

FIRST SESSION

THURSDAY, DECEMBER 3, 1925, AT 10:00 A. M.

A N JOHNSON, Presiding

Chairman, Executive Committee, Highway Research Board

The meeting was called to order at 10 a m by A N. Johnson, the presiding officer. The first speaker on the program, Dr. Vernon Kellogg, Permanent Secretary, National Research Council, welcomed those in attendance in a short address, in which he pointed out the great value of scientific research and its importance in roadbuilding.

Thomas H MacDonald, Chief, U S. Bureau of Public Roads, in a brief address called attention to the international character of highway research and gave some observations in connection with his recent tour through South America. The speaker called attention to the astonishing number of engineers from foreign lands who come here to observe the highway research work being conducted in this country, and stated that these contacts give evidence that the work being done along the lines of physical and economic research is being eagerly studied by other nations.

Chairman Johnson. For the benefit of those who may not have attended our previous meetings or who may not be familiar with our printed proceedings, I will say that the work of the Highway Research Board as indicated by the program for this meeting is carried on by research committees and special investigators. Some of the details of the reports of these committees and investigators will be presented by the Director in his report, which we shall now hear.

REPORT OF DIRECTOR

CHARLES M UPHAM

Highway Research Board, Washington, D C.

During the past year the Highway Research Board has undergone a considerable growth. Our research organization, as you know, is made up of committees created to deal with a particular group of research problems, and contact men appointed by the state highway departments and universities. At the present time 44 states, one territory, and 121 universities are represented by contact men, many of whom are here today. Those of the state representatives who have been active have not only contributed a great deal of value to the Board, but they have also benefitted a great deal by the findings of the research committees. This information they have applied in a practical way to the actual construction and maintenance of highways as carried on by the state highway departments. Through this connection the active interest and

support of the state highway organizations have been enlisted in the work of organized research which we conceive to be the proper function of the Highway Research Board, and I may say that even the four states that have not yet appointed contact men are very much interested in our work and are represented on some of the committees

The contact men for the universities have also been very active, and as in the case of the state representatives have not only contributed much but have obtained from the Board results of research which they have been able to pass on to their students. As someone has very aptly put it the possibility of keeping the universities through their contact men in touch with the most recent highway research developments should insure that their students will be thoroughly inoculated with the spirit of highway research, at least, by the time they are ready to graduate and get out into industry.

This passing on of information to the states and universities is one of the two principal purposes of the Board. It hopes to serve as a clearing house for research, gathering together the findings of all investigators and putting them into a form in which they can be disseminated to those who are in a position to use them in the construction, maintenance and administration of roads and in the instruction of the young engineers to whom we must look to carry on the work of highway improvement in the future.

Contacts are also being established with the Latin American universities and highway commissions. An invitation to appoint such representatives was presented and accepted at the Pan American Congress of Highways recently held in Buenos Aires.

The other principal function of the Board is the organization of the research itself, and I may say that a very promising beginning has been made in that direction. It is probably true that we may no longer expect great discoveries or inventions to be made by individuals. Certainly it is true that through organization, in research as in other lines of endeavor, a maximum production may be obtained with a minimum of waste or duplicated effort, and it is the aim of the Highway Research Board, through its research committees, so to organize the effort of the numerous investigators as to accelerate the solution of the problems of highway design; and to develop in the shortest possible time a rational basis for such work which will eliminate waste and promote economy in the expenditure of the vast sums which are now going into the improvement of highways.

In addition to the work of coordination which is carried on through the several committees we have also, within the past year, instituted four special investigations which are being conducted by the Board itself through paid chairmen who, in most cases, give their entire time to the work. The four investigations at present under way are A

study of the economic value of steel reinforcement in concrete roads, an earth road investigation, a culvert investigation and an urban highway finance investigation

In reviewing the findings of the reinforcement investigation, one is lead to the conclusion that there is probably more information in that particular report than has ever before been gathered together with reference to reinforced concrete highways. The questions of thickness and reinforcement, especially, are dealt with in a thorough and convincing manner—not on a theoretical basis but in a practical way that has been made possible by the study of 5500 miles of actual concrete highways. With the help of the contact men in the several states Mr. Hogentogler has done wonderful work in amassing a great volume of information throughout the United States.

The earth road investigation is at the present time in charge of Professor Steinberg, but it will eventually be assigned to a chairman who will give it his entire time. As we all know there is no State in the Union that is sufficiently wealthy to hard-surface all of its roads. The time is coming when we must build more mileage for less money. In recognition of this need the earth road committee has been assigned the problem of developing, if possible, improved methods of building low cost roads. Professor Steinberg will make a progress report to-morrow as the temporary head of the investigation. It is expected that the work of the committee will continue for at least two years.

I don't know of any problem that has given engineers more difficulty than that of determining exactly what kind of pipe to use for drainage structures. The culvert pipe investigation has therefore been undertaken by the Board to supply information essential to the standardization of such structures. It is hoped that it will be possible to determine the relative value of the various kinds of culvert pipe by a score-card system. A progress report of this study will be presented by Mr. Crum to-morrow.

The fourth of the special investigations is the study of urban highway finance which will be reported upon to-day by Professor Viner. In addition to the reports of these special investigations reports will be heard during the course of the meeting from the various committees. The work of these committees, as you will note from their reports, is not done perfunctorily by a few men getting together a week or so before the meeting and writing what happens to be their best thought at the moment. The results reported are the findings of the work of the entire year. Ever since July these various committees have held occasional meetings here in Washington or at some other point for the purpose of formulating their reports, and the results which you will hear are the composite contributions of all members of the committees after giving the respective subjects a great deal of time and thought and study.

The publications of the Board, as you know, consist of the summary bul'etins and the proceedings which cover the annual meeting and which are, primarily, the reports of the committees, and show in detail everything that has been found by them

I also want to mention the publication of *Highway Research News* which has recently been inaugurated by the Board. This little four-page paper will be published monthly with the object of keeping those who receive it in touch with the latest news about highway research. During the past year there have been numerous notices of our work in the public press. For the most part this information has reached the public, not through any effort of the Board but in a natural way, showing that the public itself is deeply interested in the question of highway research.

The Board expects to enlarge its sphere of usefulness by developing its contact with individual research workers and by greater cooperation with other organizations in the highway field. During the coming year, it is hoped finances will permit putting into effect the new policy of the Board to employ technical assistants who will give full time to research committee work.

I want to announce that Professor Steinberg has been appointed assistant director and Professor Janda, who has been acting as secretary to research committees and previously as assistant director will return to the University of North Carolina at the expiration of his leave of absence on January 1. Financially the board is in a reasonably healthy condition. When there is a demand for funds that demand is generally met.

In closing I want to say that one of the greatest advantages of the Board is its ability not only to coordinate the highway research work of numerous organizations and engineers but to carry the results of that research to the industrial field for practical application. Most of the special investigations that have been conducted during the past year have been within the industrial field and the Board has proved the value of the machinery it provides for bringing together the representatives of industry; the engineers and the research workers. The outlook is very gratifying, each year the services of the Board are found to be in greater demand, and each week more people are showing interest in its activities. I believe the Board has become recognized generally as the clearing-house for all information concerning highway research.

Chairman Johnson. We now come to the reports of the various committees. The next paper is the report of the Committee on Economic Theory of Highway Improvement.