

and mechanically deposit the tile in the bottom. This will reduce the cost of digging and it will require but little clinker when mixed with one-half its amount of raw clay to fill the trench. The after settling will be greatly reduced when the trench is so filled.

After the drain is completed the grading is done in the usual way and the surface rolled. If left to be puddled and packed by traffic the clay, even to the sods from the road side, which is the most difficult material to treat, is compacted sufficiently to be broken up by the plough into hard lumps ready for the kilns.

Preparing the Clay Clinker.—The method of the burning the clay is as follows: Iron crates were made to provide a fire box and over these the lumps of clay made by breaking up the roads which had been graded and rolled are piled. In practice it will probably be well to grade the road and leave it for a month or so for the traffic to pack and then begin the burning. Prairie sods will form good clinker only when it has been puddled and packed, as a rain and subsequent traffic will do it. The addition of salty water to the sods improves the clinker.

Eight hours firing produces a fine mass of clinkers, from two to two and a half cubic yards being produced in each kiln. A little straw is spread over the road bed and then the clinker is spread mixed with a little straw and the proper amount of raw clay. The straw serves several purposes. It prevents the clay of the under bed working up and ingulfing the clinker on the surface, and its juice has a remarkable power to lessen the shrinkage of the clay and to increase its tensile strength. It supplements the binding power of the clay which is mixed with clinker, and by its cushioning tendency it reduces the crushing effect of the traffic on the clinker. In fact it acts as the swaddling bands of the young road.

The last operation is the rolling of the road, and that thoroughly done, the road is ready for use.

Such a road should be comparatively dry fifteen minutes after a rain. It should never load the wheels, nor ever grow dusty, and if the split log drag or the lap drag be faithfully used it should prove a cheap and eminently satisfactory road. Just what it would require in the way of maintenance it is at present impossible to say. Probably if the drag be used as it should be, the addition of a couple of inches of fresh clinker to the central portion of the road once in five years will be all that is required to keep it in the finest condition.

It may be of interest to point out that the clinker will serve many other purposes. For private roads and paths in parks and door yards it will prove a beautiful and efficient material which will prevent the tracking of mud into the house. It will also be useful around schools and country churches, where the bright red color will show in pleasing contrast to the green of the grass. Ground fine it is a perfect substitute for sand in mortar, making a lighter and stronger plaster than sand lime mortar. It can be so treated that it will form a good filler for cement concrete and asphalt pavement. The homesteader can build a considerable portion of his house from the clay dug from his cellar, importing the lime only.

The Cost of a Red Road.—The cost of the first portion of the experimental road was \$1.80 per lineal foot, the latter portion cost \$0.82, and after checking over the figures with Mr. J. E. Milne, the cost is estimated as follows:

Two men at \$2.50 per day tending five kilns producing and spreading 10 cubic yards of clinker per day..	\$5.00
Hauling straw	3.00
Oversight	1.00

Wear and tear of crates80
Cost of ten cubic yards of clinkers	9.80
Cost of one98
Therefore cost of metal per lineal foot33
Grading cost16
Total49
Which is equal to	\$2,500 per mile
The underdrain costs	1,440 per mile

The total cost of clay clinker road underdrained and covered with eight inches deep of clinker and 12 feet wide will be \$3,940 per mile. A gravel road with equal depth of metal costs \$4,150 per mile, estimating material at \$1.80 per cubic foot laid on road.

A mechanical ditcher will reduce the cost of underdrain to two-thirds the above cost, namely, \$1,000 per mile. The drain once in will provide drainage and ventilation of the road bed. It may be found that the underdrain may with safety be omitted altogether. If so this will reduce the cost to \$2,500 per mile.

If compact fuel such as coal be used, so that once charged and lighted a kiln may be left to burn itself out, two men could build, charge and open 15 kilns per day, and estimating the fuel at \$9.00 per ton, a cubic yard will cost \$0.47, and a lineal foot will cost \$0.16, instead of \$0.33 as above, while the cost of a graded road per mile will be \$1,643 instead of \$2,500. We may confidently expect that in every part of the province red roads without underdrainage can be constructed for about \$2,000 per mile, and if we can cheapen fuel, as a future article will show to be possible, these figures will be somewhat further reduced, or at least made more certainly realizable.

The Black Road of Saskatchewan.—Briefly described this patent road is constructed as follows: The underdrain is put down and made to open every two hundred feet to alternate sides of the road. This secures sufficient drainage and effective ventilation, which ever way the wind blows. The road bed is graded, covered with three inches of straw and then sprinkled and puddled by traffic or by the use of a packer, or best of all by the feet of a few cattle driven back and forth along the road till the straw is tramped well into the mud. Then as it dries it is rolled until it gains that glistening surface and marble-like hardness so marked a feature of the prairie roads. The surface is then swabbed with a tarry asphalt and then three inches of asphalt is laid filled with powdered clinker and little slabs of clinkers, which when spread and rolled lie over each other in successive layers. This produces a schistose or layered structure, which will prove very strong per inch of thickness. The road may be made still stronger if chicken coop wire (one or two inch mesh) be laid on the tarry layer and the asphalt poured over it so that it becomes thoroughly imbedded in the asphalt sheet.

The little slabs are made by spreading clay on the surface of the pavement already constructed and passing the steam roller over it. They are then cut with a sharp spade or knife rake to the desired sizes, dried a little and burnt in a rotary calciner or grate. Being somewhat porous when mixed with hot asphalt, they suck in a small portion of the bitumen on cooling, and by this means become much stronger than stone of the same original hardness. The adhesion between the bitumen and the filler is perfect, being not merely a surface contact, but a surface impregnation.

It is hoped for streets in small towns and villages, the suburbs and annexes of large cities, for sidewalks, and in many cases for country roads this type of road will prove a strong, smooth, mudless and dustless road, easy to keep up and sufficiently cheap to be considered a practical proposition.