which we construct these highways.

This seems to me the most vitally important matter of a material kind before the American people to-day.

HIGHWAY CONSTRUCTION IN PENNSYLVANIA.

By H. E. HILTS, *Principal Assistant Chief Engineer, State Highway Department.*

In Pennsylvania we have laid out, as you know, what we call a primary system of roads connecting the county seats. We do not take the individual sections of that primary system haphazard, but have laid out the full program year by year, so that when we get through spending this hundred to a hundred and twenty-five millions in four or five years we shall have a complete system of highways, selecting first the sections which are in most serious shape now. In order to accomplish this, we have to consider man power. We now have over 800 inspectors from the universities working for us on the various construction jobs. We must depend upon the universities to turn out year by year men who will be acceptable to us.

In the State highway department we have an automobile division, through which we collect our money. Those moneys are spent for maintenance. We have

a maintenance division, under a maintenance engineer and the commissioner, and each county has a representative in the person of a superintendent, who is in many cases a technically trained man—an engineer—and who has his caretakers on the main primary trunk lines. The construction division handles the expenditure of moneys raised by bond issues, or direct appropriations of the legislature, and of the various bond issues authorized by the counties, many of which look to us to superintend the construction of their highways as well as to check up their plans.

We have found it very important to establish a testing laboratory. We have now about 50 men in this work, 10 stationed in Pittsburgh, to see that the materials we get for our roads are suitable when delivered. Our inspectors on the projects do the rest.

We look upon each road or group as a separate problem. We send our corps in the field and endeavor to make relocations where they are justified. We estimate an increase of 100 or 200 per cent in motor traffic after the roadway is built. We endeavor to find the cost of added rise and fall, of added curvature, and where we would be justified in shortening the distance between terminal points, or in trying to find lower loops in the mountains, so that where we have costs of \$100,000 to \$125,000 a mile we can show why we are spending the money.

In other words, we talk from an engineering standpoint, dissect all the items of cost per mile of road, and satisfy ourselves whether those costs are justified. We have problems now in our large traffic centers in detouring trunk lines around the cities. We have done that with the railroads for years, and we are now going to do it with the highways. A great many people going from Washington to New York would be glad to obviate the necessity of going through Philadelphia, and we shall be compelled to construct roads probably sooner than we think to handle through traffic. To save three-quarters of an hour in a 4-hour trip is an item worth while.

I figured roughly one morning what our justifiable expenditures might be for a primary system. Calculating that 75 per cent of the traffic would go on 25 per cent of the roads, I found that \$35,000,000 a year was a very conservative estimate of saving on tires, on general repairs, and on oil and gas in automobiles. That is just a saving in dollars and cents for the operation of the vehicle over the road. It does not take into account any of those things that we look upon in an educational way. Thirty-five million dollars! Multiply that by 20, and you have the capitalization value.

Finally, I want to impress upon all of you that, in order to carry out this work properly, the educational situation must be handled so that the highway department can get a supply of trained men, with the ability to reach the top in a short time.

FINANCIAL SIDE OF HIGHWAY CONSTRUCTION.

By A. G. BATCHELDER, *Executive Chairman, American Automobile Association.*

There is one thing, which I think is fundamental in this subject, namely, the economic side of it. It is a big task to get the money to begin with.

There was a time when we secured funds for highway improvements from counties, but first there had to be a State appropriation in order to induce the county to move in the matter. When the motor vehicle came on the scene we found that the county unit was too small, and so we realized that we must use a larger unit of taxation, namely, the State, which really meant nothing more nor less than that the richest counties of the State, through the State.

treasury, built roads across the poor counties which were not able to build roads for themselves.

Finally, the Federal Government contributed money, and now in the same way that the richer counties helped the poor counties in the State the rich States help the poor States. Our idea was that those Federal dollars would contribute to a State, and that the State should contribute to the counties, and especially the poor counties. Unfortunately, in carrying out the national plan many of the States have not functioned as they should. As a result we have not secured the highways we hoped for. Federal money should not be spent on roads unless they have some national characteristic.

THE WASHINGTON CONFERENCE ON EDUCATION FOR HIGHWAY TRANSPORT.

By P. P. CLAXTON, *United States Commissioner of Education.*

Last spring there was held in Washington, at my request, a conference on education for highway engineering and for highway transport. That conference was attended by representative teachers of engineering in the colleges and universities, by highway commissioners, and others interested in the building and promotion of highways especially from the technical side, and those gentlemen who had to do with the making of automobiles, auto trucks, and auto transportation. The conference lasted two days, and out of it grew a strengthening of the convictions that we each had of the importance of this kind of education. I think we agreed that we had come to a new era in transportation, and that probably in the next 20 years we will spend for the building of highways—hard-surface highways—as much as or more than we ever spent in a like time for the building of railroads. That means that we shall spend 10, 15, or 20 billions of dollars for the building of highways; that those highways will be of a kind different from the highways of the past, and that they will require knowledge and application of technical principles.

The highways should be built by properly equipped engineers, who understand grading, making curves, and other things far different from what they have been in the past, to meet the new condition of heavy trucks running at high speed.

Next comes the proper preparation of the roadbed, so that it will not yield to rain or frost, or give way under the surface, because a road is a thing that has to be left out over night regardless of the weather. You can not take it in and shelter it and care for it, and you have to take care of the weight on it and the impact of rapidly moving freight of many tons. All the roads, probably, in existence at the time this conference was held were practically out of date. We found that the hard surface roads made for light-draft automobiles, before heavy trucks were used much, were giving way under the heavy work of the truck, so that we decided that for the balance of these thousands and scores of thousands of miles of highways to be built there will be necessary a different kind of training from that which the ordinary engineer has had.

It came out in the Washington conference that highways are built for certain kinds of transportation; certain kinds of men are going to go over them, not horses and buggies, but automobiles and trucks, both of which are new inventions, and probably neither one of them yet perfected, especially the truck. And for the making of auto trucks, tires, and machinery there is necessary another kind of engineering involving the principles of mechanics. It is a new thing, and so far we are applying old knowledge by the hit-and-miss method:

So we need schools and higher institutions of learning to furnish the means of training men for this kind of work, and for the organization of transport over the road. We decided it would be a good thing to appoint an executive committee, which has held a number of meetings, and which has subdivided itself. Some of the committees have held meetings, and there is some hope now that there will be a definite organization by which study of these problems can be promoted, if not as effectively as they should be by the United States Government, yet effectively coordinating the study of that knowledge that we now have.

RELATION OF THE SCHOOLS TO THE HIGHWAY PROBLEM.

By THOMAS H. MACDONALD, *Chief United States Bureau of Public Roads.*

It is not expected that every man will become a builder of highways. Nor is it expected that every man will become an operator of motor vehicles. But there is not a citizen whose daily life will not be more and more influenced by the operation of motor vehicles over the public highways.

The tremendous importance which the highways in their relation to transportation have attained, the great problems which are necessarily connected with their building and maintenance, the operation of traffic over them, and the economic problems attendant upon these two, including the distribution of financial responsibility and the values to the communities which accrue from highway improvement, call for study and research. Particular attention is directed to the fact that these problems have come upon us within a very limited time. It has not been a slow development, giving us time to readjust ourselves. There has been little time for preparation, and we are now faced with the necessity of a broad educational program through which we must reach many classes if the objective of efficient and economical use and extension of our new transportation facilities is to be gained.

Upon our school system will to a large extent fall the responsibility of providing education of two very different kinds—the education of the public served and the education of the public servant. In this country little attention has been given to training young men for the public service. In fact, it is not uncommon for men to graduate from the universities without any adequate knowledge of the organization of the smaller units of the civil government in their own communities.

Many men will be needed in the highway improvement and transport program. If they obtain an appreciation of what real public service means, not only in the higher capacities but in the positions which control the affairs of the local communities, there must be implanted by the schools, beginning with the boys and girls in the lower grades, an interest in the development of the highways in their own communities. If they are taught who is responsible for their care, if their attention is called to the safe usage of the highways, they will have a much better background for higher training and their interest may be enlisted to the point that when it comes time to choose a college career they will take up a study of the technical branches which are necessary to an understanding of the science of highway building and highway transport.

A large number of technical graduates will need to be trained each year if the public is to be served by properly trained men. This is true not only in the Federal and State road programs, but in those of the cities, counties, and other governmental divisions.

It is estimated that the number of men who would be normally absorbed by the State and Federal highway departments alone each year would amount to

practically the entire number of graduates of civil engineering courses in the country. It is absolutely certain that only a small proportion of these men, under present conditions, will enter the public service because of the larger inducements elsewhere.

The second most important need of education in highway development is that of bringing to the citizenship through the agencies of the schools a better knowledge of the service demands which the highways must fulfill. It is perhaps too much to expect that the understanding will become general in a short period of the tremendous increases in the uses of the highways which have come in the past three years. It is conservatively estimated that in the agricultural communities the vehicle's mile use of the public roads has increased at least 500 per cent, while contiguous to the more thickly populated areas the increase is at least 1,000 per cent. The increased use is not alone in the number of vehicles but in the weights and speeds of the traffic units. Size and speed are the destroying agents, and our road systems which were built for very much smaller loads are showing, in many cases, failures.

There is too generally prevalent a feeling that the highway builders of the past have failed. Because some highways are not now satisfactorily carrying the tremendous traffic which has suddenly come upon them there is a tendency to criticize the men in the public service who were responsible for the construction of these roads. An impartial student of the records will undoubtedly find that if the roads were honestly and conscientiously built under the direction of a competent engineer, they are giving as good service as could possibly be expected under the changed conditions and that the construction planned by the engineer is much ahead of that which the public thought was necessary at the time.

The fact has been true of the highway engineer as of many other professions—the men who have pointed the way and who have accomplished the outstanding results have done so more often with the opposition of the public whom they serve than with their cooperation. Here is a prime function of the schools. There must be implanted in the minds of the boys and girls who are now in the lower grades a different attitude toward the governmental agencies which the public has set up to serve itself.

We need men trained in the proper expenditure of the great sums which will be appropriated for road improvement. We need men educated not only in the technical requirements of road building, but we need a larger citizenship which is more conversant with the way in which its own affairs are managed, so that it will intelligently select the men who can and will administer these offices in the public interests.

In conclusion, therefore, the teacher of to-day, who is concerned with the great questions so closely affecting the welfare and advancement of the public as a whole, will take the opportunity to implant in the minds of his students, whether these students are of the lower or higher grades, a knowledge of the service which the public needs from its young men, and will direct the attention of those who seem especially qualified to the opportunities offered for a splendid public career in the construction and maintenance of the public highways.

The need of education in highway development lies in two directions—the training of more men to carry on the actual work and the training generally of the public to the tremendous importance of the work which must be done and the economic value that will be gained by the public through the increased transportation facilities now made possible by the combination of the improved highway and the motor vehicle. These problems are educational. They belong to the teacher.

GOOD ROADS ESSENTIAL TO GOOD RURAL SCHOOLS.

By DALLAS W. ARMSTRONG, *Superintendent of Schools, Venango County, Pa.*

It seems to me that the road problem and the rural school problem are identical. The consolidation of the rural schools in the way that they should be consolidated is practically impossible in many sections of Pennsylvania until we have some road improvement. The cost of these schools is a question before the people of the State, just as is the cost of the construction of the roads. The State must bring these schools together and give the boys and girls of the country and agricultural districts an education that will help them on the farm, and will give them some of the advantages that the boys and girls of the cities have. While these schools will cost more, they will give much more to the boys and girls of the community in proportion to the cost. Poor roads delay this program; in fact, they almost prevent it. For example, it is almost impossible to drive an auto bus during three or four months in the year in my county.

Good roads and the economy of good roads should be introduced as a subdivision of the study of thrift. We have boys and girls in a certain township in Venango County 10 or 12 miles away from school, and it is impossible to get them to school with the present roads. The township plans to build a high school this year; the boys and girls are demanding high-school privileges. If those boys and girls could see the opportunities that we could give to country children through consolidated schools, I am sure they would use their influence with their parents.

THE SOCIAL VALUE OF HIGHWAYS.

By P. P. CLAXTON, *United States Commissioner of Education.*

I am going to speak first on the relation of the highway and good roads to education, particularly from the standpoint of the consolidated schools.

Originally our schools had a very small function to perform. Boys and girls in our pioneer homes had many educational agencies in connection with their daily tasks that the modern boy and girl do not have.

The home was a little kingdom to itself. The home manufactured the clothing and food. For the older boy the school did a very small part of the supplementary educational work. It merely gave the means and tools of education. There was opportunity to apply the principles which they thus got back into their home life. The modern school must give those experiences that the boys obtained in the primitive way in the primitive home. For that reason the one-teacher school in the country breaks down. In the one-room country school in Pennsylvania—and there are many thousands of them—one teacher teaches all subjects; she teaches all grades, and all ages from 6 to 18 or more. She is her own superintendent, her own health inspector, janitor, school nurse, besides being the representative of education and culture in the community. No person yet has been able enough to do the work as it should be done.

Hence the importance in this State of consolidated schools. In one county which we have recently studied, out of 170 school buildings, 147 are one-room schools, and a careful survey shows that if there were good roads in that county 20 schools would be sufficient. One-third of the number of teachers in one-room schools might actually be dismissed, and there would not be any more work on the remaining teachers.

Another reason for good roads in the community is that of the church. The country church largely breaks down, not because the country people are not religious, but because it is not easy to go to church. By bringing the people together to the country church by means of good roads, we might add much to

the cause of right living. I am sure that every good teacher would favor it. They preach a Heaven with roads paved with gold. We would like to have paved roads in the preparation for Heaven.

Let us take up the matter of community organization. A part of school work, in addition to the regular class work, is the bringing together of the grown-up people for acquaintance, friendship, instruction, discussion, and it may be for cooperation. Wherever a schoolhouse is built, especially a consolidated school, almost invariably there is a room provided for the adults to meet in, assembly halls with library, moving pictures, stereopticons, etc. But it is practically impossible to bring the people together in any large way unless there are better means of travel.

For that reason we are interested in the building of the highway as an educational project for the country. Modern education does not stop with the elementary school; it continues and becomes more important in the period of later adolescence and the earlier manhood and womanhood.

At this morning's conference it was said that teachers should be informed about highways. Country schools should teach travel and transport as well as other subjects, so that the pupil may understand his own life and his own work. If you leave him in a mist of darkness, without knowledge of his own community, his own people, and those near by, the chances are he will never be able to break through that mist and use the light you try to give him.

No doubt you will be asked to help in this State in making people understand the highway problem in its relationship to the transportation of their products and goods in their immediate community, because we are going to spend probably in the next 20 years 15 or 20 billion dollars in building highways and auto vehicles for serving communities in the way I have suggested—more than we ever spent in a lifetime on the railroads of the United States. Consequently, there will be opportunities for thousands of young men to work and serve their country in developing our highways and transport systems.

Chancellor McCormick: The Whisky Rebellion in Western Pennsylvania a century and a quarter or more ago occurred because there were not highways by which to send the products of this western part of the country to the East. It was easier to transport whisky than the grain. To-day thousands are starving in China with food in other parts of China which can not be gotten to them. So in Russia, and in other parts of the world.

It is, therefore, important that all teachers attempt to understand the significance of highways in order that they may bring the subject home to their students.

Along with this matter of highway construction and highway transport is the matter of safety. Perhaps at this time in our history one of the things of which we ought to be ashamed is the number of lives that are paid as the price of improved methods of transportation. The safety-first idea is one that, along with this matter of highway construction, ought to engage the interest and have a part of the energy of every public-school teacher.

METHODS OF TEACHING ACCIDENT PREVENTION IN DETROIT.

By HARRIET BEARD,

Supervisor of Safety Education, Detroit Public Schools.

There are a few things that I should like to recommend to aid in avoiding accidents to school children. There should be proper traffic regulations along all highways to safeguard both the driver and the pedestrian; and a rigid,

impartial enforcement of these regulations is very important, if we are to safeguard the lives of the people, especially the children.

For the prevention of these accidents, the only method that will be effective is education of grown people and of children. The education of children in the proper use and value of the highways is the thing most to be urged in these days. It is hard to educate grown people in new ways. We should begin with the children; teach them how to travel and how to live, especially in a big city.

In Detroit we have a very serious situation in regard to accidents. There are very many reasons for it; all traffic is on one level, which causes a great many accidents in a city of a million inhabitants; the streets converge to one center, which makes very heavy traffic downtown.

A check was made in 1918 at Michigan and Woodward Avenues, in the heart of the city, and from the hour of 7 in the morning to 7 in the evening, 27,983 automobiles passed that intersection. I don't know what the number is now, but I think at least 10 times as many.

There is a very tolerant attitude toward reckless driving that causes many accidents. During the 12 months ending August 1, 1919, when the Safety Department was organized, 1,007 accidents to the school children occurred, 96 being fatal. That appalling number led the board of education to insist that something be done; so that is how the safety-first movement was organized as an experiment.

There was really nothing to go by; we had no textbooks. We had only the records from the police department of the accidents to school children to study, and with that start we began to build up a safety department.

The police and fire departments lend all possible cooperation. They are anxious for us to help them and we are anxious to do so. The police send me numerous and full reports of accidents, giving the age, the circumstances, whether the accident took place at the intersection of the streets, and all details. I have found out a great many things that happen to children between the ages of 6 and 7, and to boys 12, 13, and 14, when they begin to use bicycles, and such data as that, and we have built up a course of study based on the conditions we have found to exist. We have inquired in the schools to see where the children's interests lie. We started with their drawings, and asked them to draw pictures of safety on the street. The results were very interesting. They made the drawing paper with the four corners representing the streets, and they would represent policemen and children trying to cross the streets. Some even put in an automobile or two, and one boy had a large round thing shown at the back of the automobile and when the teacher asked what that was, he said that was an extra tire.

The most interesting thing was that all of the policemen were in uniform. Some of the children didn't know enough to put arms on the people crossing the street but they put uniforms on the policemen and put buttons on the coat and a badge. We saw that the children understood that there is such a thing as a uniform. We talked about public service; how the uniform differs from the clothing of other people and the meaning of the uniform and that it involved some responsibility, and it also involved respect for the uniform.

We tried, with traffic games, to show what their ideas and interests were with regard to traffic on the street. We started with the aisle in the front of the room. That was the main avenue, and all the narrow aisles were side streets. We drew marks where they should cross. Some of the children were policemen, others were pedestrians.

They are all learning what it means to cross the streets. The children who represent the policeman have a very different idea of the policeman than they would have had if they had not been policemen themselves.

A little boy named Thaddeus is policeman at one corner. They have a boy representing the speeder, who has an automobile 3 or 4 feet long, and he comes dashing across the stage and knocks down three or four children who have been jay-walking, and Thaddeus picks up these children and tells them how important it is to be careful, and to pay strict attention about their walking. He also gives some admonition to the speeder, which, I think, is very necessary.

We have tried the Boy Scouts. I visited a school this week where they have 20 Boy Scouts, and they take turns, one scout one week and one another week. They stand at the corner nearest the school, and take the children across the street, and at times hold up the traffic.

The teachers also find that the introduction of work of this kind is not a burden, and I think that is something we must consider, because nowadays teachers have so many burdens on them that I think we should be very, very careful in what we ask the teachers to undertake.

The children are organizing safety clubs and wear safety buttons that the police department furnishes. We have had competition between the schools in keeping down the number of accidents, and competition between public and parochial schools as to how many children from each are injured, and each tries to reduce the number. We try to keep in contact with them. If they have ideas, we like to have them.

We have issued a small book that has suggestions as to the work and the methods that can be used. The teachers don't take that as an additional subject, but give it to children through their drawing or through their dramatization or their English; even in their arithmetic they learn about the city departments, because this work has developed not only in accident study, but in fire, first aid in emergencies, and the first principles of civics.

We also have a course of training for teachers in the Teachers' College in accident prevention, and some teachers are interested enough to want to specialize in it.

If the police department have some idea that they wish to give to the children, if there are special dangers that arise, we try to incorporate that in the course for the children. For instance, a few years ago, at the time when the days were getting shorter, the children were running out on the streets in the dusk. The drivers could not see them, and, consequently, many accidents occurred. The secretary of the school board asked, "Isn't there some way you can impress on the children that it is not safe to run out unless they carry a newspaper or something white that will show when they cross the streets in the dusk?" We gave them some lessons in protective coloring, showing how birds in nature have protective coloring, and in that way a great many of them got the idea, and when they went out in the dusk, going to the grocery just before supper, they would carry a newspaper, or wear something light, so that they could be more easily seen in the darkness.

The Boy Scouts help us very much in our work and we help them. We help them to demonstrate the principles of first aid in their Boy Scout Manual, and, of course, the children feel if the Boy Scouts can teach these things, they want to join, and the girls want to join the Fireside Group. We are planning to have Boy Scouts for every school. If we can have the troops meet right in the school we feel it is going to be of great help to the school.

We have had community evenings, where the parents and the department and the board of education cooperate. We furnish some feature that the children have been doing in the school. It is always interesting to the parents to see these things. We have one or two community features, dramatization

or music, or whatever is easiest to give, and then have a safety talk, and a moving picture showing how accidents occur, and another moving picture to attract the people. There is no admission charge and the thing is very satisfactory. It was quite interesting to see how the children would bring the parents who had never been in the school before. In that way we have the parents see what a splendid work the children are doing, and they have their children at school every day on time.

You may be interested in the results of one year of our work, which was largely experimental. During the year before we had 96 school children killed, and many more younger ones; the 96 were children from 6 to 18. During the 12 months that ended with the 1st of September, 1920, after this work was instituted, we had 48, which was a saving of 50 per cent of those lives, and instead of a total of 1,097 accidents to the school children of the city, we had 589. That is 589 too many, but still it is a reduction of almost 50 per cent the first year. So we feel in Detroit that education along these lines is well worth while.

REPORT OF THE HIGHWAY TRANSPORT COMMITTEE.

1. This committee strongly commends that universities and colleges offer a required 3-hour course throughout one year in highway transport and highway engineering as a part of their civil engineering courses, and that not more than 10 universities located in different geographical sections of the United States offer short-period advanced courses covering the various phases of highway engineering and highway transport, and a 4-year course in highway transport engineering or highway transport and highway engineering option in 4-year collegiate or technical course.

2. It is the opinion of this committee that the textbooks in high-school economics should be so revised as to treat the subject of transportation in a broader and more complete manner and to include more recent developments in highway and waterway transportation as a means of assisting other modes of transportation now in use.

3. The committee recommends very strongly the revision in textbooks of civics, particularly as they refer to highway transport, and further recommends that those in authority in the secondary and grade schools make strenuous endeavors to satisfy the need in all phases of highway transport as it involves both safety and economies.

4. The committee suggests that the time is now opportune for the Bureau of Education in Washington to consider stimulating interest in the field of highway engineering and highway transport and to consider that the high-school graduate should be helped in his selection of a vocation in life.

H. E. HUTS, *Chairman.*

REPORT OF THE VOCATIONAL EDUCATION COMMITTEE.

This committee discusses:

- (1) The need of vocational training for—
 - (a) Foremen, road supervisors.
 - (b) Chauffeurs and auto mechanics.
- (2) Where and how the vocational training required for these positions may best be given.

Training for foremen and road supervisors.—The discussion tended to show that at present, to a very large degree, vocational competence in the positions of foremen and road supervisors is reached as a result of actual experience on

the job. The conference, while recognizing the value of this experience, concluded that it could be made to yield more immediate benefits as an occupational training factor if supplemented by organized courses of instruction designed to extend and improve the knowledge and skill of those undergoing such experience. It was the consensus of opinion that, under present Federal and State legislation, trade extension training for persons already employed in these positions might be conducted at public expense by public-school systems through the organization of dull-season and evening classes. It appeared to be the general belief, however, that the questions of what agency should undertake to provide the necessary training, and of what the character and content of the training ought to be, should be determined only after a very careful study and investigation of the requirements for successful service in these positions.

Training for chauffeurs and auto mechanics.—The discussion brought out the fact that there is a great and increasing need of training for chauffeurs and auto mechanics. The trend of the discussion indicated that this need is being met only to a very slight extent at present through the agency of public schools. It was finally agreed that the problem presented by this situation could best be met at present by the following methods:

- (1) By having employers assume responsibility for the initial training of chauffeurs.
- (2) By establishment and maintenance of one or both of the following types of courses in public-school systems, depending upon the local conditions to be met—
 - (a) Day courses, preparing specifically for the occupation of auto mechanics and open to persons 14 years of age or older capable of profiting by the instruction.
 - (b) Short-unit evening courses, designed to extend the trade knowledge and skill of persons already employed as chauffeurs or auto mechanics.

Conclusions and recommendations.—The discussion revealed that there is a general lack of understanding on the part of representatives of industry in reference to the possible types of training service that may be organized and maintained by public-school systems under existing laws. There was also revealed a corresponding lack of information on the part of public-school authorities in regard to the kinds and specific requirements of positions for which representatives of industry consider it necessary and desirable to provide organized training. The conference concluded from these disclosures that there is need of a more direct and effective means of presenting the required information to industry and to the public schools, and that representatives of industry and public-school administrators should work in close cooperation to the end that appropriate and economic plans of training for the positions under consideration may be developed.

It was recommended that the general committee on highway and highway transport education set aside an adequate sum of money to be spent in investigating the requirements of positions for which training is needed, with a view to developing appropriate courses of instruction therefor. It was further recommended that this work be intrusted to competent educators, in cooperation with recognized experts in the occupations for which training is to be provided.

A. S. HUBBELL, *Chairman.*

REPORT OF THE COMMITTEE ON EDUCATION FOR SAFETY.

1. That the Department of Education of Pennsylvania be asked to form more extended courses for the schools under the subject of safety-first rules, and especially to require a more strict enforcement of existing rules than at present;

provided that if the laws of the State do not compel the teaching of these safety-first rules that the next legislature be asked to enact legislation giving authority to enforce them.

2. That the State superintendent of schools require reports of *all accidents* to school children, whether on streets or elsewhere, and that accident statistics be kept as a part of State school records, and that the tabulated reports be published.

3. That we recommend the enactment of such legislation as will permit the regulation of pedestrian traffic by vesting a greater degree of responsibility of conduct in the pedestrian. We further recommend that a State law be enacted empowering municipalities to adopt ordinances requiring in congested districts and at other dangerous points that crossings be designated for foot passengers and prohibiting the crossing at other than the crossings designated.

HARRIET BEARD, *Chairman.*