

antee clause they are really made to pay part of the maintenance, as they pay the insurance on the life of the pavement or on part of its life.

"Sheet Asphalt Pavements," by T. Linsey Crossley, of J. T. Donald & Co., consulting chemists, Toronto, discussed the essentials of this type of pavement, the preparation of the specifications and the tests of the materials. An interesting article on these points, by Mr. Crossley, was published in *The Canadian Engineer* for February 22nd, 1917.

Arthur H. Blanchard, professor of Highway Engineering at Columbia University, New York City, was unable to be present, but forwarded his paper on "Road Oils and Tars," so it was read by Mr. Huber. Among those who took part in the discussion on this paper were Paul Mercier, city engineer of Montreal; Richard McClelland, city engineer of Kingston; F. C. Askwith, assistant city engineer of Ottawa; and W. H. Connell, chief of the Bureau of Highways, Philadelphia. Mr. Connell's discussion was particularly thorough and instructive. He told how traffic mats can be constructed to the best advantage with asphalt or tar oils.

The last paper read before the congress was "The Highway in Relation to Land Development," by Thos. Adams, town-planning adviser to the Commission of Conservation, Ottawa. During the ensuing discussion H. Brad Billings, of Billings' Bridge, Ont., who is one of the most enthusiastic good roads supporters among the wealthier Ontario farmers, having constructed many a mile of county road at his own expense so that he can motor to and from his estates, called serious attention to the fact that Mr. Adams, in his plans for highways and towns, provides no public green, or parking area, for aeroplane landings. The time is rapidly approaching, prophesied Mr. Billings, when aeroplanes will be more popularly used, and in any far-sighted and comprehensive town-planning scheme an area should be assigned where the machines can safely alight, the area being suitably indicated by markings distinguishable from the air by day, and by signal lights at night.

Next Meeting Probably at Hamilton.

A business session of the Dominion Good Roads Association was held Saturday morning at the Chateau Laurier. An invitation was received from the Hamilton Board of Trade, asking that the fifth session of the congress be held in that city. The invitation was accepted subject to the condition that favorable arrangements can be made.

The 1916 board of directors of the association was re-elected for 1917. A few additional directors will be added at the next meeting of the association. The old board was continued in order to allow it to perfect its work of incorporating the association under Dominion charter. The officers are now as follows:—

President, J. Duchastel de Montrouge, city engineer, Outremont, P.Q.; vice-president, S. L. Squire, Waterford, Ont.; secretary-treasurer, Geo. A. McNamee, Montreal; honorary presidents, U. H. Dandurand, Montreal; W. A. McLean, Toronto; B. Michaud, Quebec; and O. Hezzlewood, Toronto.

The directors of the association are the above officers and Thomas Adams, Ottawa; A. L. Caron, Montreal; E. A. Cunningham, Lethbridge; Dr. E. M. Desaulniers, St. Lambert, P.Q.; A. C. Emmett, Winnipeg; R. S. Henderson, Winnipeg; Geo. Hogarth, Toronto; J. W. Levesque, Montreal; A. F. Macallum, Ottawa; P. E. Mercier, Montreal; and J. A. Sanderson, Oxford Station, Ont.

THE CONTRACT AND SPECIFICATION FOR PAVING.*

By Charles A. Mullen,

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IT is only necessary to look at the contract and specification forms in use by our many city, county and provincial road departments to realize that the importance of this subject either has not been fully grasped, or, if understood, has been sadly neglected. For my part, though I have had occasion to examine and study many paving contracts and specifications, I have never found even one that seemed to be a finished product; or, in fact, any more than the throwing together of many more or less disconnected sentences and paragraphs. When it has fallen to my lot to prepare such documents, I am free to confess that I have added but little or nothing to the art, and that I am no more pleased with the form and lack of completeness of my own products than with those of my contemporaries.

Some one has aptly remarked that a short contract makes a long law suit. It may well be added that a poorly drawn contract makes a long law suit still longer. I do not know that anyone has ever estimated the cost per square yard of the many litigations growing out of road and street paving work, but certainly this can be no inconsiderable amount. To the judgments and law costs paid directly by public bodies must be added that part of a contractor's contingency figure included in his bid price to cover probable legal expenses. It may truly be said that, no matter which side wins the law suit growing out of a paving contract, the public always loses. If it wins the suit, it loses possibly not so much; but it should be remembered that the contractor's losses and expenses always go to make up other contingency items. Therefore, it behoves those entrusted with the design and construction of public road work to do all in their power to reduce the possible causes of such law suits.

The Relations Between Contractor and Engineer.—

The relations between the road department and the paving contractor are no different than those existing between any other buyer and seller. Their interests are diametrically opposed. The main reason a contractor builds a road is for the profit there is in it. With him, use is a secondary matter; in which, if he is in the better class of his calling, he is mildly interested. Where road paving is done on a strictly competitive basis, no matter how high a contractor's ideals may be, or how much secondary pleasure he might be able to get out of doing a good piece of work, the least that the road department can be induced to accept is the most that any contractor can afford to give. After all, the standard of road construction in any community is not so much the letter of the contract as the interpretation of it that the road authorities are accustomed to permit in actual practice. A well-drawn contract and specification is a prime necessity, of course; but with it, competent supervision and careful inspection are also indispensable to good roads.

Nothing in the foregoing paragraph is intended in any way as an aspersion upon contractors. As fine men may be found amongst them as in any other walk of life. They are quite as human as other people, and equally governed by their practical necessities. In justice to him and to the public alike, a better understanding between the contractor and the road department is essential if we

*Paper read before the Dominion Good Roads Congress, Ottawa, April 10th to 14th, 1917.