

Good Roads

(R. O. Wynne Roberts, C.E.)

So much has been written and said on the subject of good roads that it would seem difficult to discern a new phase of the topic, but it is almost like a perennial spring yielding up a flow which furnishes power for renewed activities.

Although there may be extensive mileage of railways of various kinds and other means of transportation in a country, good roads, after all, constitute the primary arteries by which its economic and social development and prosperity can be established. Every cent saved in the cost of transporting goods means adding to the wealth of the community and this is reflected in the manner of living. This becomes apparent when a comparison is made between countries in possession of good roads, and those where they are less general. Or the contrast, perhaps, is more vividly exemplified when we consider a district where good roads have supplanted bad ones. As an extreme case, the writer can refer to one where in former years the farmers took three days to negotiate a mountain pass, causing untold cruelty to the cattle and hardships on the men, but to-day it is possible to reach the same destination in about four hours by travelling along fairly level roads traversing romantic valleys and crossing turbulent streams which run through between the steep and rocky mountains. It requires no argument or statistics to convince the people in that district as to the value of good roads. Take another. Years ago the only route for farmers, travellers and explorers to take from one part of a country to another was over a wild, sandy flat. So bad was this route that the farmers had to erect poles to direct their way, just in the same manner as sailors have buoys in a turbulous shifting channel. The wind drifted the sand and obliterated the track. It took two days to make thirty miles, but to-day the same parts form a pleasure route for automobiles and the main road between important districts. The gumbo-clay roads of Western Canada and the Central States in wet weather are often as bad as roads can be, unless attention is paid to surface grading and dragging. The efforts made by the authorities to improve them are persistent and when the problem is tackled in the right manner there is no doubt that these roads are capable of great improvement. The experience of travelling along a badly maintained gumbo-clay road in wet weather is not easily forgotten; and the contrast between such and those which are carefully maintained is great. The farmers who live in the gumbo-clay area are encouraged to drag the roads adjoining their land and thereby keep them in good order; but, although the expense is relatively small, it is difficult to induce them to perform the work. His duty should devolve on the road authority and the burden should be carried by all. This is being done in some districts, but it is not yet general, although the relief in transportation in wet weather especially is manifest. Road construction and maintenance is obviously a communal or state duty. Napoleon perceived this fact generations ago, and France obtained her great system of highways. The Romans recognized this fact nearly 2,000 years ago, and since the initiation of the Good Roads Movement the idea has spread world-wide.

Binding Materials.

The interest which is taken in good roads is remarkable. The great conventions held in Brussels, Paris and London were attended by delegates from almost every country, and great things have been achieved. The development of the automobile has contributed much to the improvement of existing roads and the construction of new ones, inasmuch as that vehicle has become immensely popular and useful. The automobile has created a demand for superior roads, for the employment of efficient and experienced engineers, and for the use of materials to allay the dust and preserve the surface against the disintegrating forces caused by the increased and more rapid traffic. Water bound roads were never entirely satisfactory, for in frosty weather they were frost-bitten and when thawed became saggy and treacherous. In dry weather they disintegrated because the dust which bound the macadam together was loosened and blown away. The rubber tyres of automobiles raised the fine stone by adhesion, and the same was thrown off again by centrifugal force. Consequently a better binding material was sought. France was early in the field in the

use of coal-tar, as a dust abater and surface binder, although British engineers had employed tar for road construction a generation or so previous. The use of tar, however, was not uniformly satisfactory because coal-tar varies in quality and attributes, according to the process by which it is produced, and whether it is dehydrated, partially distilled or otherwise treated. The writer contributed slightly to the knowledge on this matter as his experience in gas engineering, tar distillation and tar macadam works suggested that it was necessary to extract certain element before tar was fairly uniform in character. Coal tar is not obtainable in all parts consequently recourse had to be made to other bituminous binders and to-day we have a goodly list of them for use. Moreover, careful researches have been made into the essential characteristics of good road bituminous road binders. Britain has abundant supply of tar and therefore concentrated on its improvement, whilst the United States, having to depend largely upon other bituminous materials, made investigations as to their most satisfactory compositions.

Apart from the construction and maintenance of suburban and country roads, the question of better city pavements has also received attention, although it is possible that the progress has not been quite as spectacular. Bituminous mixtures and sheet asphalt paving are largely used. P. C. concrete is employed on certain interurban roads, and brick pavements have been laid. Investigations have been made respecting the use of Canadian lumber for wood paving, but in many places there is a prejudice against wood block paving owing to the unsatisfactory experience gained. This is exceedingly unfortunate because there is no tangible reason why a lucrative industry could not be built up in Canada, where timber is so plentiful. In Australia, hardwoods have been used and these were for many years tried in Britain, but British engineers have returned to creosoted soft wood. It would seem possible that Canadian lumber could be used for wood block paving provided creosote of a proper quality was used, and the blocks were thoroughly impregnated and the surplus oil exhausted. Wood block paving have caused considerable trouble in the States, presumably because the creosote was not of the right composition and probably because the surplus oil bled and caused a nuisance. Nevertheless, there is room for the development of a Canadian wood block paving industry. There is another pavement which also could be developed. Sett pavements are laid but the blocks are irregular in size, nodular in shape, and not carefully laid. Cube blocks make a fine pavement as can be seen in Manchester and elsewhere. There doubtless are suitable quarries in Canada for the manufacture of gauged stone setts. Lastly, the Duvax stone paving, which consists of stone setts of small size laid carved or plain, make a good pavement for light traffic.

The subject of good roads has become very great and important and deserves careful consideration by all who desire to see the country develop.

RECORD HANDLING OF GRAIN.

The Grand Trunk Pacific Elevator at Fort William, Ont., has established a wonderful record for the handling of grain, during the past season, one that has never been equalled at that port of big records and marvellous achievements in moving grain. The following figures are interesting and expressive:

Unloaded from cars between Oct. 1 to Dec.	
23, bushels	21,994,000
Or, cars	18,500
Average per working day of 12½ hours, cars	241
Loaded into boats in October, bus.	5,600,000
Loaded into boats in November, bus.	8,987,000
Daily average loading, bus.	300,000
Loaded into boats between Dec. 1 and 12, bus.	5,700,000
A daily average of, bus.	475,000
Loaded in 36 hours ending midnight Nov. 30, an average per hour of, bus.	42,000
Loaded in 4½ hours one complete cargo, an average of nearly 63,000 bus. per hour, bus.	283,000