

Burnt Clay for Highways.

For a number of years, in several of the central states, Illinois, Iowa, Missouri and others, burnt clay has been extensively used for railroad ballast, and, to a less extent, for surfacing common roads. For railroad ballast this material is said to be superior to broken stone, but for common road certain hard qualities are preferable. As with brick making, only certain qualities of clay are suitable, but the success of vitrified brick-paving certainly suggests the suitability of the more roughly prepared clay as a good substitute for stone or gravel where the latter materials are not available. Climatic conditions would no doubt have to be considered, and it will have to be learned whether the material found so suitable in the south would be equally durable when subjected to the severe tests of a northern winter. Of the use of burnt clay by railroads, or "gumbo" as it is locally termed, the Review of Reviews says:

The railroads handle the clay and carry on all operations connected with its burning by machinery. The burnt gumbo, ready for use, can be delivered on board the cars at a cost of twenty-five to thirty-five cents a cubic yard. When burned by hand, as would usually have to be done in highway improvement, the cost would be perhaps ten to fifteen cents more. The railroad gumbo pits are often a mile or two long and hundreds of feet wide. In the case of the highways, the mud would merely have to be shoveled out of the roadway, burned and shoveled back.

While for macadamizing purposes on country roads burnt gumbo is not quite as durable as some of the best grades of rock, it has many advantages to offset this one shortcoming, slight as it is. The process of producing burnt gumbo requires practically no capital or great skill to carry on. The most ordinary labor and a little common sense on the part of one person, as overseer, can produce the best of results. Of course the road should be properly graded and crowned before putting on the gumbo road-metal. A surface of burnt clay, six to eight inches in thickness, is commonly sufficient for good results; or ten inches in particular places, where unusual conditions exist or traffic is especially heavy.

With no more expenditure of money and effort than is now put on the country roads, ballasting with burnt clay would produce in a dozen years a system of highways equal to any of those for which France has so long been famous.

A burnt gumbo road is never muddy, for that property is lost in the burning. The surface of the road is hard and smooth. As a speedway for bicycles and automobiles, it is ideal. For carriages and heavy wagons, it has no superior. No vegetation can grow on it. It is practically free from dust after the high-

way system has been well developed, so that mud is not brought in from the tributary roads. Moreover, the warm, red highways contrast pleasantly against the green landscape at those seasons of the year when country drives are most enjoyable.

The process of burning clay is quite simple. Along the roadside cord wood is piled ten feet wide. On this is thrown three or four inches of coal slack and twelve inches of gumbo mud, which is cut from the roadway or a pit, as the case may be. On firing the wood, enough air enters the pile to enable slow combustion to be carried on without the generation of too much heat, which would vitrify the clay.

When a "pit" is made, as often is necessary when burnt gumbo has to be hauled some distance, or, as is the usual way with railroads, new additions of slack and mud are added each day on one side of the pyramid, while on the other side the burnt gumbo is allowed to cool and is then carried away. In this way the pit advances sideways a few feet a day until it has become several hundreds of yards across.

The gumbo clays have many notable qualities, besides being excessively sticky in wet weather, enabling them to be readily distinguished. They usually form what the farmer calls cold, sour soils. These soils cannot be tilled to advantage. The land occupied by them is almost worthless, except, perhaps, for scant pasturage at certain seasons of the year. The clays absorb and are capable of retaining an immense amount of water, often as much as twenty-five gallons to a cubic yard.

Permission to locate a railroad ballast pit on some farmer's gumbo land is usually readily obtained. He not only gives his consent and the use of the land free, but he is secretly delighted at the idea of having the railroad excavate, without cost to him, a big pond for his stock. The best clays for making burnt ballast are distinguished by certain physical properties. They are very plastic, quite impure, very fine-grained and tenacious. Their strength is enormous, often as high as four hundred pounds to the square inch. The shrinkage is very great—ten to twelve per cent.—in the drying and burning process. These are the technical tests for recognizing these clays. A ready, practical test is to find the very worst stretch of muddy country highway.

John Gilmer Speed, in an article on the question of "The Common Road as a Social Factor," says:

"If the common roads had been properly laid out, constructed and attended to, and their development had kept pace with the development of other highways, I suspect that we would now have other problems to solve than those that confront us."

Not alone does the farming or country community reap the benefits of the good roads. Money paid out among the farmers is applied to the fountain-head of all business, and from there it will ultimately flow downward, filling all the channels of trade, production and finance. The commission men in our cities, handling the immense output of fruit from our orchards; the grain brokers, buying and shipping our wheat; transportation companies, shipping the products of the farm by rail and water; the wagonmakers and implement dealers supplying the farmer; the commercial world trading with the farmer; the public at large enjoying the benefits of good city markets, accessible from the country, where fresh farm produce can be purchased at reasonable rates; the wheelman, the tourist, the owner of riding and driving stock, or horseless carriages, all will receive their full share of the benefits.

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It is difficult to arrive at any fact in dollars and cents, relative to the effect of improved public roads upon the value of land or other economic condition, but the effect of such roads now, and for so long in existence, is seen on every hand, and the influence felt in the English mode of life. Englishmen, be they of the gentry or of those in the humbler walks of life, seek their pleasure in, and gladly betake themselves to, their country homes. The one medium of this pleasure, so natural to all men, is the solid roadbed over which one can walk, or drive with equal comfort or pleasure any day in the year.

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Of France it is said: "The road system of France has been of far greater value to the country, as a means of raising the value of lands, and of getting the small peasant proprietors in easy communication with their markets, than have the railways. It is the opinion of well-informed Frenchmen who have made a practical study of economic problems, that the superb roads of France have been one of the most steady and potent contributions to the material development and marvelous financial elasticity of the country."

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Viewing the question of road improvement from whatever side one will, its financial advantages can be so strongly set down in facts and figures that they are bound to appeal to any one. When we consider that practically every pound of freight carried by our railroad and steamship lines has previously had to undergo transportation over our roads in one form or another, is it any wonder that the greatest railway financiers and managers are strongly in favor of the good roads movement, and are willing to lend a helping hand to those communities who are alive to their own interests, and who wish to rise up and throw off the yoke of the demon mud.