VALUE OF WIDE TIRES

CANADIAN DOCTOR TELLS HOW THEY BENEFIT ROADS.

Mave a Greater Bearing and Do Not Cut Into Them-He Pavors Tires Four Inches Wide-How They De-

A vast amount of the present wear and tear of and injury to roads could readily be avoided by using wide instead of narrow tires on heavily loaded wagous, says Dr. J. O. Reume of Toronto, Canada, in the Motor News. Narrow wagon tires are the great destroyers of good roads. The injury done by the e increases as the wagon gets older and the wheel wabbies loosely on the axle. A narrow tire on an old and heavily loaded wagon can do more damage to a road in one trip to market and back than would pay for a new wagon.

Wide tires, on the other hand, are a benefit rather than an injury to the road. They have a greater bearing and do not cut into the road. Instead of two luches of road surface supporting the load, wagon and all, by doubling the width of tire the load is distributed over twice the amount of road surface. In making wagons consideration should be given not merely to the strength of the wagon and its wheels,



A WIDE TIME BOAD IN KANSAN.

but also to the strength of the roads to be traveled and the kind of wagon they have strength to support.

Tests have been made from time to time of the effect of wide tires not merely on the roads, but also on the pull required to move the loads. Among these tests have been those made by the British Association For the Advancement of Science in 1902, by the experimental station of Missouri university of 1807 and more recently by the United States war department, The results in all cases have been practically the same:

First.-With regard to the roads it is found that wide tires leave a road in better condition than before passing over it.

Second.-As to tructive effect, the only practical disadvantage of wide tires arises where the road is so soft that the wheels sink into it and the mud sticks to the rims and packs between the spokes. On very hard, smooth roads or roads covered with dust wide tires require a very slightly. increased tractive effort. On all other classes of roads the advantage is in

favor of the wide tire. The practical application of the result of tests is that for traffic on country roads if wide tires of four inches and upward are generally used there would be a decided improvement in every class of road. The tractive was er required would be less and the coof keeping the roads in remain a mid-

be much reduced. If all form wagons, were equipped with wide fires the muddlest and sticklest of our roads would be very much improved and many of what are now known as bad roads would be for the most of the year in fair condition.

While the majority of wagons continue to have narrow tires, the few having wide tires are heavier to draw on very muddy and sticky clay roads, out on the great majority of roads, the average country roads, the advantage is in f or of the tire four inches wide.

It is urged against wide tires that they do not roll freely in the ruts made by narrow tires. So long as narrow tires are commonly used this will be the case to some extent; but, on the other hand, if wide tires were generally used the ruts would not exist.

In any case, with narrow tires the bottom of the ruts made by the narrow tires are uneven, and the narrow rims are constantly grinding against the sides of the ruts, creating the greatest friction, so that the objectionable difference is not so great as it appears on first sight, if it exists at all.

It is further contended that the wide tires come in contact with more loose stones than do those with a narrow tread. The greater resistance offered in this way is more than counterbalanced, however, by the loose stones dropping into the narrow ruts.

In the one case the wheel goes to the stone; in the other the stone gets in front of the wheel. The irregular bottom of the ruts and the stones in the narrow ruts keep up a constant vibration of the wagon, which transmits a swinging motion to the tongue, galling and annoying the horses and de-

structive to conveyances. A provincial law coming into effect after a term of years requiring a stated width of tire for certain sizes of wagon axles would not create hardship, might be accompanied by a rebate of taxes or a small bounty and would result in a benefit to the roads, decreasing the cost of maintenance.

NEEDS OF GOOD ROADS DRAINAGE OF ROADS

IN HIGHWAY CONSTRUCTION.

large Sums of Money Wasted by Incompetent Overseers - Features of town School Where Men Are Trained For Road Supervisors.

It is somewhat astonishing to learn that a sum aggregating nearly \$3,000,-000 is spent annually by the rural districts of the state of Wisconsin for conds and bridges, says Hoard's Dairyman. It is hard to believe that in the last ten years about \$25,000,000 have been spent for these purposes outside of the cities and villages, especially so when the condition of the roads and bridges is taken into account. They have now practically the same appear- phy of the region through which the ance that they used to have before those \$25,000,000 were spent. The to be served, the comfort and conmoney has literally been dropped into the holes in our roads.

But more astonishing than the greatness of these amounts is the fact that they have been spent on engineering projects in almost every instance without the advice of a trained man. We absolutely crazy if he did not hire the parts of the science of road building. best engineering talent be could get. In fact, the courts would promptly be asked to appoint a guardian by his heirs if he selected men who had no on a level, as longitudinal ruts are liaexperience and no technical training great state of ours (Wisconsin) and spend millions every year on just that any advice from trained men. We all a level road; hence the advisability of nothing of the work they are supposed to do, and their work shows it.

When we start to build a house we a carpenter to put up the woodwork, a who know their business. We don't boy, who never built anything more pretentions than a cow shed. Yet when we come to select a man to keep the road in repair, so we can get to and from that house, we elect one who has never given a day of careful consideration to the best and cheapest means. of keeping that road in proper shape.

We trust to luck that he will do it well enough. But he puts in a hundred dollar culvert that is too small and washes out or a \$500 bridge with-



SUBVEYING A RIGHWAY.

out proper abutments, which is soon undermined after some heavy shower, and the bridge and abutments must be replaced. We cheerfully look upon it as unavoidable and, although we gramble a little, quite readily pay taxes next year for some one else to waste in putting in a culvert about four times too large and a bridge twice as long as needed.

But when we ask where we can get trained men we find we haven't them available-our system hasn't been of the sort to make them. We have hired a mason to do our woodwork, a novice to lay the foundation and a blacksmith to paint the house, until each has forgotten his over trade and does not know the other. We must train men from the start if we are ever to have good roads

The Iowa highway commission has adopted the plan of holding a road school for a week in the summer, to which all road supervisors are invited. They go to the Iowa State college, where they see all kinds of road machinery at work and listen to lectures on the best type of bridges, culverts and road machinery. They are given liberal opportunity to ask questions, and all the help possible is given them in the various problems they have met in their work.

The commission owns a number of road levels and instruments such as are necessary in laying out roads, taking profiles and fixing the grade of the drainage lines. Parties of four or five students each are sent out with these instruments, each party under the direction of an instructor, and profiles are run over different roads and the grade lines fixed with reference to draininge outlets. The standard sheets of road cross sections and bridge designs which have been made up by the commission are taken as a basis for the drafting room work, the idea being to develop more men who can lay out a piece of road and make estimates as to the cost of reducing it to grade

and become expert road engineers. Some such method as this must be adopted in Wisconsin if we are to see any results from the \$30,000,000 that will be spent on the roads and bridges in the next ten years.

A King Finishing Fine Road. King Leopold of Belgium is having the projected automobile road along the whole Belgian coast finished at his own expense, as he has drawn on his privy purse to the extent of 10,000.000 francs for the purpose. A part of the magnificent way near Ostend has been completed.

WHY TRAINED MEN ARE REQUIRED MOST IMPORTANT FACTOR IN CON-STRUCTING GOOD HIGHWAYS.

> How to Underdrain the Roadway. Disposal of Storm Water Quite as Important as Location and Grade. Value of Water Breaks.

Drainage is the essential factor and essence of all good road building, says W. R. Golt in a paper read before the recent Missouri good rooads convention. Exercising its proper functions. all roads are good roads, metaling of the surface being simply a question of how much a community can stand and without drainage would be ineffectual and worthless. A study of the topograroad is to pass, the quantity of traffic venience of those who use it, should determine the best location for a road. and these require the study of one qualified and educated for the work.

A level road is most desirable and economical; hence one should seek to locate a road so as to obtain the lightwould naturally think a man who start est grades, as a proper estimate of ed to build a \$25,000,000 railroad was grades is one of the most important

The perfectly level road is the best for transportation, but it costs less to maintain a road on a slight grade than ble to be formed and interfere with the for the work. Yet we go on in this drainage. Any earth road surface is greatly benefited by having longitudinal drainage and is not so likely to beprinciple, without any definite plan or come soft and moddy in rainy times as know road overseers-many of them in introducing slight grades at intervals lefferson county-who know next to for this purpose. The gradient of the road will be determined by the amount of traffic to be accommodated.

Disposal of storm water is quite as get a mason to put up the foundation, important as location and grade and should have the constant consideration plumber to put in the piping, a painter of the locating engineer. Money exto fluish the job and perhaps men of pended in intelligent study of location. other trades. In a word, we get men grade and drainage gives more return than any other expenditure, drainage let the Job to Neighbor Jones and his being the most important factor in the construction of roads and the foundation of all road building, water being the greatest enemy of dirt roads. Prompt and thorough drainage of the water from the road can only be accomplished by one who has made a study of the subject and is master of the situation.

Underdrainage or longitudinal tiling of the road or roadway lowers the water level and maintains a dry subsoil. thickening the crust of the surface so as to permit heavier loads, and prevents settling of the roadbed; also prevents the destructive effect of the frost. Three to four inch tile is a suitable size and can be laid so as to be carried down into the side ditches at regular intervals, thus having a free outlet. A line of three or four inch drainfile laid along either or both sides of the grade at sufficient depth to intercept the underflow will effectually lower the water level and drain the subgrade. If the road is located on a slope or side hill, the line of tile should be laid on the upper side of the roadway, under and across the roadway into the lower ditch.

The arrangement of side ditches or drainage should be such as will effeetually carry away from the roadway or grade all water from either ditch and prevent the storm water from adjacent lands reaching the roadway or grade. Wide shallow ditches with long flaring sides toward the roadway or grade should obtain, the outside bank having slope enough to prevent caving, which will necessarily have to be changed for the different soils over which the road may pass. The slope from center or highest point in the roadway should be made with two planes, say one inch to the foot for six feet each way from the center; then change to one and one-half inch to the foot and carry this gradient to the outside of either ditch, a distance of

roadway Side ditches should have a uniform grade and free outlet into some waterway, so as to drain the road quickly. Under no conditions should water be allowed to stand in the side ditches, as it filters through and into the subsoil of the grade. Water should not be carried long distances in the side ditches nor concentrated to avoid a culvert. Natural drainage conditions should be followed as nearly as possible, and whenever the flow of water in a draw or waterway is obstructed by interposing a dam in the shape of a road grade the natural conditions should be restored by supplying an outlet in the shape of an adequate culvert across or through the road grade to the lower

Drainage of the surface of a road is largely determined by its maintenance. If the depressions and ruts are filled by some device or machine so as to leave a smooth, even surface, which is easily and quickly accomplished, the roadbed will remain dry and solid. On long, steep grades "thank-you-marms" or water breaks should be constructed at frequent intervals to force the storm water into the side ditches. Construct these in a broad angle, extending from an apex in the center of the road, down and out to either ditch. The steeper the grade the sharper the angle should They should also be made at the top or summit of every hill to intercept storm water and divert it to the side

ditches. In conclusion, let me recommend the employment of a competent engineer to plan all drainage and make profiles and contour maps. He will locate properly the line of drains and roads to constructed. His contour map should show the acreage of drainage areas that shed water to each culvert, and his profiles should show grades, cuts and fills and estimate quantity of yardage of each.

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