

and the Provincial Government exercises direct control of all the roads. The Province is divided into thirty-eight districts, each having about 100 miles of road, and a road overseer is in charge of the work in each. The Province spends about \$32,000 annually in maintaining earth roads, and very little macadamizing has yet been done.

**The Federal Government.**—The Dominion Government at the last session introduced a bill to provide for grants to Provinces to aid in highway improvement to be distributed according to population, and also to provide for direct expenditure on construction by the Dominion. The bill passed the House of Commons, but the Senate, while approving of subsidies, objected to the Dominion Government making direct expenditures. The amendments of the Senate were not acceptable to the Government, the bill was not re-introduced into House of Commons, and the measure thus failed to become law.

**Summary.**—Canadian road systems have been, to the present, without enormous Government appropriations or other spectacular features, and construction, as a rule, has been of a comparatively inexpensive type. Rather it is sought to build as substantially as possible for present requirements, and to establish efficient systems of maintenance that will thicken and widen the road crust as traffic requires. Such a policy will, we believe, lead to the more rapid and economical extension of good roads without creating large public debts that will embarrass the future.

Summarizing the situation briefly, Canadian Provinces have about 250,000 miles of public highways. Each of the Provincial Governments contribute directly to road improvement, generally in the form of Provincial grants, where municipal organization permits. Such grants, rightly directed, help the people to help themselves, combine all energy into one effort, and have a highly educative value. Each of the Provinces has a Highway Department for building roads with which the educational object is more or less associated. The Canadian Highway Association is now carrying on an extensive propaganda to construct a road 4,000 miles in length from Halifax to Victoria while the Ontario Good Roads Association, the Manitoba Good Roads Association, and other organizations are doing much to form public opinion. As a result of the interest created, Provincial appropriations are now being made in millions where they were formerly made in thousands. This year the total Provincial expenditures, apart from municipal levies, will amount to \$10,000,000. Canada has developed splendid railway and waterway systems, but it is evident that an era of common highway building is being entered upon, that will connect the trunk lines of transportation with the homes and daily life of the people.

### DURABILITY OF PORTLAND STONE.

"Experiments on the Weathering of Portland Stone," was the subject of a paper by Dr. J. S. Owens, before the Engineering Section of the British Association. The investigation was initiated by Dr. Des Voeux and was being made for the Coal Smoke Abatement Society. Its object was to find the connection between smoke and the well-known deterioration, by sulphating, of stones containing a large proportion of calcium or magnesium carbonate, when exposed to city air.

The stones were subjected to the following conditions for periods varying from 105 to 687 days: (a) Broken without exposure; (b) broken after exposure to natural conditions out of doors in the country and in London; (c) broken after having been kept indoors in the country and in London; (d) broken after having been exposed, while embedded in soot, to country and London air. The experiments were still in progress.

### THE USE OF MOTOR TRUCKS IN ROAD CONSTRUCTION AND MAINTENANCE.

The use of motor trucks has rapidly increased during the last year. In a recent issue of the *Concrete-Cement Age*, Mr. Rollin W. Hutchinson, Jr., gives some data and costs regarding their use on road construction and maintenance. He says that those who have made a careful study of economic road maintenance have generally conceded that the neglect on the part of cities, towns and townships promptly to repair their roads has brought about an excessive maintenance cost. It is generally accepted as a truism that \$50,000,000 is being spent for road building in the United States every year and not 1 per cent. of this is expended for their maintenance.

If two men with the proper equipment were kept constantly employed going over the roads in their territory equipped with materials and tools with which to properly repair trifling defects, the annual expense of such repair work would be considerably less than is now the case with the plan of periodical repair work.

From all information obtainable, it appears that a new piece of road is generally allowed to take care of itself for the first year or two, and at the end of that time the neglect properly to repair what were originally trifling defects has allowed the road to get in frightful disrepair, requiring a very considerable sum to restore it to its former condition.

Very many miles of road could be taken care of by a motor truck operating daily and covering all of the roads in the care of the city or county where it is to work. This truck could be provided with changeable bodies, one of these bodies to be of box construction to carry sand, gravel, crushed stone and top dressing as might be required; at other times tar kettle and material for building roadside fires. The other body could be for water for sprinkling.

A small hole or rut worn in a road, if neglected, will have its sides gradually torn down by continuous traffic and develop into a large hole, requiring the expenditure of a considerable sum to effect proper repairs.

With the advent of the motor truck and automobile it is believed that the business men in every community have come to realize the importance and economy in maintaining good roads.

Depreciation on all vehicles, both horse-drawn and motor-driven, is very considerable where poor roads exist, or where good roads are allowed to get in bad condition for the want of prompt repair.

A manufacturer in advertising the hill-climbing ability of its pleasure cars uses the winding road ascending Eagle Rock Mountain in the Oranges, New Jersey, as a test climb, and many a car has attempted the ascent of this mountain and faded pantingly away before reaching the summit of a grade which runs from 15% to 17%.

Knowing these facts one would hardly look here for a heavy vehicle of any kind operating otherwise than down hill. Modern transportation equipment must however, meet and cope with local conditions, surmounting grades and other difficulties.

The Joseph Murphy Sons C., Hoboken, N.J., employ at Eagle Rock quarry a 7-ton Mack truck with dumping body, on this steep mountain road, hauling broken stone from the Eagle Rock quarry to various points on both sides of the mountain.

The quarry is three-quarters of the distance up the road from the base of the mountain, at a point where the road verges into an abrupt curve, which adds to the difficulty of the ascent, which is here at its steepest.