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and expansion are directly proportional to the facilities afforded.

Although roads are the offspring of civilization, they have become the chief factors, if not, indeed, the means for its advancement. No country has reached the height of its civilization without a good system of common roads.

It is frequently asserted that since the introduction and development of railways, that they have assumed to a greater degree the functions of the common road. This is true only to a limited extent. Railroads have changed the character of the traffic on the common roads, and personal travel for business or pleasure is no longer so much dependent upon the condition of the highways; but commercial intercourse as represented in the exchange of products is as much dependent upon the condition of the public roads today as it ever was, for the reason that it is impossible to construct a railroad to the door of each producer and consumer. Hence, the railroads never can supersede the common road, and every ton of freight carried by them must be conveyed over a highway at either or both terminals, and the cost of this highway transportation has a marked influence, not only upon the price paid by the consumer, but also on the profit realized by the producer.

RELATION TO RAILWAYS

The true relation between railroads and wagon roads frequently seems to be lost sight of; the functions of each are in no sense rivals. The highway serves the very important purpose of effecting local intercourse, and of connecting the local freight and passenger traffic with the railroad service, while the railroad traffic is the summing up of what has passed over the common roads. It is the roads running at an angle to the railways, and connecting them with the country to the right and left, thus acting as feeders, that require attention in modern times.

With the network of railways now existing in the greater portion of this province, with market towns, elevators and loading sidings at intervals of a few miles apart, it is most probable that the roads used at the present time in reaching these railway points will be the leading and main travelled roads for a long time. There is very little likelihood of the importance of roads so situated, being diminished by the advent of new railway lines and the springing up of new market centers. Improvements made on these roads should therefore be of a lasting and far reaching character.

ROAD CONSTRUCTION

The subject of the construction of roads is a very large one. It has occupied the attention of engineers for several generations and a great number of books have been written in regard to it. There is also a great variety in the forms of construction, depending upon traffic to be carried,

the nature of the country over which the road is to pass, the road material available and the amount of money which can be used for construction.

Technical engineering in road construction must yield to the practical, common sense plan of action. An engineer with plenty of money at his disposal can construct a good road almost anywhere and meet any conditions, but with limited resources and a variety of physical conditions to contend with, he has to "cut the garment to suit the cloth." We must have good roads and our means for getting them being very limited, if we cannot get them as good as we would like, let us get them as good as we can.

ROAD SUPERINTENDENT

In order that this work may be carried on systematically and at a reasonable cost, it is of the utmost importance that an efficient plan of management be established. The present condition of the roads in this province, after the enormous outlay of labor and money upon them, is due in no small measure to the lack of some efficient system of dealing with this problem. It is impossible to construct and improve all our roads at one time, or in one year; it is a work that will have to be continued for many years, and, therefore, requires a plan that will extend into the future; it is a work that requires experience and as such should be placed in charge of competent, experienced men. No municipality should be without such a man as road superintendent, the tenure of his office would be similar to that of a municipal secretary-treasurer.

He should preferably be an engineer, and as such, would soon be able to store up an abundance of knowledge in connection with the physical features of his own as well as adjoining municipalities, that would be of enormous value and assistance to the council in laying out a comprehensive plan of improvement and construction.

It is desirable that each municipal council should have before them some plan of improving the condition of their highways. The leading roads which are now most heavily travelled should be designated as such and should receive special attention, the object in view being to build these roads up as quickly as the means of the municipality will allow, as high a standard of efficiency as the economic conditions of the locality will permit, and to give the side roads the attention that their importance demands. In this way, and with the co-operation of adjoining municipalities the whole province would be acquiring a system of roads that would eventually prove to be a vast benefit to every one and assist materially in the development of the whole country.

EARTH ROADS MOST COMMON

The style of road to be adopted will depend considerably on the prevailing conditions of the

locality over which it is to traverse. There is no doubt that in this province for some time to come the earth road will be the most common type. This class of road provides splendid accommodation for light traffic in dry weather when properly built and cared for; but during spring and wet seasons they are deficient in the important requisite of hardness and are almost impassable.

In the construction of earth roads, drainage is of primary importance; in fact, without it it is impossible to keep them in a serviceable condition.

Good drainage is the first requirement of all good roads, and an earth road is the foundation for them all. Side drains must be made continuous to proper outlets and sufficiently large to adequately carry off all the water that may be collected in them during freshets and wet seasons. The earth grade should always be properly crowned by giving it a fall at the least of one inch to the foot from the center to the sides; no shoulders or ridges should be left along the sides of the grade that will hinder the water from having free access to the side ditches. Tile drains are of immense importance where roads are built across springy ground or soil of a retentive nature. They keep an excess of water from accumulating in the sub-soil, and permit the roads to dry up more quickly in the spring thereby leaving them less liable to "break up."

BEST HEIGHT OF ROAD

The height of a newly constructed road depends in a measure on the conditions of the soil that forms the grade, and to the fall obtainable in the side ditches. Where the soil is heavy and sticky it is generally found that the surrounding country is flat, and difficulty may be experienced in securing sufficient fall for the drains; across such places the grade should be kept high, being at least three feet above the ground level as far below the surface of the road as possible.

Leading highways should have a roadway eighteen feet in width, and nearer cities and towns this might well be increased to twenty-two feet, while a width of sixteen feet will be found sufficient on side roads in the country where traffic is somewhat lighter.

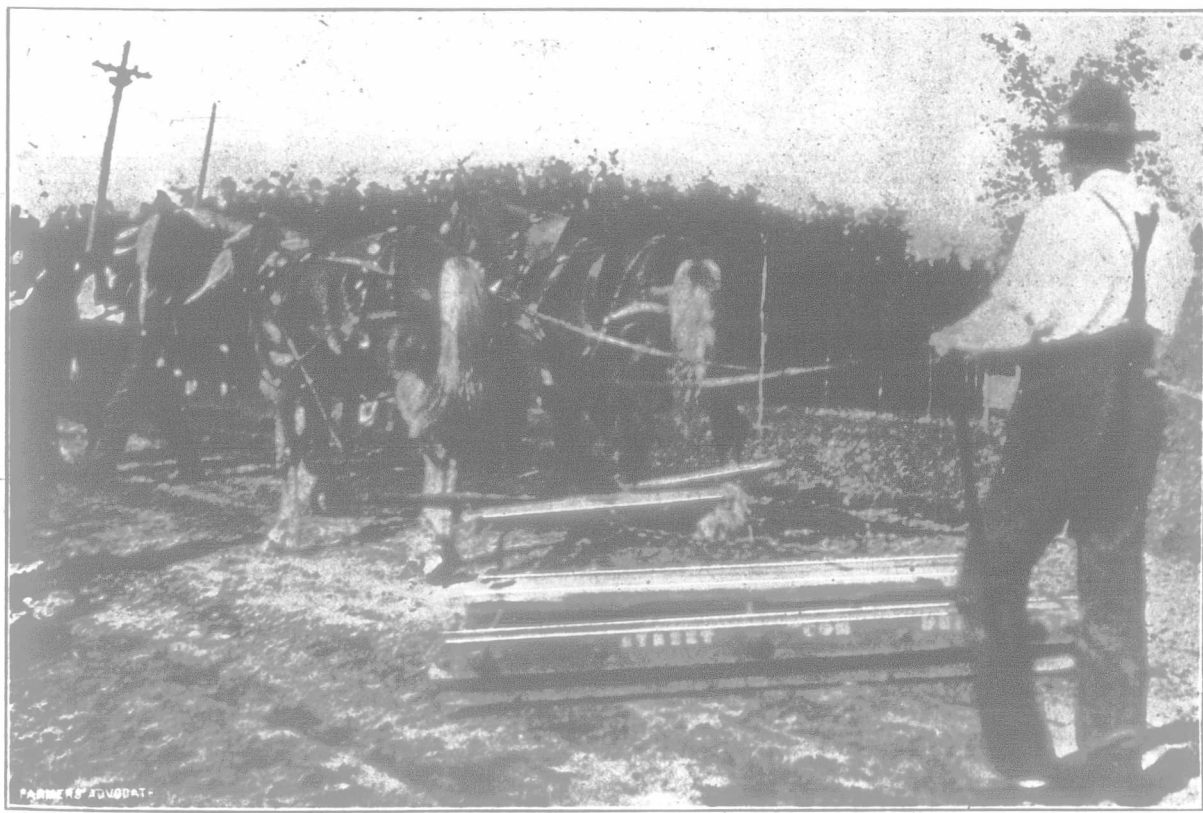
While the maintenance of wider roads will be found more expensive than that of narrower ones, on account of the earth sides flattening out and being cut up by traffic it is desirable that sufficient width should be maintained to secure the safety of travel upon them and provide ample room for the passing of vehicles. A great mistake has been made throughout this province in having roads built too narrow and allowing the side ditches to encroach too near to the center of the road allowance where the road proper should be built. In many places where necessity demands the widening of such roads, it will be found that the cost of so doing will be equal to, if not more than, the original cost would have been if it had been properly done at first.

A distance of twenty-six feet should be left between the inside edges of the ditches. This will be sufficient width in most places upon which to build a proper road grade. It is not advisable to have them a very much greater distance apart than this, as the practice of farmers and others is to drive on this where possible, and the consequence is that deep ruts and trenches are found by the wheels which not only absolutely prevent the water from escaping into the ditches, but retain it against the road dump by which it is absorbed to the detriment and injury of the road.

GOOD DRAINAGE A NECESSITY

Water is destructive to any road and especially to an earth road, therefore drainage that will at once carry away rainfall or melting snow is absolutely necessary. With good drainage established in building the road, and frequent inspection to keep the drainage efficient and to mend promptly small injuries to the surface, the earth roads of this province could be maintained in a much higher state of usefulness than at present, and at considerably lower cost. Little breaks in the roads caused by rain or heavy loads passing over them, if not repaired immediately will grow into mudholes, especially

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FINISHING OFF A CLAY ROAD WITH THE SPLIT-LOG DRAG