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Rock Quarrying Industry in Minnesota

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deposit of *red drift* which is radically different from the gray. A much smaller proportion of the drift is clay, and when clay occurs, it contains pebbles, not of limestone but commonly of granite and related rocks. These do not have so serious an effect as the limestone, which may slake and swell after burning, but the clay is, of course, improved by their removal. A large plant at Coon Creek, near Minneapolis, is using the red drift clay, after passing it through conical rolls to remove pebbles. The product is an excellent grade of hard red brick, for the clay can be safely vitrified. In the few places where Nature has washed the pebbles from this red drift clay, the resulting clay is extremely plastic and shows such a high shrinkage as to make it difficult to manufacture. It yields good vitrified products, however, as shown by its use at several plants in Wisconsin. Such clay is abundant around Lake Superior and along the St. Croix River.

In a few places, notably at Wrenshall, and along the rivers farther south, washed clays have been mixed by natural processes, being derived partly from the gray and partly from the red drift.

In the southeastern corner of the state there is an area in which are many deposits of *loess*, a material derived by some process of working over and assorting surface material. The loess is used at Preston and elsewhere for excellent red brick.

MINNESOTA

ROCK QUARRYING INDUSTRY IN MINNESOTA

By T. M. Broderick
University of Minnesota

THE stones quarried for building purposes in Minnesota are chiefly granite, sandstone, and limestone. The limestone area is mainly in the southeastern part of the state, along the Mississippi river, and westward to the middle and southern parts of the state. The sandstone occurs along the western boundary of the limestone area, in the southwest corner of the state, and near Lake Superior. The important granite producing areas are along the upper Minnesota valley at Ortonville and Redwood Falls, and in the section centering about St. Cloud. As most of the state is covered with drift the quarries usually occur along the sides of the valleys where the streams have exposed the bed rock.

The region in Stearns, Benton, Sherburne, and Kanabec counties, but centering mainly about St. Cloud, is the largest granite producing area in the state. Here pink, red, and gray granites are quarried. The coarse grained pinkish-gray granite in the basement of the new capitol at St. Paul is from the St. Cloud quarries. The red stone is used for polished monumental works, pillars, and columns. The gray stone is used for monuments, building stone, curbing, and paving blocks. In the vicinity of Ortonville a dark red granite is quarried which is being used extensively in the Twin Cities.

In the southwestern corner of the state a quartzite, locally called granite

on account of its hardness, is quarried. It is taken out in Rock and Pipestone counties, and there is another area centering at New Ulm. This quartzite is used for building material near where it is quarried, but its largest use is as crushed stone for road construction. On the Kettle river at Sandstone, Pine County, a fine grained, light pink sandstone is quarried. The quarry is operated on a large scale and has all the facilities for a large output of stone. The principal products of this quarry are building stone, crushed stone, sawed stone, rubble, paving blocks, curbing, bridge stone, coping, and monument bases. The library building at the University of Illinois is built of this stone. The use of the Kettle river sandstone for building purposes is widespread. A brownish red sandstone is quarried at Fond du Lac, near Duluth, in St. Louis county. At Jordan, Scott county, a light colored sandstone is quarried.

The limestone quarried in southeastern Minnesota is mostly of two geological ages. The older is high in magnesium but the younger is comparatively pure calcium carbonate. The beds of each sort are horizontal and range in thickness from a few inches up to two feet. The stone is usually blue when fresh but turns to a buff on exposure. It is quarried at Kasota and Mankato for building stone and for natural cement; at other places for crushed stone and lime manufacture. Along the Mississippi it is used extensively for riprap.

The Mankato and Kasota quarries are in high grade magnesium limestone that can be tool faced, carved, and polished. The Mankato stone is of a buff color, and that at Kasota is of a light pink shade. That at Mankato is used largely for massive masonry and crushed stone. The Kasota stone is used for flagging and building purposes, such as polished wainscoting. Much of the wainscoting of the new capitol at St. Paul is of polished Kasota stone.

Limestone quarries are opened also at Rochester, Mantorville, Faribault, and Minneapolis. Most of the stone taken out in these quarries is used in the form of rubble and crushed rock. Lime is burned from local stone in Blue Earth, Fillmore, Goodhue, Mower, Rice and Scott counties.

The output of stone in Minnesota for the year 1912 was as follows: Granite, \$950,000; limestone, \$546,000, and sandstone, \$349,000. These totaled \$1,845,000. Minnesota ranked twelfth as a stone producing state in that year.

MINNESOTA

LAND VALUES

In 1910 the average value of land in Minnesota was \$46 per acre; in Iowa it was \$95.96 per acre, and in Illinois \$108.13, more than twice as much, in each case, as in Minnesota. At these prices, 160 acres—which in Iowa would cost \$15,360, and in Illinois \$17,280—could be bought in Minnesota for \$7,360.