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## GOOD ROADS IN RELATION TO FARM VALUES.

The value of a farm is determined to a large extent by its accessibility. Given similar conditions of soil, climate and demand for produce, and the land that is favored with the best transportation facilities, whether by rail, road or river, will bring the best price per acre when put upon the market. The homestead claim of the pioneer, set far back in the virgin forest, has a value that is measurable by the daily necessities of the owner and his family. A farm which is located within a few miles of a railroad or a thriving city, where the conditions are normal, that is to say, where the rates are reasonable and the market not oversupplied, will have a value directly proportional to the condition of the wagon roads by which it is approached.

In view of these self-evident but too easily forgotten facts, the growing agitation in favor of building better roads has a deeper significance and will have a more widespread effect than is generally supposed; for, as soon as the people begin to realize that the question is an economic one that vitally affects our national prosperity, we may look for a thorough reform in the present methods of road building, so far, at least, as a large number of the States are concerned.

At the same time it must be borne in mind that the construction of good roads in this country is a very different task from that presented in the more thickly peopled countries of Europe. The vast extent of the country and the comparative sparseness of the population render it unnecessary and indeed impossible to cover the United States with a network of such magnificent roads as are found, for instance, in France, England or Germany. The same conditions which obliged the engineer to build our pioneer railroads on lines of the strictest economy have governed the construction of our country roads. It may be safely said, however, that both railroads and wagon roads were built with the expectation that they would be subsequently revised and improved in their location and construction. This revision has already taken place or is now being carried out on the railroads, and the improvements are being made as fast as the increase in the traffic will justify it; but it must be confessed that the phenomenal increase in the wealth of the country has not been followed by any proportionate improvement in the condition of our country roads. After making all due allowances for the vast extent of the United States, the large size of the farms and the great distances to be traversed, it must be admitted that our highways, taking the average throughout the country, are a distinct reproach to the otherwise highly developed civilization of the United States.

This statement is made with the knowledge that some of the States have already begun the work of reform in good earnest, and can show as the result of it a system of first-class roads that is extending every year; but of several of the States it must be admitted that they are building and repairing roads to-day according to the primitive methods which were adopted by the original settlers half a century ago—methods which were necessary and adequate then, but are wasteful and inefficient to-day.

When the level prairie lands of the West were settled and devoted to wheat raising, the roads were frequently laid out with a width of eighty feet, and the process of road making consisted in merely plowing up the soil on each side and scraping it to the center to form a raised roadbed. This provided a cheap road, sufficient for the light and infrequent traffic of pioneer days; but with the settling of the country and the increase in the number and weight of vehicles, these roads have proved to be altogether inadequate, especially in the alluvial soils which are common in the wheat raising districts alluded to. The fall and winter rains and the narrow tires of the heavily loaded wheat wagons quickly turn the so-called road into a mere mud track, with the immediate result that the hauling capacity of the teams is reduced one-half, and the cost of transport and the value of the season's crop are proportionately affected.

Now it is a question well worth consideration whether one mile of good, durable macadam road is not worth considerably more in such a district than five miles of plow and scraper road that will go to pieces under one winter's travel. There is food for thought in the fact that the cost of a few years of thistemporary work would have supplied such districts as these in question with permanent highways, whose cost of maintenance would be certainly no greater and possibly less than that of the present dirt roads. The mere turning over of the soil is an expedient of doubtful utility at the best, and it is a question whether it would not be good economy to concentrate the labor and material which are now practically wasted in patching a given stretch of road in producing permanent results on a smaller section of it.

A thoroughly well built macadam road will cost, on an average, about \$5,000 per mile, this estimate being subject, of course, to considerable variation, according to local conditions, such as are due to the nature of the country and the cost of labor and material. In the more thickly settled and wealthy Eastern and Middle

States the expediency of building all the main roads and many of the by-roads with a macadam or telford surface admits of no debate, and its effect in raising the price of farm lands or cheapening the cost of farm products, or both, would be certain and immediate.

Scarcely less important than the question of surface is that of the grades; for it is evident that the existence of but one steep hill between a farm and the railroad may reduce by one-half (no matter how excellent may be the surface of the road) the loads that can be hauled. The location of many of our present roads was determined over a century ago, when economy of first cost was a strict necessity, and, consequently, all heavy excavation and embankment were avoided. They were frequently built with excessive grades, which remain to this day a hindrance to traffic and a constant check upon the development of the districts affected.

No discussion of the cause of good roads can fail to make reference to the powerful stimulus which it has received from the development and popularity of the bicycle. Good roads are the necessary concomitant of a perfected "wheel," and the fascinating pastime is making zealous converts to the cause of better roads who would give it but little thought as a mere economic question. There is a danger, however, lest effort from this quarter should be directed merely to the construction of bicycle side paths, to the neglect of the more serious problem of building permanent highways. The profit of the farmer and the pleasure of the wheelman can both be subserved by building once and forever first-class macadamized roads, and the union of such powerful interests would materially hasten their ultimate construction.

## AN INTERESTING POINT IN LOCOMOTIVE HISTORY.

A curious instance of the facility with which a serious error may find its way into the historical records of mechanical engineering is found in the celebrated Nasmyth sketch of Stephenson's locomotive, the Rocket. This engine is in some respects the most famous historical steam engine in the world, and great care has been exercised during the last twenty-five years in gathering up all possible information regarding the details of its design, and giving an exact reproduction of the engine as it appeared on the day of the famous Rainhill trials in 1829. These illustrations are familiar to the majority of our readers, and although they may vary in slight details, they all show the familiar features, such as the inclined cylinders, the lofty smokestack issuing directly from the front end of the boiler, the sloping fire box, and the rude tender, consisting of a cask of water carried on a four wheeled truck.

On July 26, 1884, Mr. James Nasmyth, who is famous as the inventor of the steam hammer, wrote a letter to The Engineer, inclosing a pencil sketch which he said he had made of the Rocket over fifty years before, as it stood on the rails in the year 1830, or one year subsequent to the Rainhill trials. Mr. Nasmyth was a good freehand draughtsman, and the sketch had evidently been made with considerable attention to detail. This fact made all the more remarkable and puzzling the astonishing change which the Rocket appeared to have undergone in a brief twelve months. The smokestack had been cut down and now projected from the top of a smokebox; the wooden driving wheels had been replaced by others of cast iron; the cylinders had been brought down to a nearly horizontal position; the sloping fire box had been entirely remodeled, and the crude tender had given place to one of a very neat and greatly superior design.

As may well be imagined, the publication of this sketch brought forth a mass of correspondence, which went to show that, between the Rainhill trial in 1829 and the opening of the Liverpool and Manchester Railway in 1830, seven other engines were constructed by the Stephensons, and that when Nasmyth went down to see the much-talked of locomotive, he probably came upon one of these later and improved machines, and was told that that was the Rocket. The sketch was made by Nasmyth in good faith and labeled Rocket, whereas in reality it represented an improved Rocket, and probably the Phoenix, the first of the seven new locomotives above mentioned.

In order to assist its readers in clearing up the difficulty, The Engineer published a reproduction of the Nasmyth drawing and labeled it the Rocket, 1830. Subsequently, it would appear, The Engineer's engraving came to the notice of some imaginative artist, who proceeded to make a highly fanciful picture, placing in the background a typical wayside inn with the soon-to-be-superseded stage coach standing at the main entrance. The picture was published in the form of a colored plate by the Leadenhall Press, of London, and some party, thinking, doubtless, that the date 1830 was an error, changed it to 1829. The fiction was now complete.

The reproduction of this plate in the issue of the SCIENTIFIC AMERICAN SUPPLEMENT of January 30, 1897, has called forth an explanatory letter from a correspondent, in which the origin of the Leadenhall Press engraving is explained. The letter, together with illustrations of the actual Rocket of 1829 and the sup-