ROAD CONSTRUCTION.

THE BINDER

A matter in which there is considerable diversity of practice, is in the use of a binder. A binder, I may explain, is some fine material, generally sand or gravel, which is spread over a layer of stone on the roadbed, and is then flushed or harrowed into the interstices so as to fill the vacuum, and for a bond between the stones when the layer is rolled. It is, I have said, generally sand, but in some cases roadmakers have used clay, or even ordinary dirt. I was recently shown a binder used largely on the streets of St. John, New Brunswick, which was merely a red clay. The majority of engineers, however, who recommend this kind of a binder, specify "clean, sharp sand."

A layer of stones such as will pass through a 2-inch ring, loosely spread on the roadway, will have spaces between the individual stones amounting to about one-half the entire mass. It is the province of a roller to compress the stones until a smooth, hard roadway is formed. The heavy weight of the roller will, in consolidating the layer of stone and in wedging one against the other, wear off sharp angled edges. After such a layer of clean broken stone is thoroughly consolidated the vacuum remaining is reduced to about 33% of the mass, but varies according to the toughness or softness of the stone. A hard trap rock will necessarily pulverize and yield less under the pressure of a roller, than will a limestone rock. So that the vacuum remaining with the former will be greater than with the latter.

Personally, I have always preferred to use for a binder the stone chips and dust, known as screenings, which is created in the crushing of the broken stone, and the less foreign material incorporated in the roadbed the better. The value of any stone used in a roadway is largely dependent upon the degree with which its dust will cement and re-cement in the roadway. For this reason the utility of limestone and trap rock is not by any means proportional to the difference of hard. ness of the two stones, since pulverized limestone will form a cement more readily than will the dust of trap. Sand or any foreign material mixed with broken stone prevents this cementing process. It prevents, moreover, the firmer mechanical clasp which one stone takes upon another as the result of rolling. It helps to retain water in the texture of the roadway, rendering it more liable to injury from frost. The result is that in the spring or in wet seasons, the roadway becomes spongy, the sand oozes to the surface and has merely to be carted away. Its only advantage is that, with less rolling the road material can be consolidated into a hard (but not so durable) pavement. Clean

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