SOME GOOD ROADS, THEIR CONSTRUCTION AND MAINTENANCE.

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NE of the chief requirements of our advanced civilization is good roads. This is proved by the growing demand for them. The excellence of the Roman roads still existing in various parts of Britain is direct proof of the high state of civilization to which the ancient Romans had attained, and it is admitted that no more reliable evidence can be given as to the condition of a people than that evinced by the quality of their roads, experience teaching that social, industrial and commercial development depend largely upon them.

Everyone interested in the question realizes that manufacturers, merchants and farmers save thousands of dollars through being able to haul their products to markets over an improved highway. This, the author considers the best reason for spending money on good roads.

The chief factor at the present moment is, Where is the money to come from to build and maintain good roads?

For reference the author will here explain the method employed by the Imperial Road Board of Great Britain for raising and apportioning money.

Imperial Road Board of Great Britain .- It was constituted under the Development and Road Improvement Funds Act, 1909.

The money derived from motor spirit duties and motor car license duties, imposed by the Finance Act (1909-10) is as follows:

Motor spirit excise duty of 6c. per gallon.

Manufacturer's	license	 .\$4.85	Additional excise
Dealer's license		 .\$4.85	duty of \$1.25 each.

Rates of Duties on Motor Cars.

Motor cycles and bicycles\$	4.85
Motor cars not exceeding 6½ h.p.	9.70
Motor cars exceeding 6½ h.p. but not exceeding	
12 h.p	14.55
Motor cars exceeding 12 h.p. but not exceeding	
16 h.p	19.40
Motor cars exceeding 16 h.p. but not exceeding	
26 h.p	29.10
Motor cars exceeding 26 h.p. but not exceeding	
33 h.p	38.80
Motor cars exceeding 33 h.p. but not exceeding	1.1
40 h.p	48.50
Motor cars exceeding 40 h.p. but not exceeding	
60 h.p 1	01.85
Motor cars exceeding 60 h.p	203.70
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improvement fund for users	board
improvement fund for years 1909-10 and 1910-11 a	iggre-

gated \$5,806,720. In 1910 the Road Board issued a circular as follows: "For guidance of highway authorities who contemplate making application for grants, the Board desires it to be understood that, at the outset, applications should be confined to those of the most important and urgent nature, and that special consideration will be given to those in connection with proposals dealing with:

(1) Reconstruction of important roads, the condition of which is exceptionally bad and cannot be improved without reconstruction.

(2) Widening of important roads which are dangerously narrow.

(3) Surfacing with granite, basalt, or other suitable material treated with tar or other bituminous compound by some approved method, main roads or important dis-trict roads which already have adequate foundations, especially those in or just beyond the fringe of large towns, which have to carry a heavy traffic without aid from rates of the towns served by the roads.

(4) Opening out dangerous corners and alteration of dangerous curves.

(5) Alteration, where possible at reasonable cost, of steep gradients.

(6) Strengthening or reconstruction of weak bridges, which seriously limit the use for commercial transport of roads of first class importance.

(7) Construction of new by-pass roads to avoid villages or main roads or important district roads where the conditions are exceptionally dangerous.

(8) Acquisition in urgent cases where building is imminent of vacant land required for future widening of roads, especially in urban or suburban areas.

Allocation of Grant .- The Board goes upon the principle of paying 75% of any approved scheme. First of all they must be satisfied that any proposed scheme will be beneficial to the through users of the road, and secondly, to the local authority charged with its upkeep.

This 75% is of the portion of cost which is extra over the ordinary yearly upkeep, that is to say, the average yearly upkeep is deduced from the total estimate of the scheme; then the Board pay 75% of the remainder.

This is the general principle with all county authorities, but the Board is not so generous with municipalities, where a grant of 25 to 35% is only occasionally allowed.

Specifications of Road Board .- The Board gives specifications for surface tarring, tar macadam, pitch grouted macadam, and No. 1 and No. 2 tars.

Tar Macadam Specification .-- (1) Roads must have proper foundation.

(2) Thickness of surface should be ascertained by opening roadway.

(3) Thickness of tar macadam when finished should be from 2 to 3 in.

(4) Hard subsoils should have at least 6 in. of road crust foundation, and clay subsoils at least 11 in.

(5) Cross fall should be I in 32.

(6) The aggregate of the tar macadam should be of approved stone, at least 60% broken to $2\frac{1}{2}$ in., 30%, $2\frac{1}{2}$ to 11/4 in., and 10%, 3/4 to 1/2 in., the last-mentioned to be kept separate and used as top dressing.

(7) The stone to be dried before coating with tar. (8) Tar to be in accordance with Board's specifica-

tions Nos. 1 or 2. (9) The quantity of tar to be from 9 to 12 gallons per ton.

(10) To be rolled smooth.

(11) Paint surface with tar after road has been open to traffic for some weeks.

(12) Surface to be gritted with 1/4 in. chippings.

Specification for Tar No. 1.—Tar should be treated to a temperature of 220° to 240° F. It should be derived from the carbonization of bituminous coal.

The specific gravity at 15° C. should be 1.19 or may vary from 1.16 to 1.22.

It shall not contain more than 1% of water, which water shall not contain more than 5 gr. of ammonia per gal. of tar.