How the Streets of a City Are Surfaced

ROLLING THE STONE BASE WITH BIG ROLLER—Photo by a Staff Artist.

PUTTING ON THE ASPHALT SURFACE—Photo by a Staff Artist.

TWENTY years ago there was not a foot of asphalt street paving in Omaha. Last Tuesday night was laid the last square yard of a district that brought the aggregate up to 31.6 miles of streets covered with this material.

That first job done two decades ago was at an expense of $2.98 a square yard. The work of this fall and winter has been accomplished at an average cost of $1.60 a square yard. That is exceedingly low, much lower than any figure that has before been secured in normal times. In 1897, however, when the big competitive fight between three paving companies was on, Omaha did some paving at a price of $1.19 a square yard.

Omaha was a pioneer in asphalt paving. The first work of that kind done in the United States was of an experimental sort in Brooklyn in 1870. Fifteen years later there were but two cities in the country that had as much asphalt on the streets as the Gate City. Omaha now stands seventh in the list. When the first asphalt was laid here only two cities, Washington and Brooklyn, had any at all.

The last thirty days has seen a race between the paving companies and Jack Frost in Omaha. Delayed by litigious complications the city engineering department despaired for a time of ever getting started on the work planned for this year. When all obstacles were finally cleared away and the labor begun it was put forward with a rush. As a result there is now 40,000 yards of additional asphalt surface for street travel.

Accomplishment is Remarkable.

This is faster than paving was ever before laid in Omaha and the most satisfying feature of it all is that the work is well done. The mixture has been even richer than usual this year, and the layers have been rolled and compacted thoroughly, though rapidly.

The total length of the streets that have been covered in this short time is two miles, and that is a great deal of paving to lay in thirty days. It has meant absolute system, extensive equipment and the employment of great numbers of men and teams.

At one time during the progress of the work on Twenty-eighth street there were 120 men working on the spot. Besides this there were fifty more getting out the material at the plant and 100 more driving wagons to and fro with loads of the completed mixture.

Most of the work this fall has been done by the Western Paving and Supply company.

PUTTING ON THE FINISHING TOUCHES WITH A "LIGHT" STEAM ROLLER—Photo by a Staff Artist.

The Grant Paving company did the remainder, about 5,000 square yards. In addition to the entire repaving of streets done in the last month there was some patching earlier in the fall, the total expense of this being $8,500. This was also of asphalt and 4,500 yards were laid in the holes on Sixteenth street, while it took 3,000 more to repair Cuming street.

All the work done since November 1 has been repaving and in all cases it has been a matter of replacing cedar blocks with asphalt. That has done away with the necessity of laying a concrete base, for the six-inch bottom of this substance which supported the blocks was used again.

Peculiar Feature of Repaving.

This has greatly facilitated the repaving although some time was consumed in filling in the extra depth with broken stone. Cedar blocks are six inches long and they are set on an inch of sand. This makes seven inches above the concrete which must be filled in order to keep the pavement at its old level. The asphalt top surface is but an inch and a half in thickness, the binder of the same depth. That leaves four inches to go. Broken stone is called into service as a substantial material for the filling. Were it not for the fact that the height of the surface must be maintained, this stone could be left out with no injury to the pavement, and it is not used in the original asphalt paving.

Besides the low cost per square yard this repaving is in still another sense a light financial burden to the taxpayers who must eventually settle for it. Payment is provided for on a ten-year basis. The expense to each foot of abutting property is divided equally over this period of time, so that in few cases will it become a troublesome tax and in none an oppression.

These 40,000 square yards of broken stone, binder and asphalt represent a great amount of material, both in quantity and weight. In the first place, 320 carloads of broken stone were used in the base. This was laid in depths varying from four inches to nine. The total weight of it was about 9,000 tons and its size 7,000 cubic yards.

In the binder that came next were 150 cars of small stone, or 2,300 cubic yards, and fifteen cars of Trinidad asphalt, or 300 tons. Binder stone ranges down from inch-square blocks to those of pea size.

Next came the top layer, the asphalt surfacing. This comprised fifteen more cars of asphalt, ninety cars of sand, or 1,800 cubic yards; eighteen cars of limestone dust, or 240 cubic yards, and 100 barrels of oil.

Nebraska Material is Used.

This material is gathered from all parts of the country. The asphalt comes from Trinidad island, off the coast of Brazil. From the sandbeds of the Missouri and Platte rivers come that ingredient. The stone is from quarries at Weeping Water. Thus a considerable portion of Omaha pavement is of Nebraska products.

The three layers are put down in the order named, stone, binder and asphalt. Each is rolled and compacted. No special period of time need intervene between the laying of one and the addition of the other above it.

The use of the binder is a comparatively new method. It is found to be the best satisfactory method of binding and interlocking the wearing surface to the base. Another method is to have a layer of asphalt in place of this binder, and the wearing surface on top of this. Of very simple composition is the binder. It is merely a mass of stones glued together with the bitumen or asphalt. The wearing surface, or what is known as the asphalt itself, is more complicated in its structure. This top layer is in reality but an artificial sandstone, in which the asphalt and oil comprise the matrix which keeps the sand together. Its imperviousness is rendered still more absolute by the addition of the limestone dust, which fills every little crevice and interstice left between the grains of sand.

The proportion of the components in the asphalt layer shows that it contains but a small amount of asphalt. Fully 80 per cent is sand. Five per cent more is oil and limestone dust. The other 15 per cent is the bitumen. This asphalt is very pure, being refined at Long Island. It is hewn out in chunks at Trinidad by miners with picks, and shipped to this country in that condition. At the refineries all the foreign substances are removed, liquefaction being the principal process. Then the asphalt comes to the Omaha plant in barrels, solidified once more.

Here it is melted in great cauldrons, and then the mixture is made in vats. When sand, dust, oil and asphalt are properly commingled to the desired consistency, the completed composition is loaded upon wagons, especially prepared to keep it hot till it reaches the place where it will be laid. It leaves the plant with a temperature of 400 degrees Fahrenheit, and is never below 380 degrees when it arrives on the scene.

The workmen are ready to receive it, and here is where they put in their careful work. The binder lies ready and the top layer is dumped on in wagon loads. Then it is quickly scattered and a huge steam roller run over it, compacting, leveling and smoothing it. In cold weather, when it is feared that the composition will cool too much before the big roller can do execution, a very small roller is first used, then larger ones by degrees. Places along the sides which the roller cannot reach are smoothed with heavy iron surfaces on a handle which men heat in a nearby fire and shove back and forth along the spots where attention is needed.

Clearing Away the Rubbish.

The task is completed, but the millions of old half-worn paving blocks which were torn up from the concrete base in all these districts just completed are yet to be accounted for. A glance through the back yards and woodsheds of Omaha people will show where the cedar has gone. The poorer classes swarm after the blocks all day long by the hundreds, bringing every method of conveyance, from an apron to a wagon and team. They will take all they can get, and the paving people never have any trouble in getting rid of this material.

Other people buy them in large quantities, hiring men with wagons to get them. Fuel is the object of all. The sand, meanwhile, and the small chaff and rubbish from the blocks, is scraped up and carted away to some dump, there to become a portion of some future geological strata in the ages ahead.

HOW THE OMAHA SCHOOL CHILDREN CONTRIBUTE TO THE AID OF THE NEEDY—SAMPLE PHOTOGRAPHS TAKEN BY A STAFF ARTIST ON THE DAY BEFORE THANKSGIVING.