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SAND-CLAY ROADS.

A Simple and Economical Method of Building Roads in Vast Areas of Our Southern Sand Belt—An Authoritative Discussion by an Official of the Bureau of Public Road Inquiries.

Messrs. Editors: Almost every community is favored with an abundance of stone, gravel, sand or clay, and by the proper management a desirable road can be constructed with either one of these. As there is a wide difference in the character of the materials great care should always be exercised in selecting only the best—such as contains sufficient toughness and cementing qualities as will form a surface sufficiently hard and durable to endure the volume of traffic, and at the same time make the road less impervious to water, which is its worst enemy.

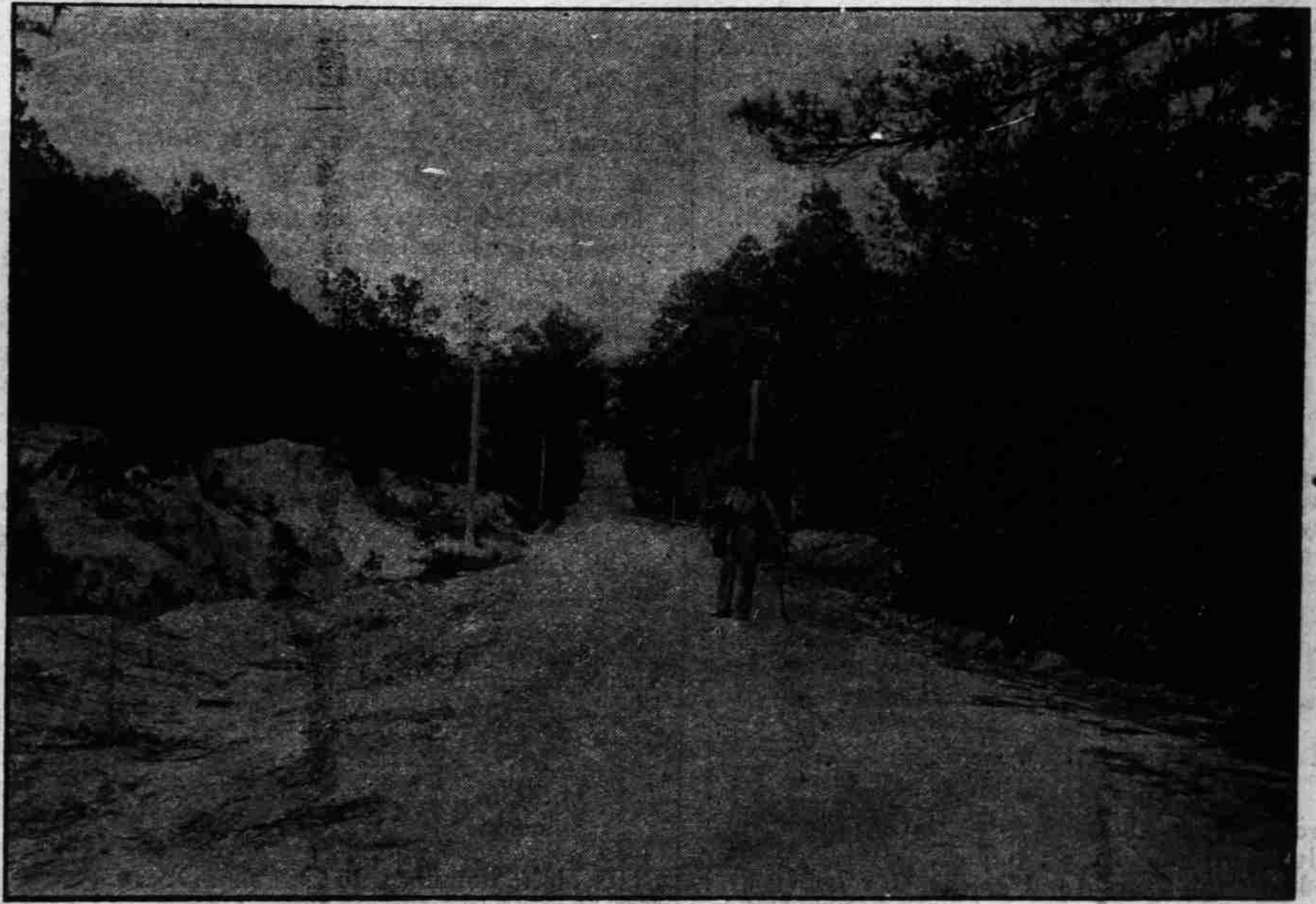
In successful road building too much attention cannot be given to the proper drainage, surfacing and rolling; and in doing this work the use of the latest improved machinery is very necessary in the construction any kind of a road if the best results are to be obtained. Any thing that is worth doing is worth doing well, is an adage that might aptly be applied in connection with this question. This rule is not always adopted, however, but it is far better to build permanent highways so that they will need little or no repairs for a long time to come. In some localities conditions are such that a good stone road may be built at a cost ranging from \$2,000 to \$3,000 per mile, but in others \$5,000 or \$10,000 are expended; while good sand-clay roads can be built from \$200 to \$500 per mile.

There are many phases of the question of road improvement of which much might be said, but at present the writer wishes to direct attention more particularly to the improvement of the common roads by the sand-clay method, which is quite inexpensive. When sand abounds in such quantity as to render travel on the roads difficult, an application of clay may be made to good advantage, and where clay is equally objectionable sand may be similarly applied and with equally as beneficial results.

The value of good roads and the methods in which the good road movement is sometimes given an impetus is shown in various ways, therefore it might be said in this connection that the sand-clay method originated in the following very simple manner: A few years ago a South Carolina farmer had occasion to dig a pit near the highway, and wishing to get rid of the clay he spread it on a piece of sandy road. In doing this he "built better than he knew," as that was the beginning of the improvement of the roads in his county.

The accompanying illustration demonstrates what can be accomplished where sand and clay are the only available materials. The section of road shown was improved by spreading clay upon a sand foundation, and was constructed under the supervision of the Office of Public Road Inquiries, Washington, D. C. The work was directly in charge of Mr. W. L. Spoon, a special road expert of the office, who has given valuable assistance along this line in many of the Southeastern States, including the Carolinas, Florida, Louisiana and Mississippi.

Perhaps more has been accomplished in the real permanent improvement of the country roads with this simple admixture of sand and clay in South Carolina than in any other State. After constructing two and one-half miles of ordinary macadam road, at a cost of from \$2,000 to \$3,000 per mile, it was decided to try the simpler and cheaper plan of spreading sand over the clay roads and clay over the deep sandy roads. It was



A SAND-CLAY ROAD IN RICHLAND COUNTY, SOUTH CAROLINA.

not easy to determine the amount of sand needed in the one case, or of clay in the other, to produce the best final result. Consequently, it has been necessary to study the resulting road surfaces for several months, in some cases adding more sand where the surface showed a tendency to give way under the traffic in wet weather, or in other cases adding more clay where the tendency was for the surface to break up during the dry season. First, the roads were cut to a grade of from 2 to 3 per cent, then the surface was given the proper section for shedding water, this surface slope being kept sufficiently gentle to permit the water to run off slowly and not to carry the sand with it. The sand or clay was then hauled in wagons usually short distances and spread over the surface a thickness of from two to six inches. The mixing of the sand and clay was done by the ordinary travel and the surface was finally packed by the wide-tire wagons and a horse roller. Many of these roads which are twenty-five to thirty feet wide, cost for grading and surfacing about \$3,000, while others under more favorable conditions cost about \$2,000, and in a few places where little grading was necessary, material was near at hand, and convict labor was used, this work was done at a cost not exceeding \$150 per mile.

Richland County, in which Columbia, S. C., State Capitol, is located, takes the lead in this method of improving the public highways. The following valuable information is taken from a letter which the writer has received from Road Supervisor, Mr. S. H. Owens, who is an authority on the construction of sand-clay roads. He says:

"The necessary quantity of sand on clay, or clay on sand, has to be determined by experimenting. When the road has been properly graded, and the road-bed is of sand foundation, the clay is spread evenly over the surface to a depth of from four to six inches, the depth depending on the per cent of sand in the clay. If the road-bed is of clay foundation, the sand is spread on a little thicker, say from six to eight inches. The clay or sand is simply spread on, not mixed, as the mixing is done by the travel over the road, which is not interfered with while the road is in course of con-

struction. I find after thorough experimenting that sand on clay does not give us as good results as clay on sand, on account of the drainage being insufficient under the road-bed and the clay not being as porous as the sand.

"As to the durability of the roads treated in this manner, I will state that those which were built five years ago are in as good condition now as when constructed, and in some instances better. Of course the roads have to be run over occasionally and repaired, which is quickly and easily done. Sometimes when there is much travel over the roads small holes will wear in them, due to a lack of clay or sand being not at that particular point. I find this to be the case near Columbia where travel is necessarily greater than in the remote sections of the county. There are some roads in the county, constructed five years ago, that have had no repairs and are now in first-class condition.

"We have about four hundred miles of public roads built on the sand-clay method out of a total of about six hundred and fifty miles in the county. These roads are giving perfect satisfaction, and have stood the tests of hard rains and constant travel. The cost of constructing roads by this method depends on the amount of grading to be done and the distance the sand or clay has to be hauled. The cost of repairs is very slight.

"In constructing roads by this method care must be taken not to get the cross-section grade too heavy, as this will have a tendency to cause the sand or clay to wash from the surface of the road."

There are very many sections in this country, particularly in the South, where sand and clay are the only available materials suitable for road-building, and in sections where such conditions prevail the people would do well to follow the most excellent example of Richland County, S. C.

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