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JAMES J. SALMOND—MANAGING DIRECTOR.
 H. IRWIN, B.A.Sc., A. E. JENNINGS,
 EDITOR. ADVERTISING MANAGER.

HEAD OFFICE: 62 Church Street, and Court Street, Toronto, Ont.
 Telephone Main 7404, 7405 or 7406, branch exchange connecting all
 departments. Cable Address: "ENGINEER, Toronto."
Montreal Office: Rooms 617 and 628 Transportation Building, T. C. Allum,
 Editorial Representative, Phone Main 8436.
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THE INTER-ATTRITION THEORY OF ROAD WEAR.

At no time in its history has road building received such attention as the road associations are devoting to it this season. Certainly many discussions, long pending, should be settled and many points scientifically gained as a result. Highway construction and maintenance has sufficient technical knowledge now connected with it to prevent further profuse expenditure upon methods not the most suitable.

A theory gaining ground among road engineers in England, and which has to do with the wear of roads, attributes the chief destructive tendencies to an internal movement among the stones at some depth below the surface, producing an abrasion which results in a gradual rounding off of angles and corners and impairs their interlocking and resisting power. According to a Times' correspondent, the dustlessness of roads, especially if they are made with tarred material, and not merely tar painted on the surface, arises in a comparatively small degree from the fact that the surface is protected from wear. The real saving lies in the fact that between the stones, which are packed together in close association below the surface crust, there is little or no wear, owing to the oily nature of tar or bitumen as a binder, which prevents the faces of the broken stones from actually grinding against each other under rolling weights. The surface wear of an ordinary non-tarred road is, except in cases of heavy continuous traffic, a comparatively negligible factor, and it is undoubtedly heavy weights which are the chief cause of road wear seen above and unseen below the road crust. It thus comes about that the heavy traction engine, even though its tires may be broad and the diameter of its wheels large, from its mere weightiness, apart from any question of speed, causes irresistible crushing of the road surface and the inter-attrition of the stones beneath it. This produces more dust and more mud than the passage of thousands of smaller vehicles even though they may travel at a rapid speed; for light vehicles affect only the part of the road near the surface.

Ordinary tar-macadam or tarred slag, where slag from blast furnaces is used instead of stone, laid in a layer several inches and afterwards rolled, forms a homogeneous foundation for the surface crust, in which the stone probably forms about 75 per cent. of the total volume, and the combined material—that is, small, broken stone and tar, or some compound of it—forms the remaining 25 per cent. of it. When this is rolled together the inter-attrition of the stones is reduced to a minimum, for every angle of every stone is bound together firmly or is coated with an oily surface. The beneficial result extends far beneath the surface of the road itself; so that when these stones move, if they ever do, under the influence of heavy traffic, all that happens is that a certain proportion of superfluous tar or bitumen may be forced to the surface, and ordinary mud, such as is produced by the grinding together of two plain surfaces, does not appear.

Other forms of bituminous binding that meet this interstitial wear, and confine it largely to the upper surface of the road, include several patented surfacing preparations, to be applied to ordinary water-bound macadam road. Tar grouting, where the tar or bituminous mixture is poured upon freshly laid dry macadam immediately after laying and rolling, or a modification of it using standardized pitch, or a further modification, in which a layer of a fine mixture of tar and concrete is laid, and upon which dry macadam is spread and rolled, are