

*Blasting*

But with the decrease in the production of building, or dimension stone, and the increase in the demand for crushed and broken stone, came more changes. Careful cutting of the stone was no longer necessary. Holes were drilled to depth back of the rock face, and charges of powder set in the holes. A blast, and a pile of broken rock was produced. Pieces too large to be conveniently handled could be drilled and blasted with a small charge. The broken rock was hauled to the crusher for processing; i.e., for crushing, screening, and grading. Today, the holes are drilled mechanically, at various diameters and to various depths, depending upon the nature of the rock. Blasting methods have changed, the types of explosive have changed, but the process is fundamentally the same. A large pile of broken rock is produced, thrown back against the rock face. After removal of the broken rock, more holes are drilled and another blast is set off for the production of more broken rock, and so on.

*Distribution of Iowa Quarries*

Why has quarrying been more of an industry in some parts of Iowa than in others? For an answer to that, and related questions, we turn to a further consideration of the geology of the state. To begin with, it is safe to say that all over the state wherever rock is at or close to the surface, it has been quarried for one purpose or another.



All geologic formations except those exclusively of shale have served. A map of the "Mineral Resources of Iowa" printed by the Iowa Geological Survey (1947) shows the location of the great number of quarries, concentrated particularly in the eastern part of the state. Some of those may now be abandoned or inactive, but many others have since been opened. Others will be started in the years to come.

#### *Cambrian Formations*

Starting with the geologically oldest rock and looking again at the map on the back cover as we do so, we shall proceed upward in time. First are the Cambrian formations, outcropping in a limited area of northeastern Iowa. These are mostly sandstone, rather crumbly, not usable as building stone or in the form of crushed rock.

#### *Ordovician Formations*

Above the Cambrian lie the Ordovician formations, which contain useful beds of limestone. The Prosser, Stewartville, and Dubuque members of the Galena formation have found great use, wherever they can be quarried, in Allamakee, Winneshek, and Dubuque counties. By way of explanation, formations and other geological units are commonly named from places where they are first studied, or where prominent. Thus Prosser and Stewartville are named from localities in Minnesota, the Dubuque of course from our own city of Dubuque, and the Galena from nearby Galena,



in Illinois. The St. Peter sandstone, also Ordovician in age, is at present being mined in Clayton County for use as a molding sand and in the manufacture of refractory brick; this operation started as a quarry on the river front, and developed into a drift mine, a tunnel into the side hill.

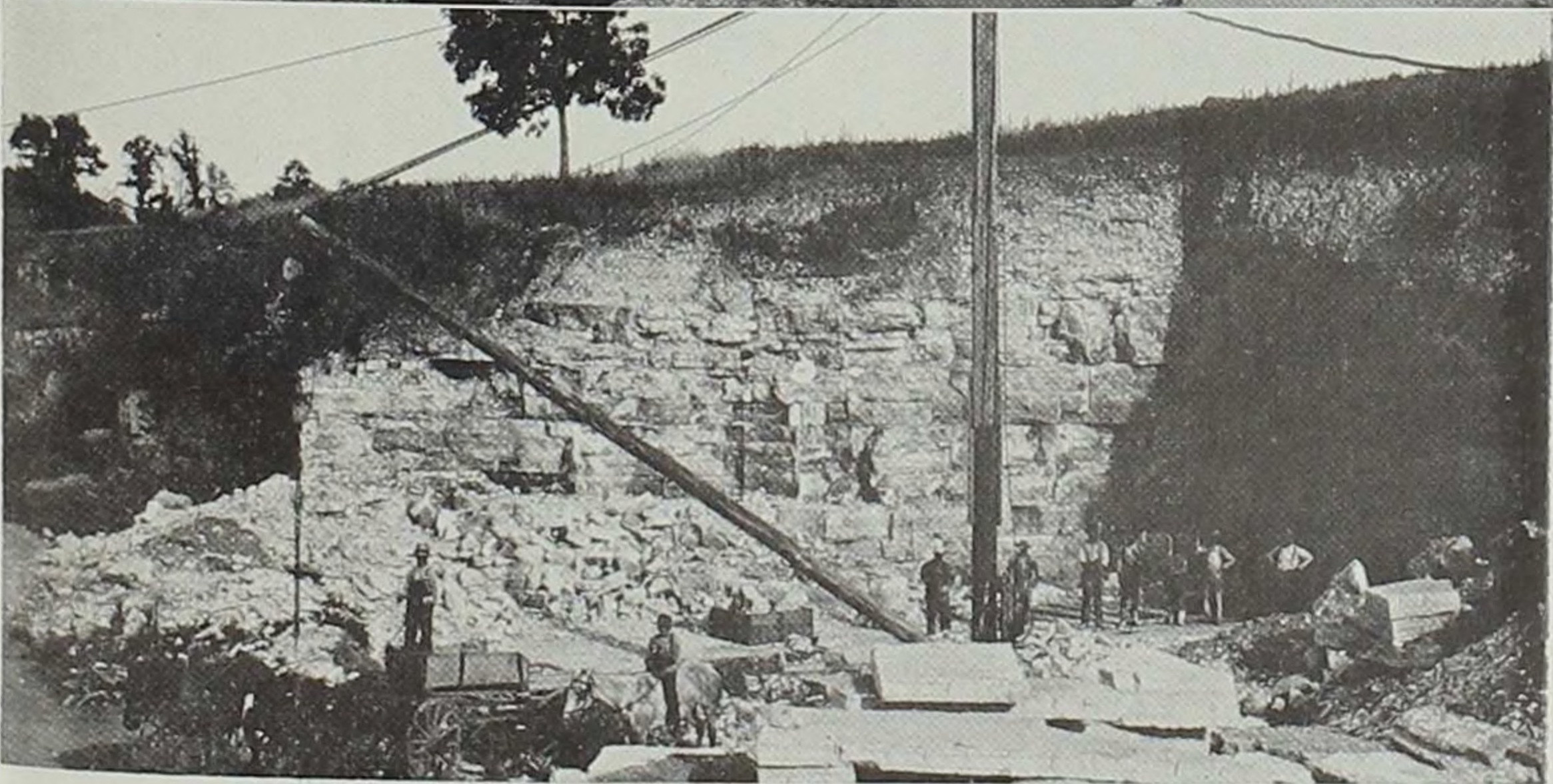
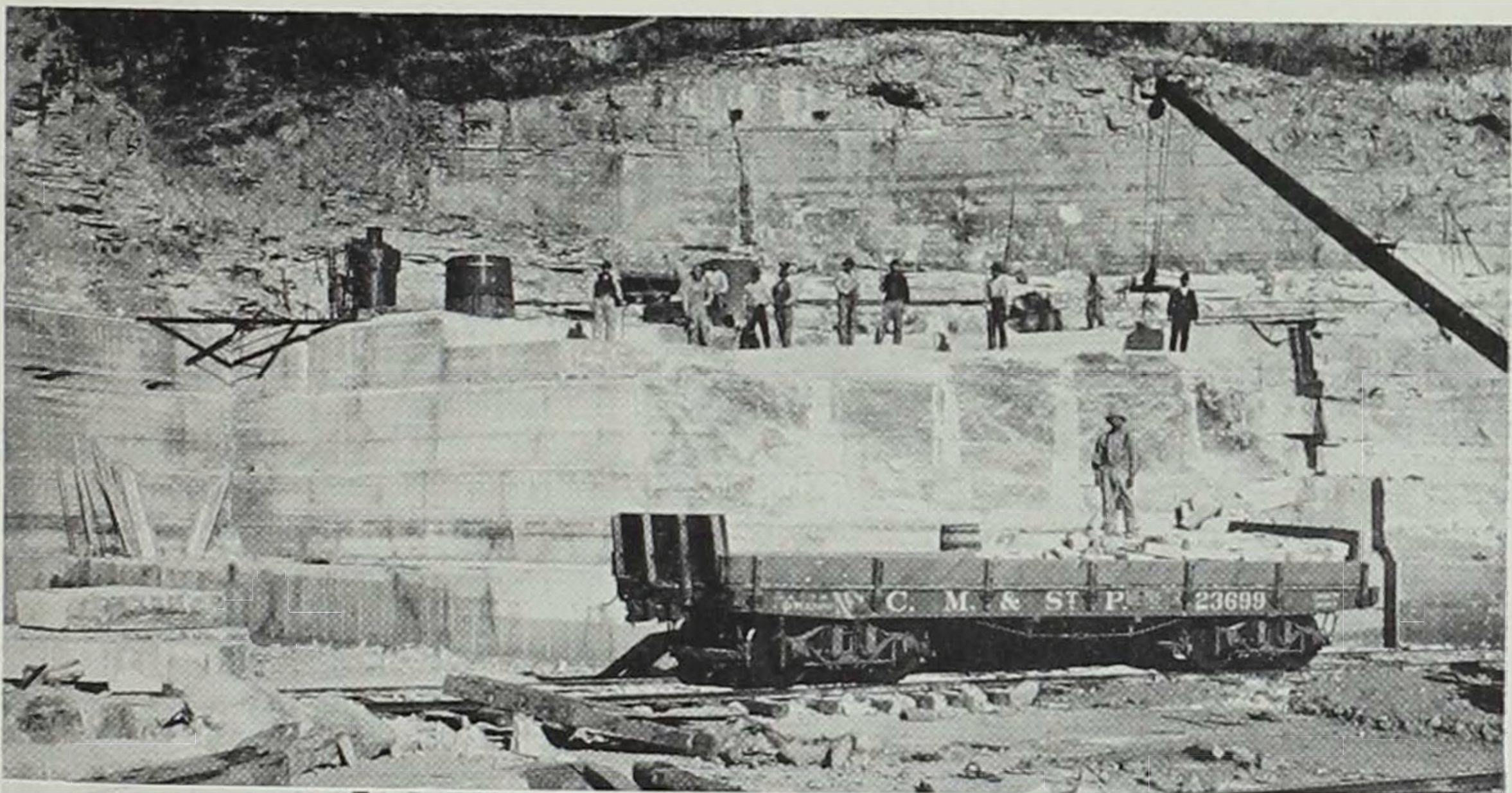
#### *Silurian Formations*

The next succeeding system, the Silurian, is also a variety of limestone. It forms all or a part of the surface bedrock in many eastern counties, including Jones, Delaware, Jackson, Cedar, Clinton and Scott. This has been one of the most actively quarried rocks of the state. Great quantities of building stone were secured from it, particularly from quarries in Jones County. Quarries were operated by penitentiary personnel at Anamosa for many years, and the stone widely used in public buildings, for walls and terraces. The lower courses of Botany Hall and Morrill Hall at Iowa State College are made of this stone, as are many buildings in state parks. Botany Hall bears the date of 1896. Wherever used, this so-called Anamosa stone can be recognized by its delicate stratification, which becomes particularly prominent upon weathering. It is still being quarried to some extent as a dimension stone, although its big use is in one of the crushed forms.

#### *Devonian Formations*

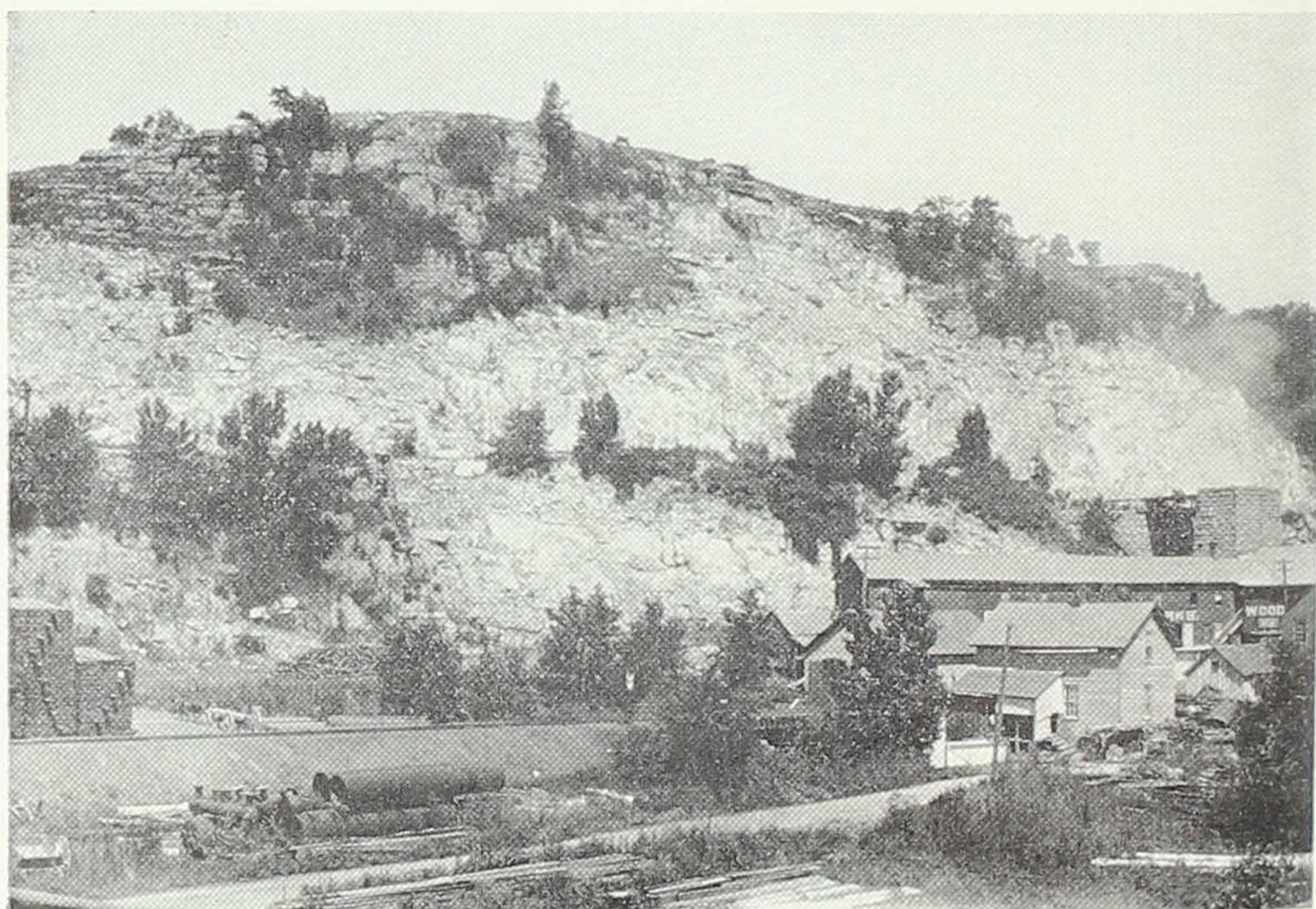
The formations of the Devonian system form the surface bedrock in a wide band, as much as



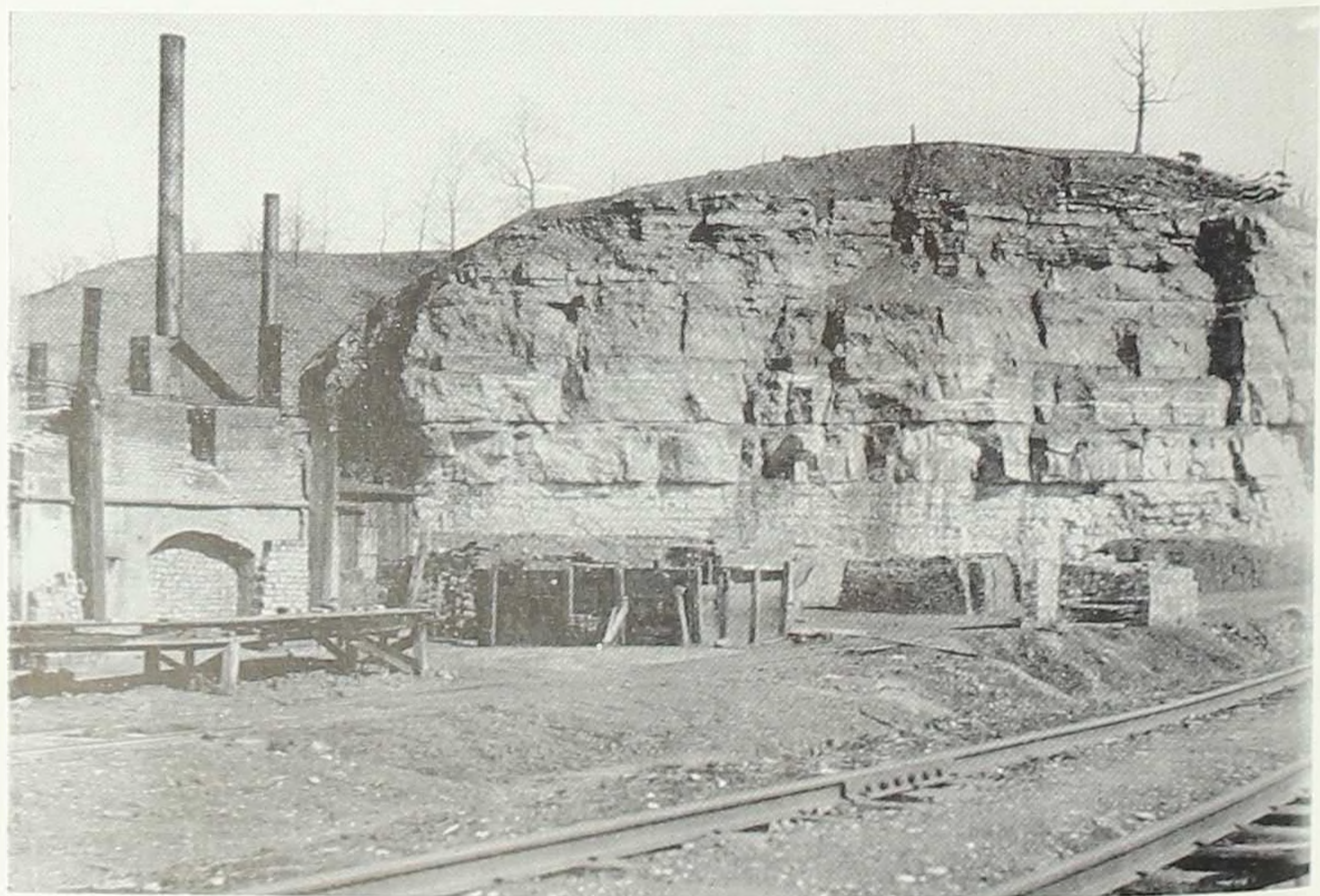


*Top: Stone City quarry, Jones County (Niagaran limestone).  
 Center: Champion quarry, Jones County (Niagaran limestone).  
 Bottom: Farley quarry, Dubuque County, Niagaran limestone).*





Eagle Point quarry, Dubuque County (Galena limestone).



Quarry near Burlington (Burlington limestone).





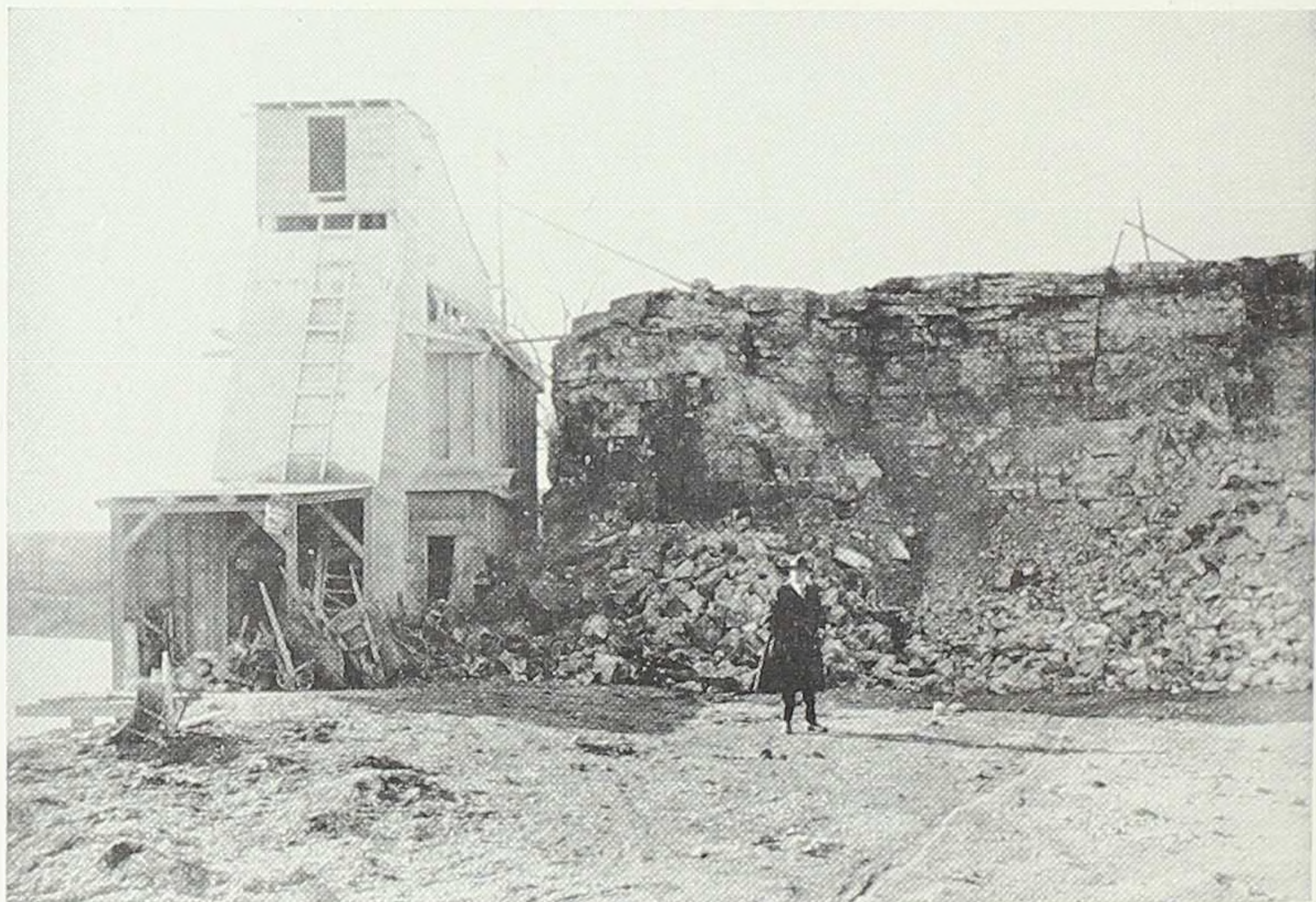
Hutchinson's quarry, Iowa City (Cedar Valley).



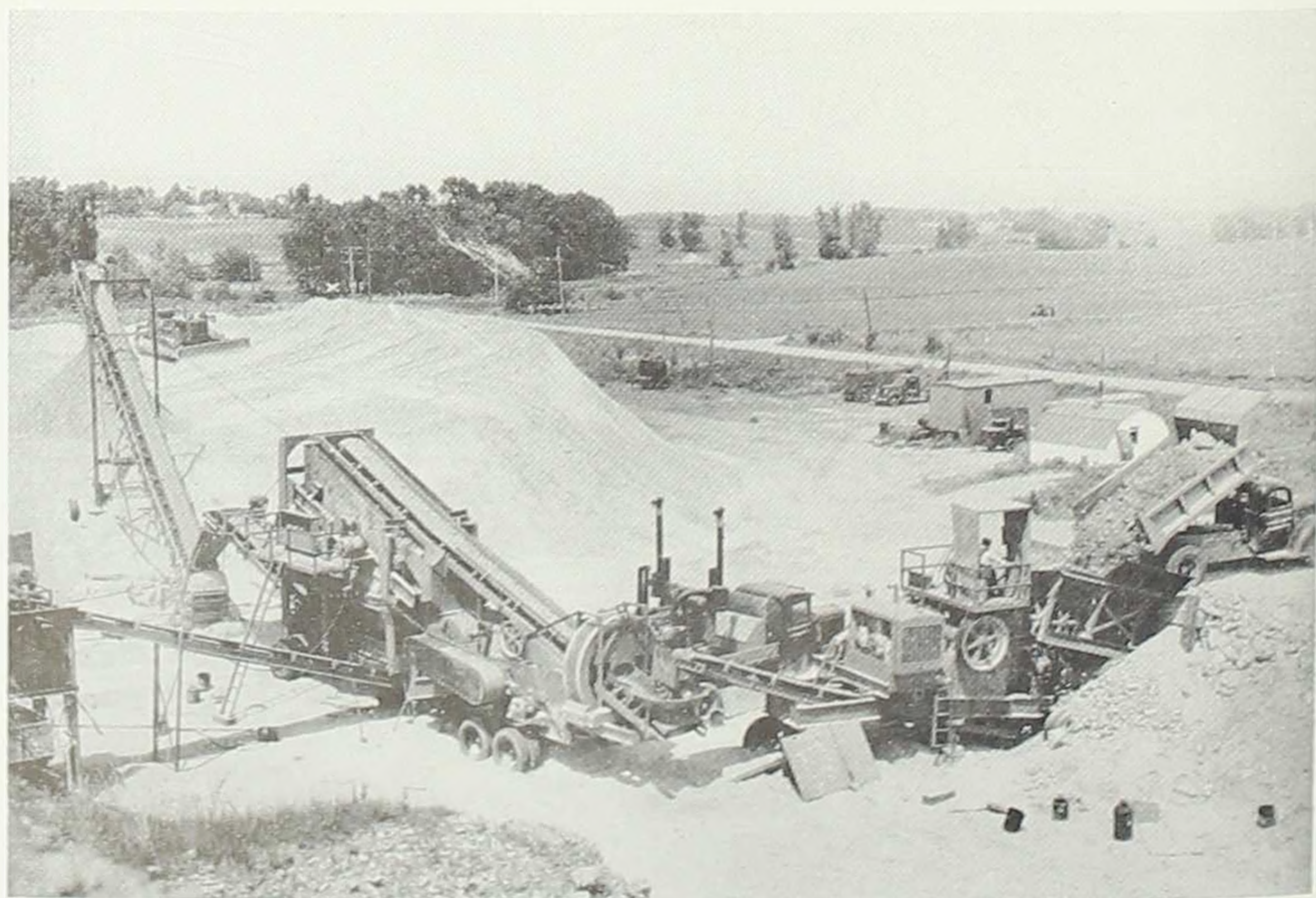
State quarry, Johnson County (State Quarry).



RIVER PRODUCTS COMPANY, IOWA CITY



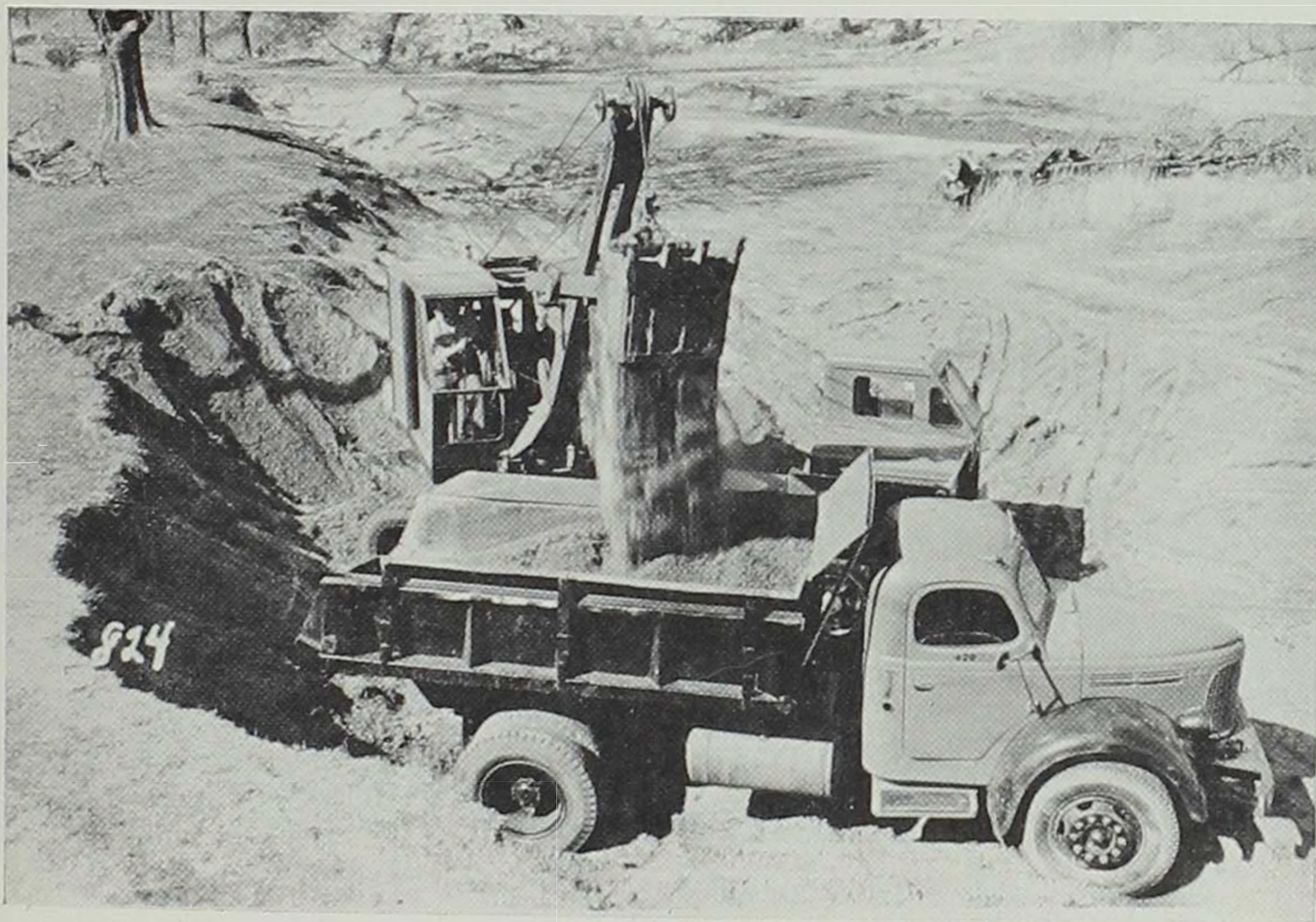
Old quarry when hand labor and wheelbarrows were in use.



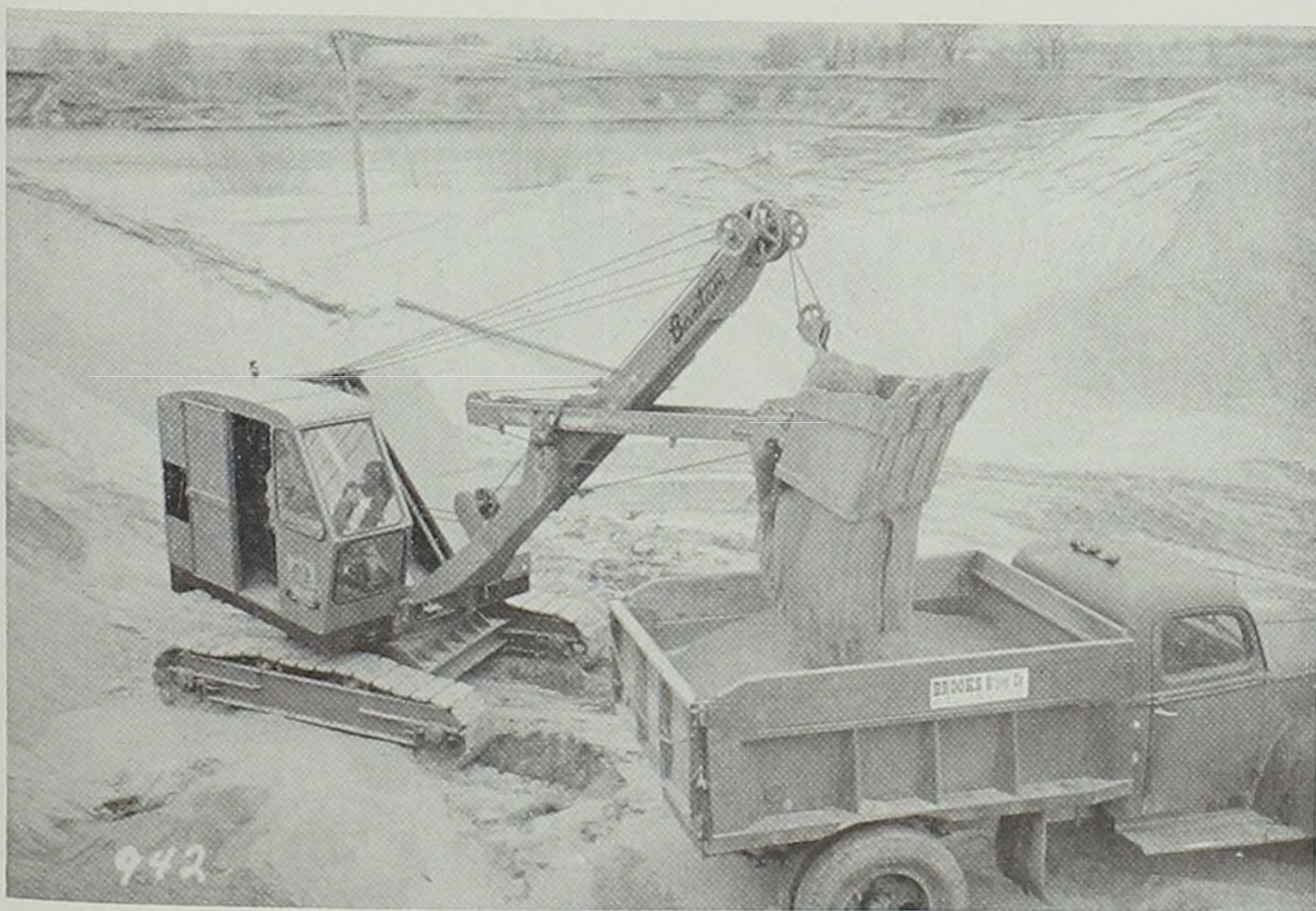
New quarry, showing modern mechanized equipment.



SCHILD BANTAM COMPANY, WAVERLY

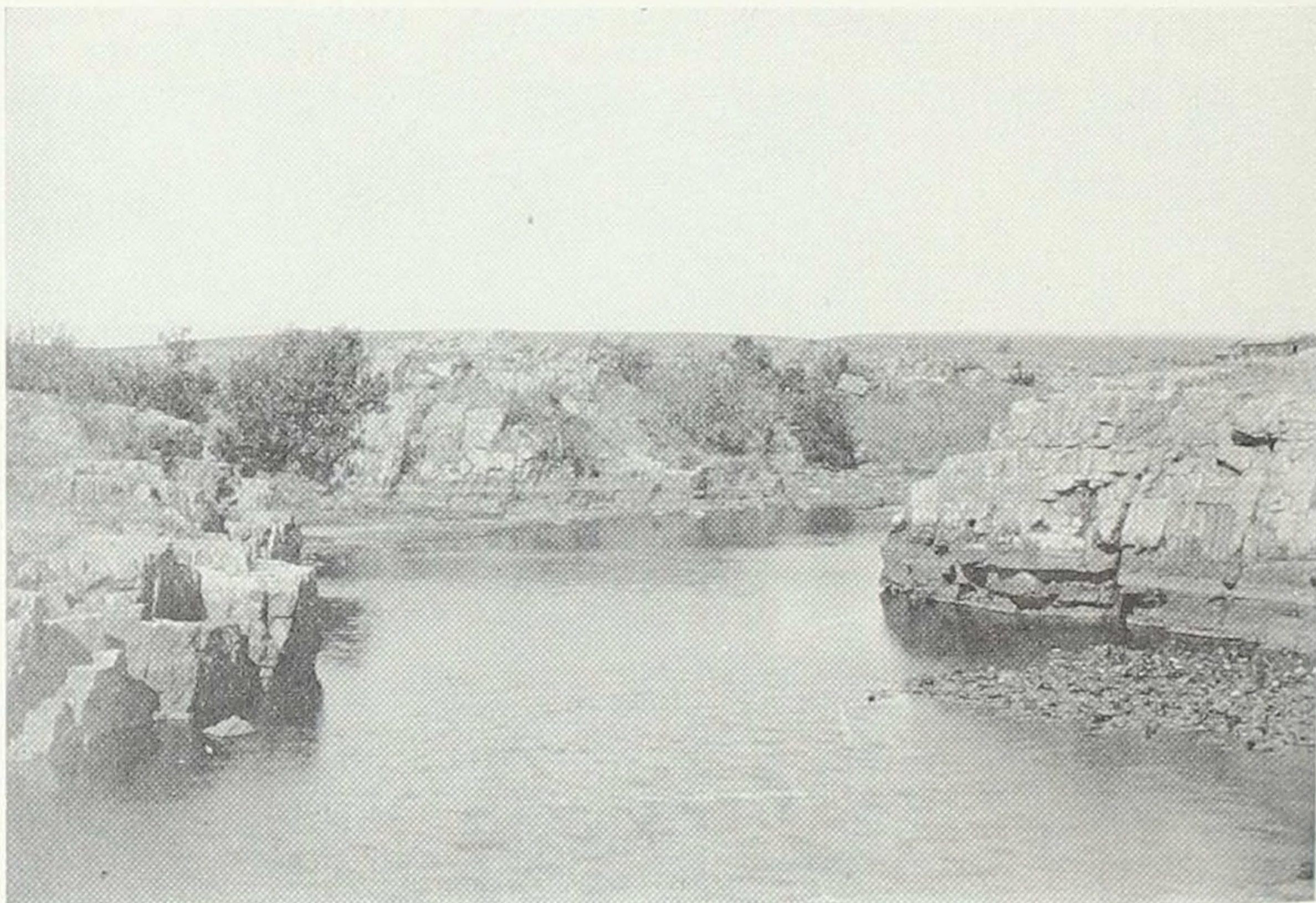


Excavator removing overburden on rock quarry.

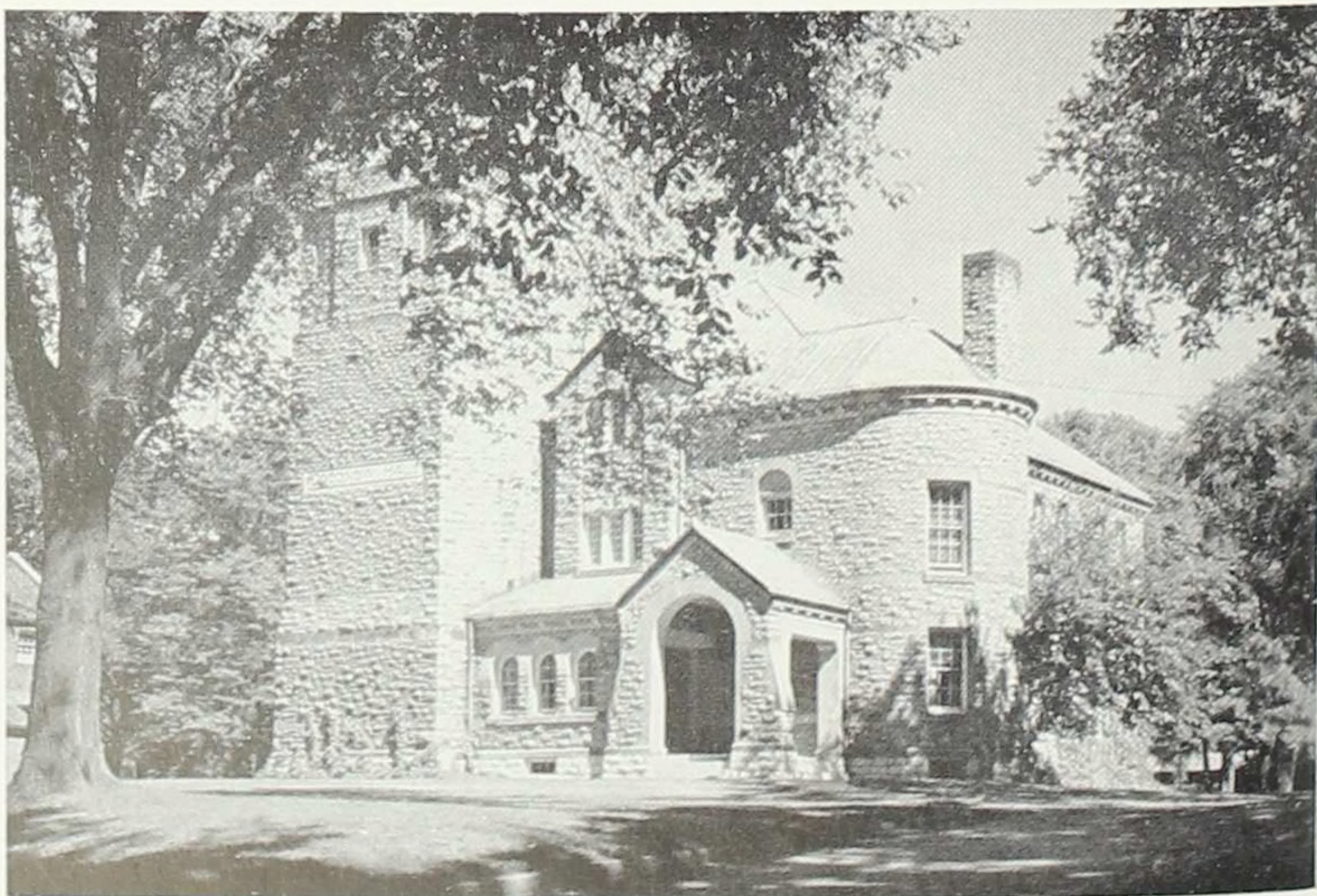


Shovel working in rock quarry loading stock-pile material.



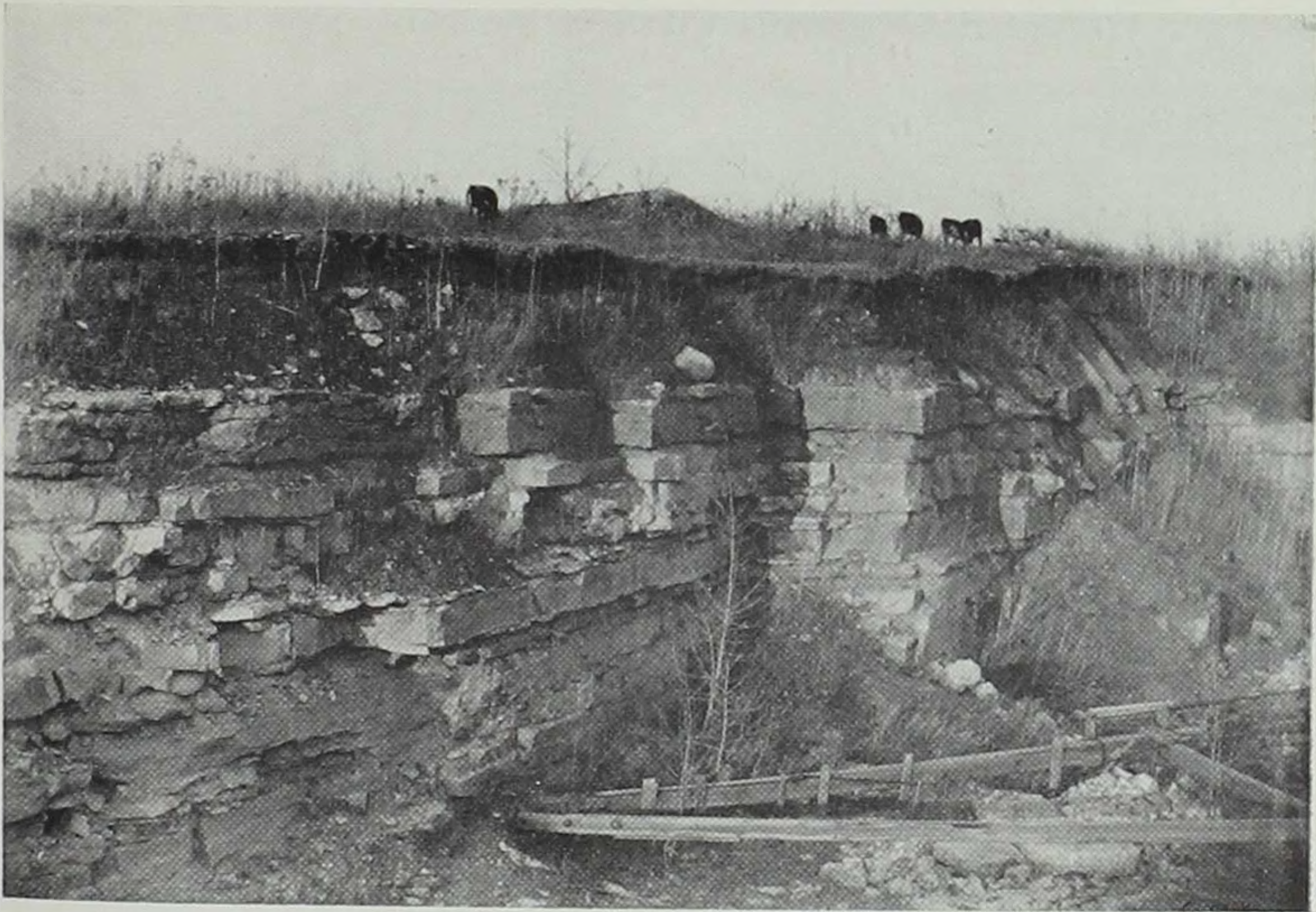


Jasper Pool, Lyon County (Sioux quartzite).



Goodnow Hall, Grinnell College, Grinnell (Sioux quartzite).





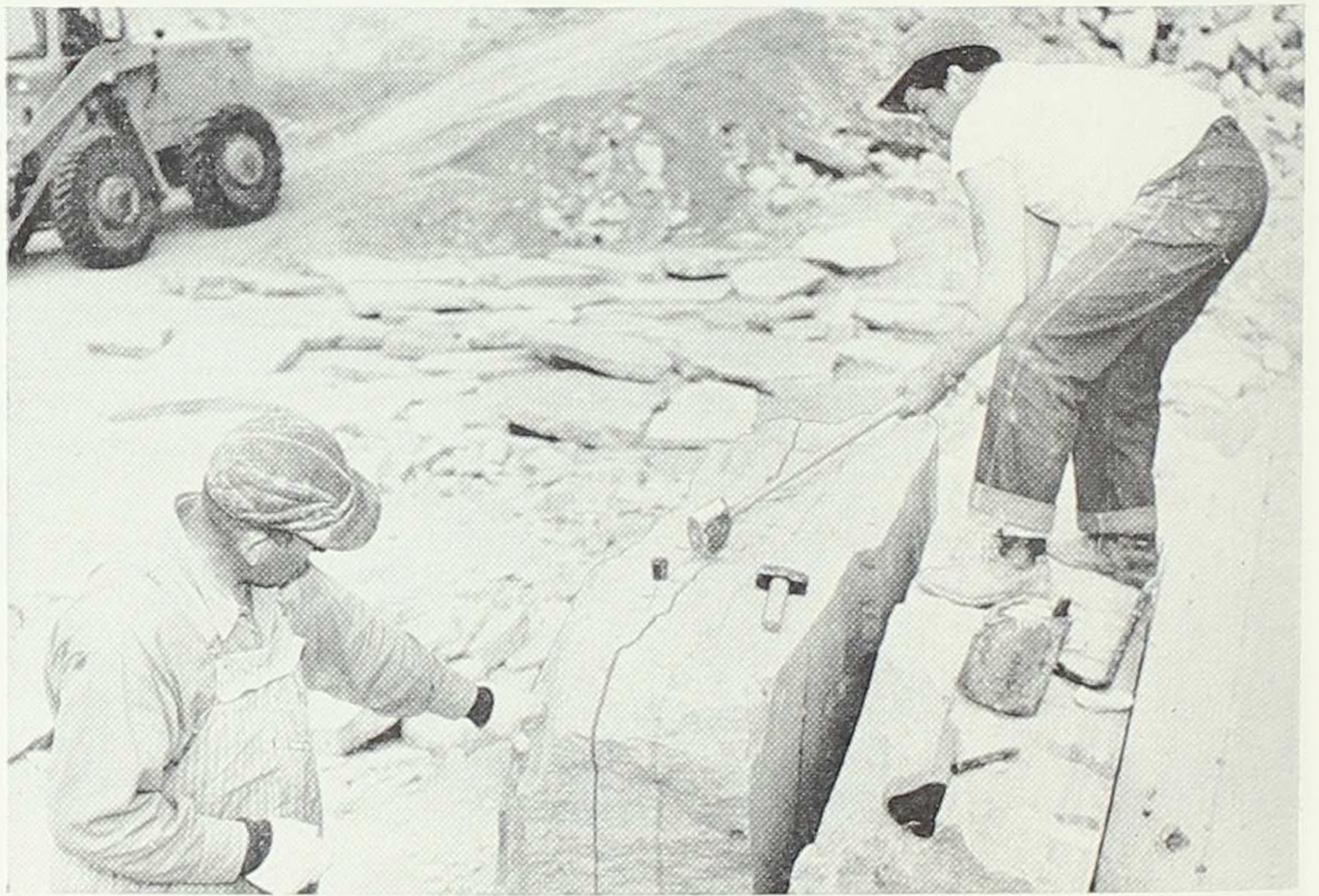
Quarry at Earlham, Madison County (Pennsylvanian).



Amana store, Amana (Pennsylvanian).



DEWEES-WEBER QUARRY, STONE CITY



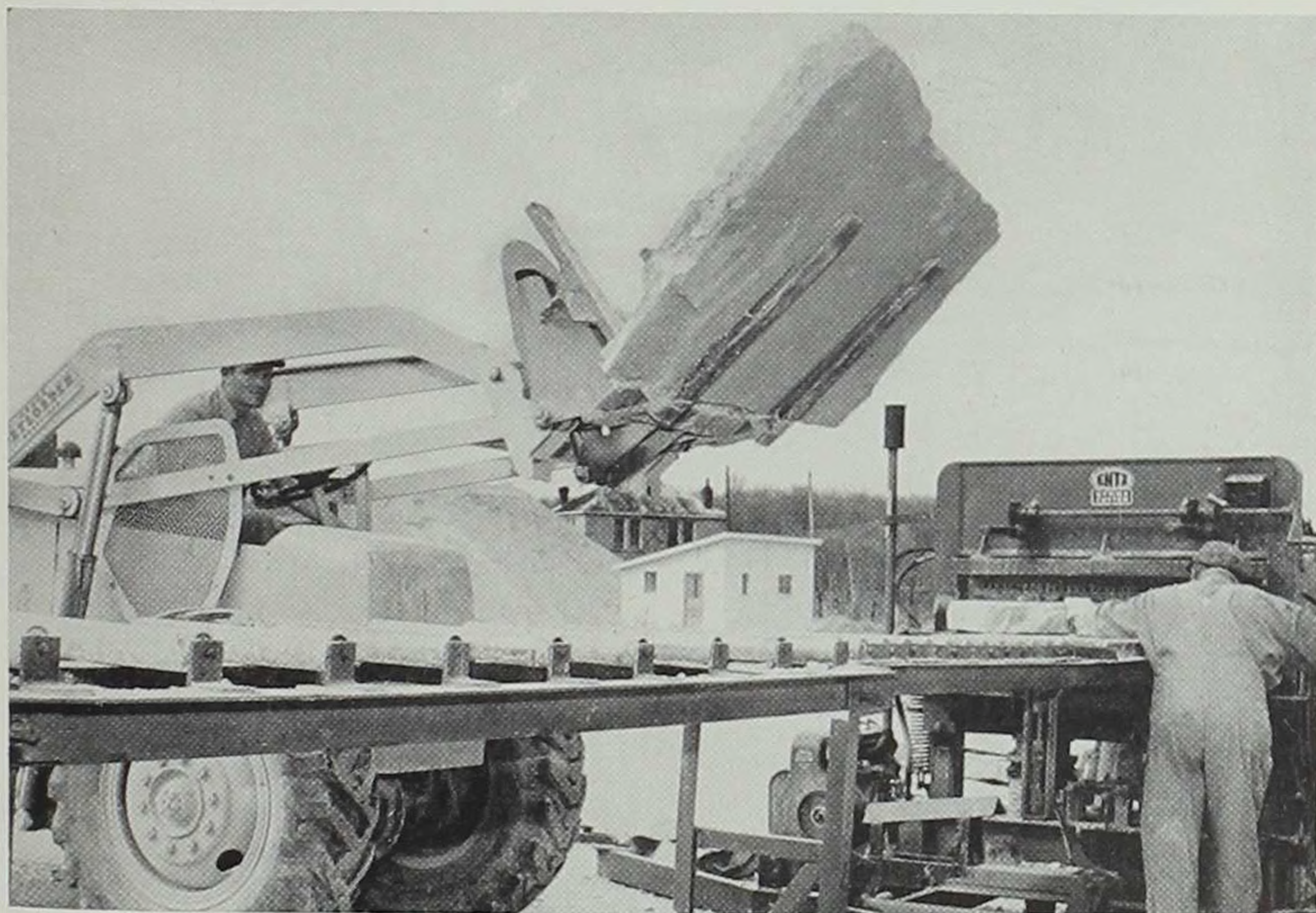
"Capping the rock." Chisels are driven into the soft layers of Anamosa limestone, breaking off the hard layers in a single slab.



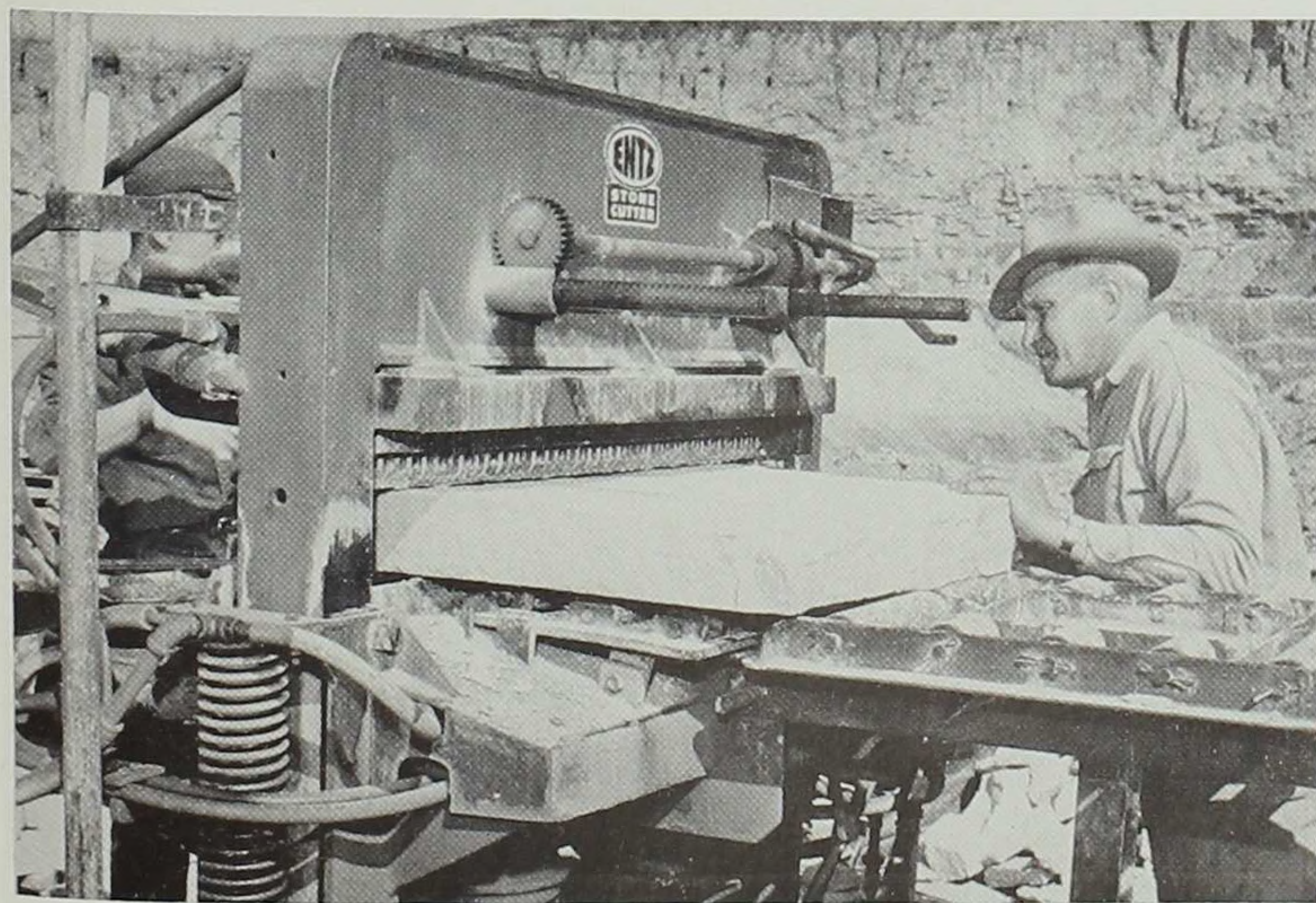
Slab of Anamosa limestone being lowered onto a fork lift.



## DEWEES-WEBER QUARRY, STONE CITY



Stone being lowered from the fork lift to the conveyor belt.



The conveyor carries the stone to this machine where it is cut into the desired size.



RIVER PRODUCTS COMPANY, IOWA CITY



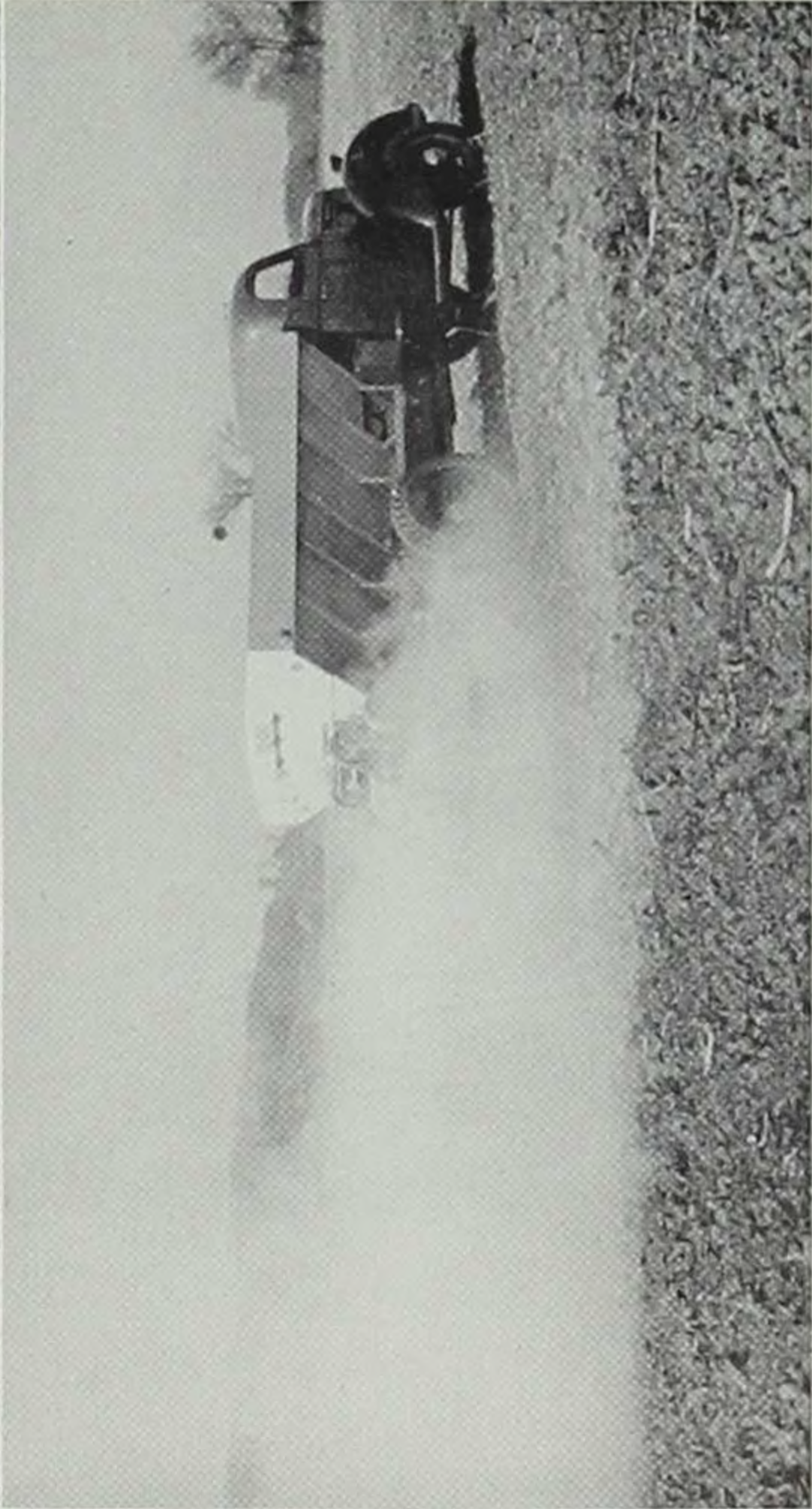
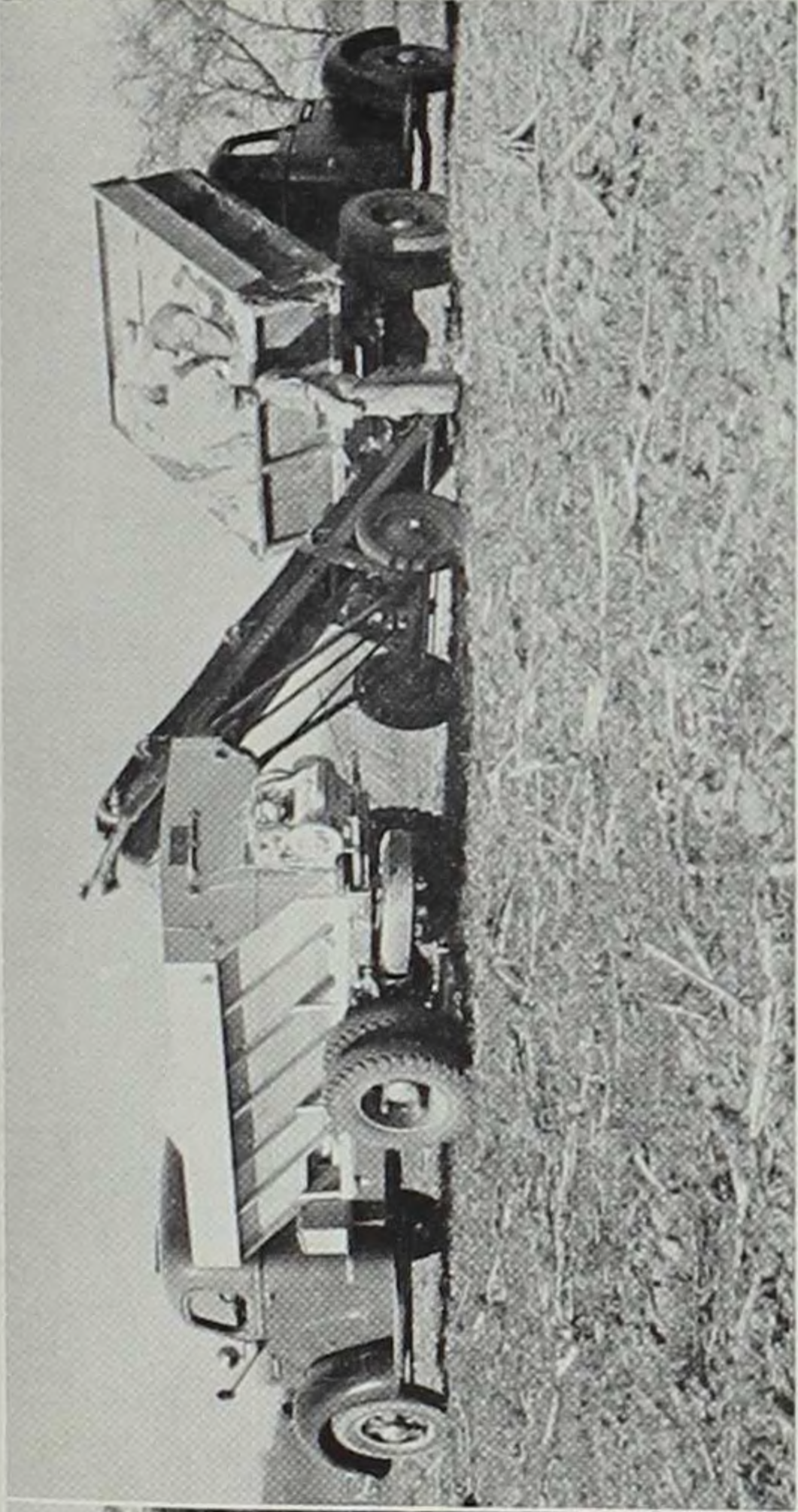
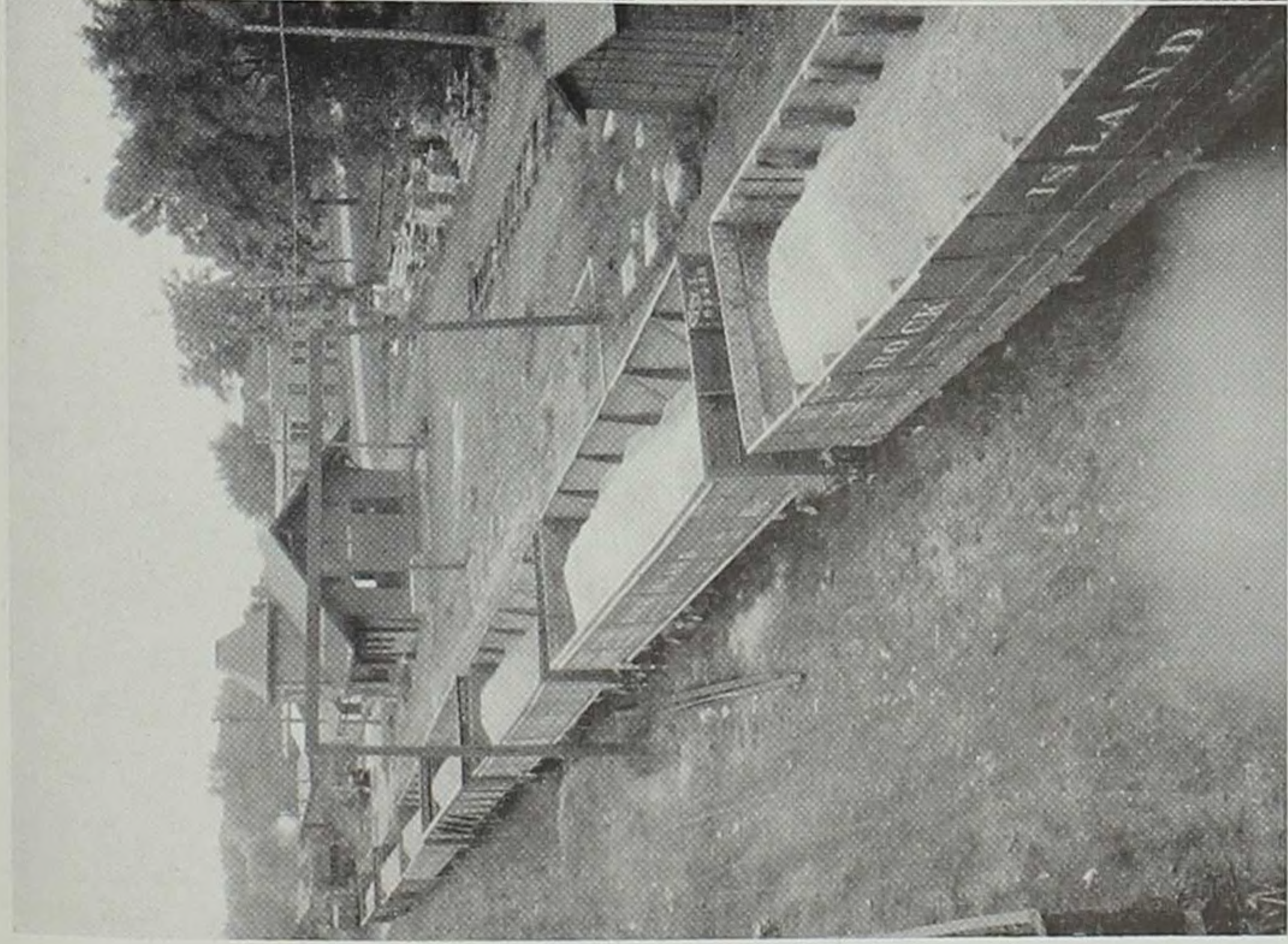
Explosives are set off in the rock; drilling machine at right of explosion.



The results of the blast. Broken stone is used in highway construction and for other commercial purposes.

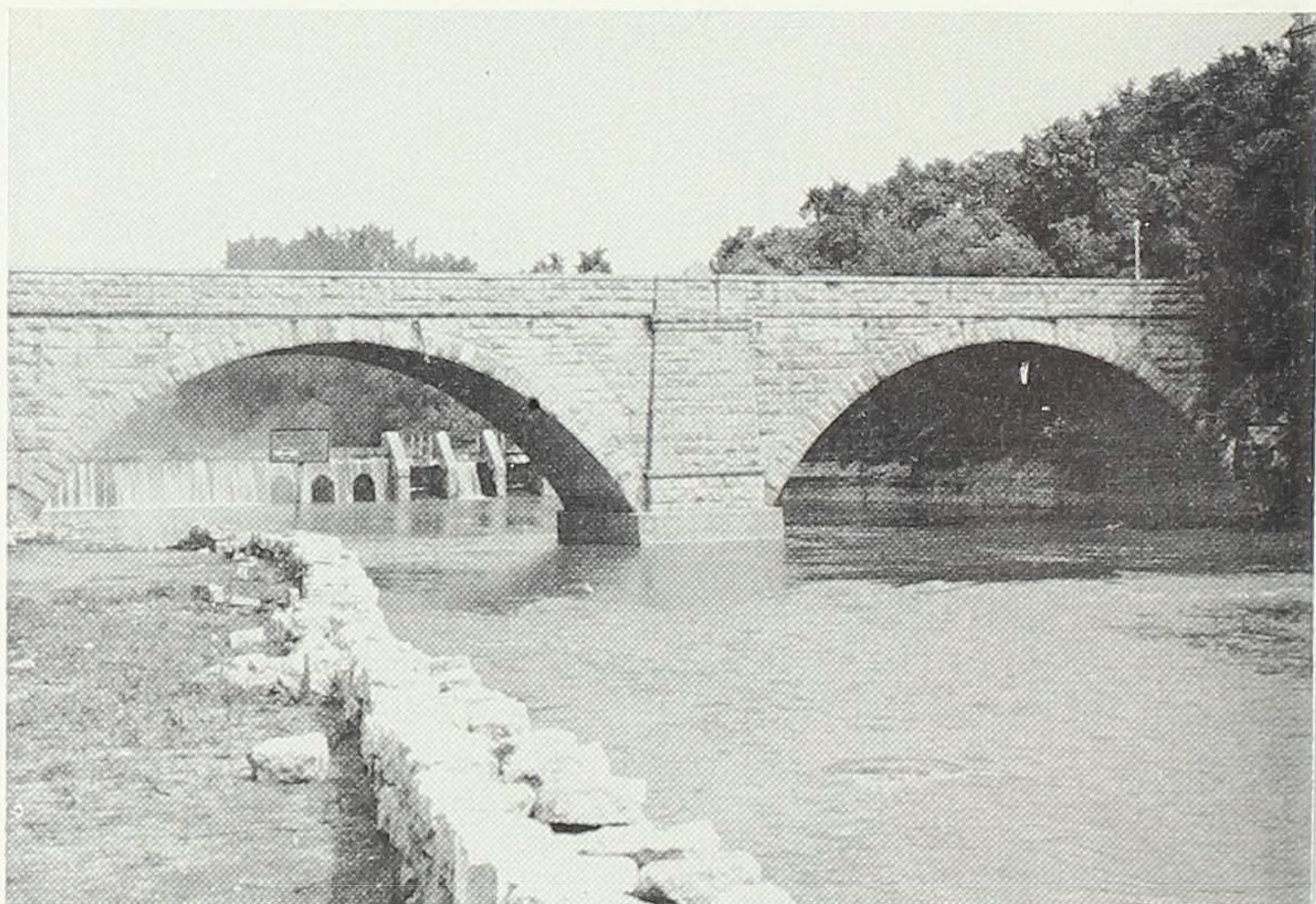


RIVER PRODUCTS COMPANY, IOWA CITY

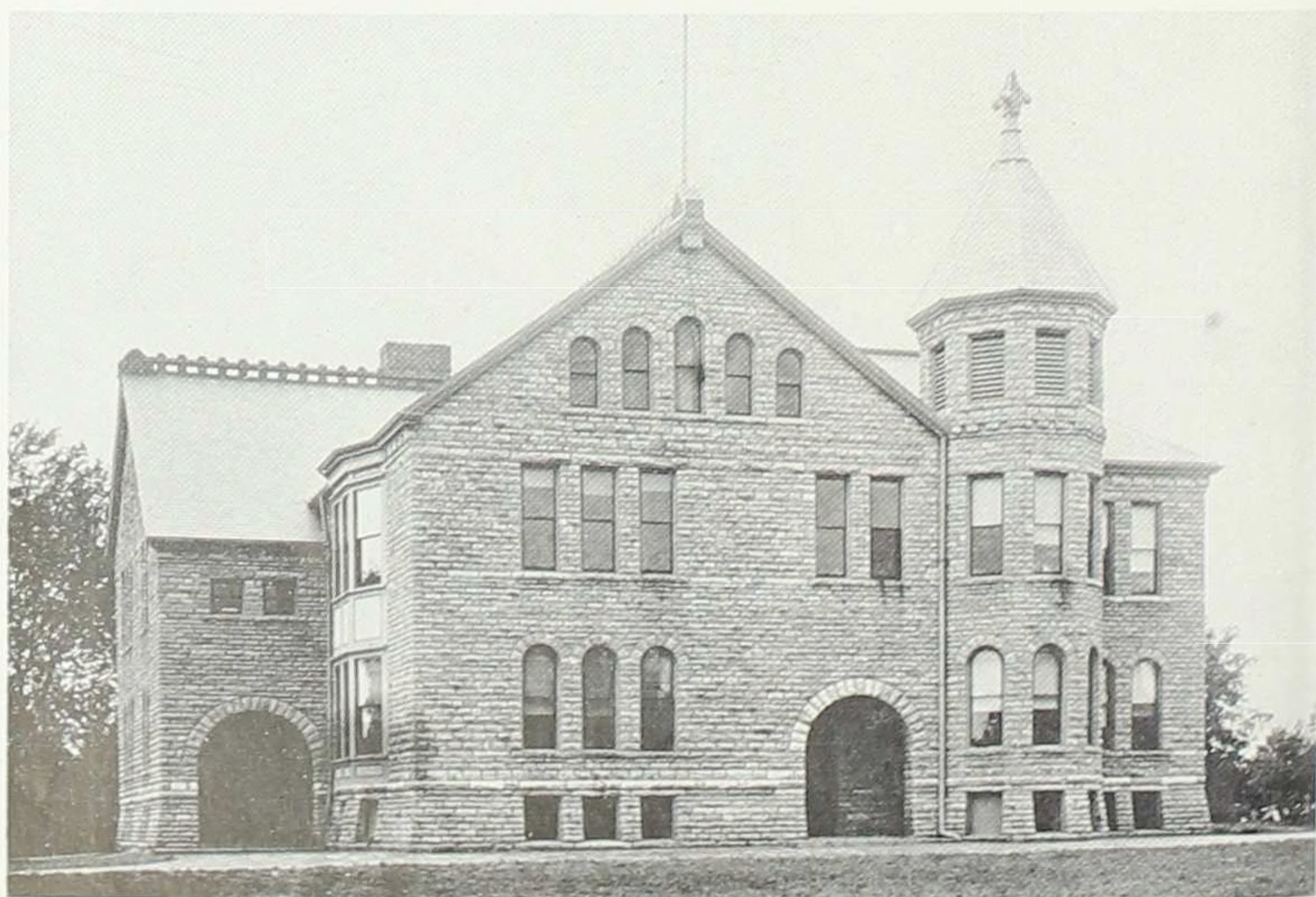


*Left:* Old method of transporting agricultural lime by rail.  
*Right, top:* New method of conveying agricultural lime by truck to a spreader.  
*bottom:* Spreading the lime on Iowa farm.





Elkader bridge, Elkader (Galena limestone).

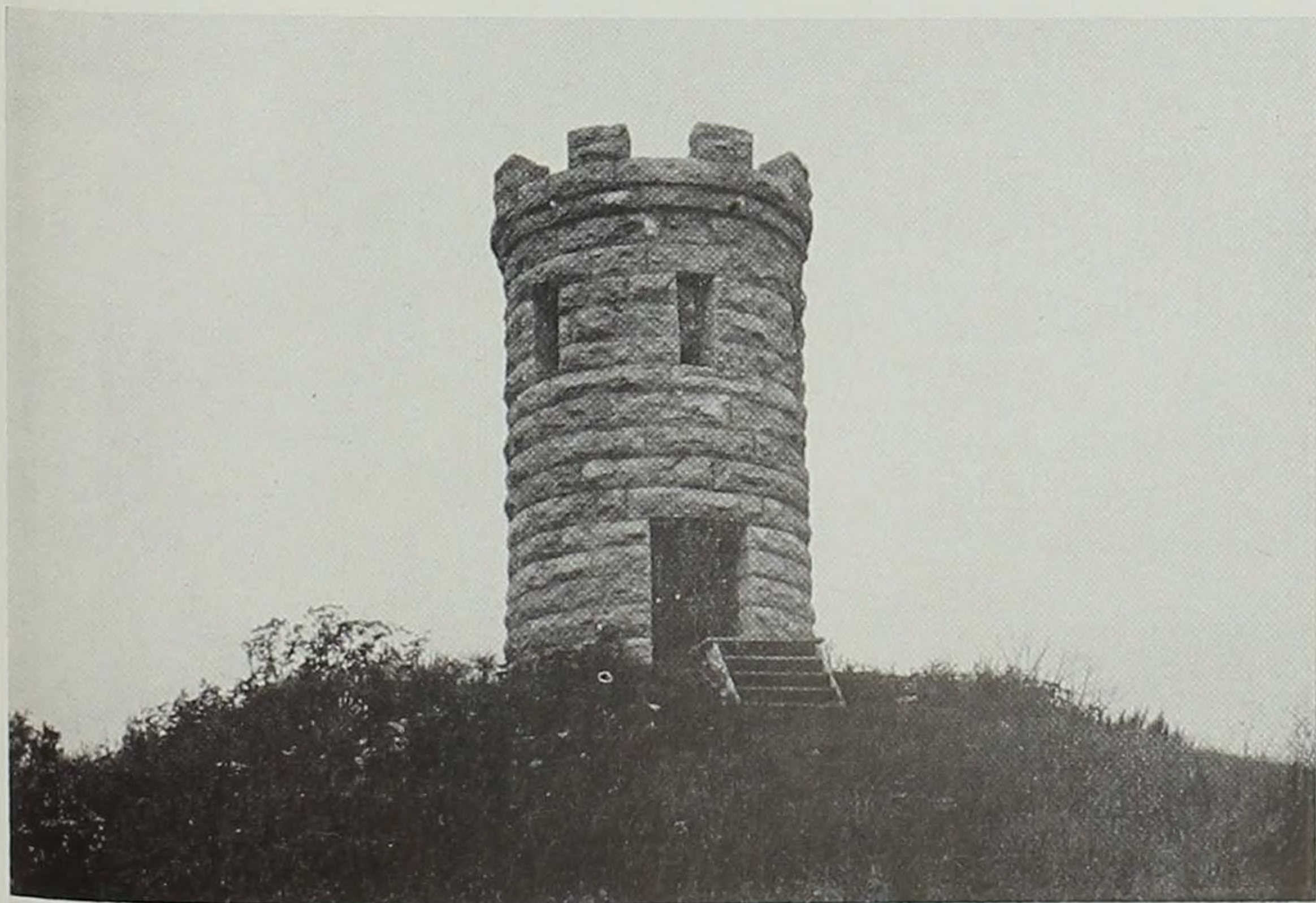


Humboldt school, Humboldt (St. Louis limestone).



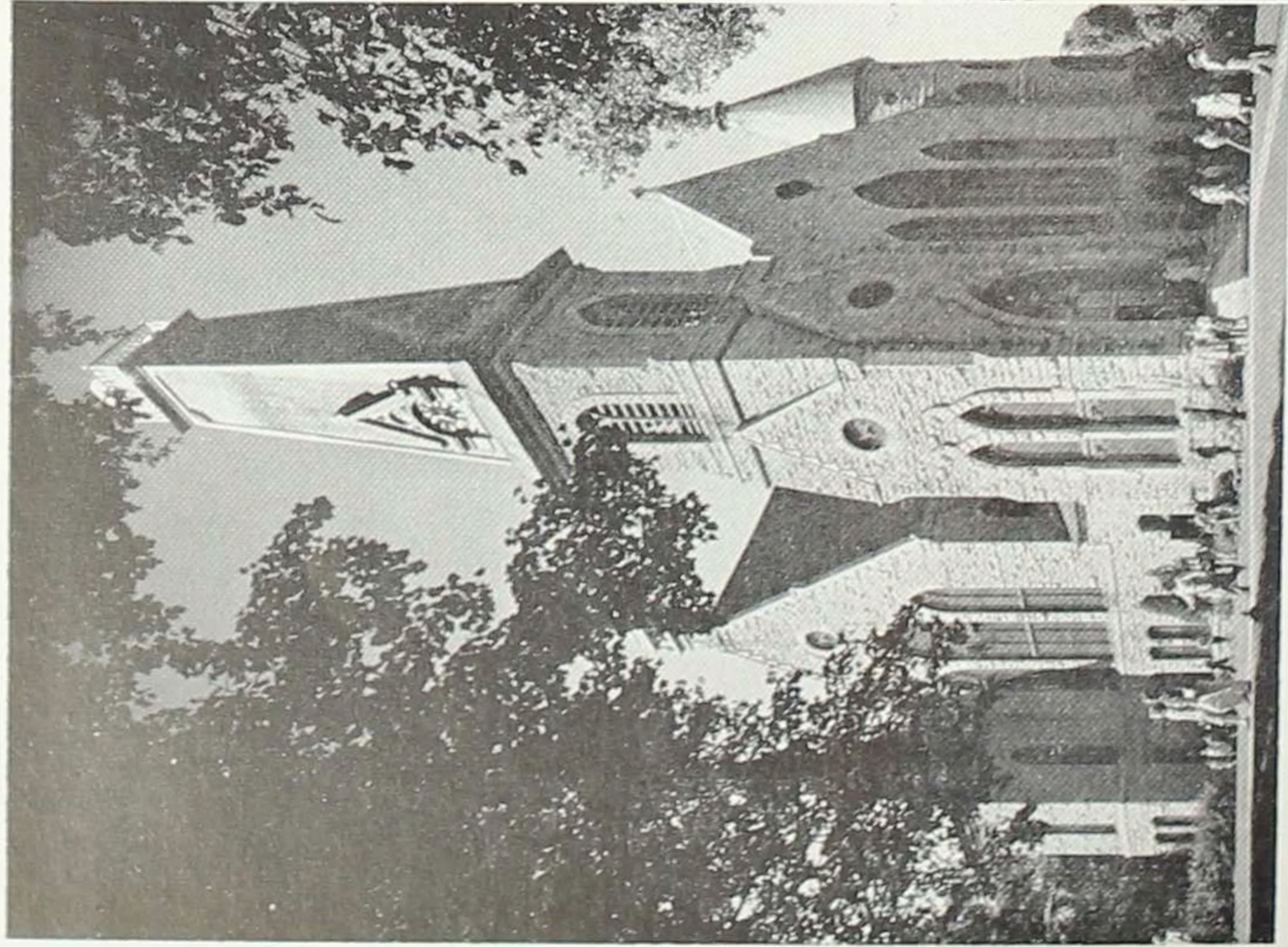


Old Capitol, Iowa City (State Quarry Beds).

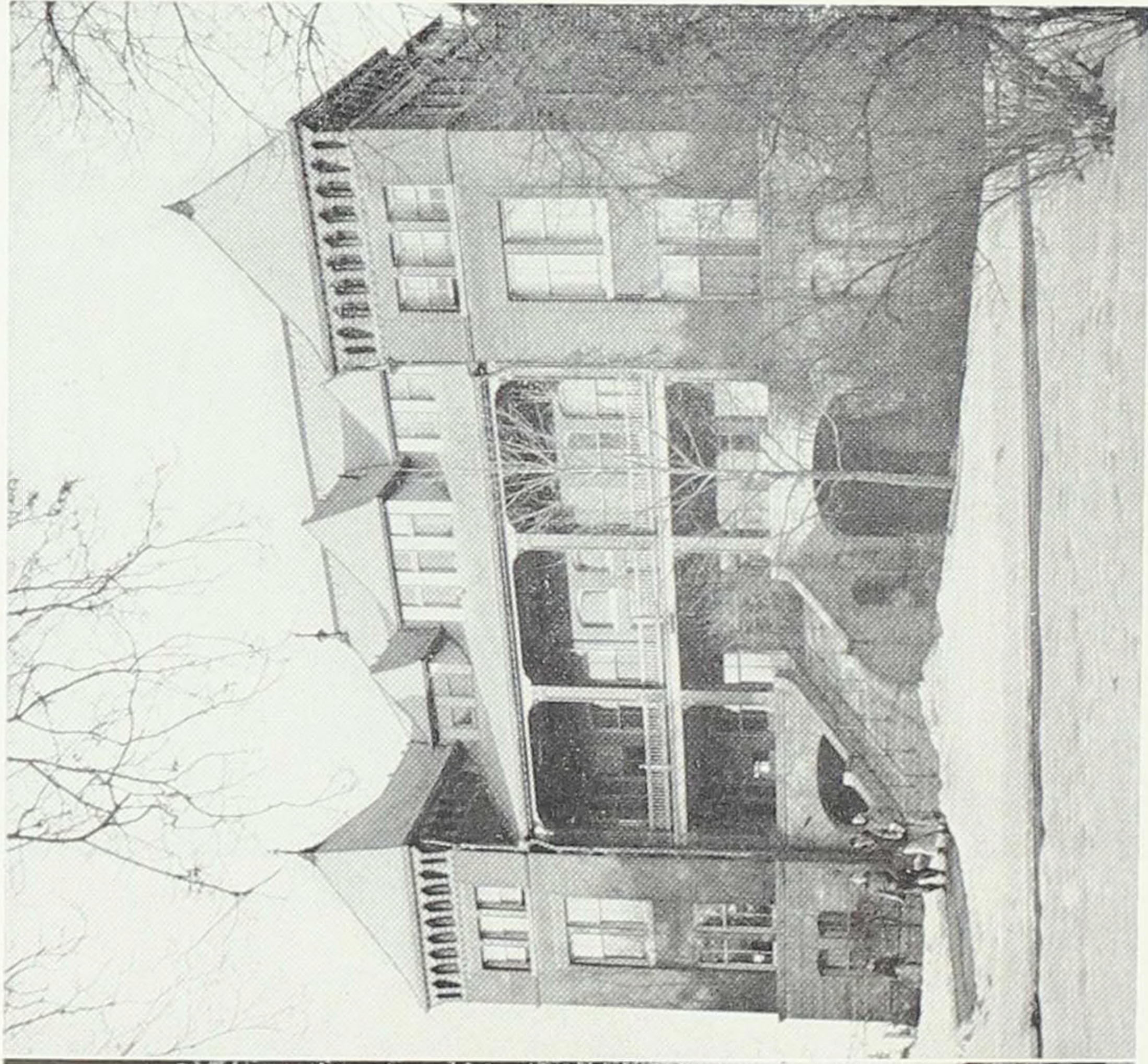


Julien Dubuque monument, near Dubuque (Galena limestone).



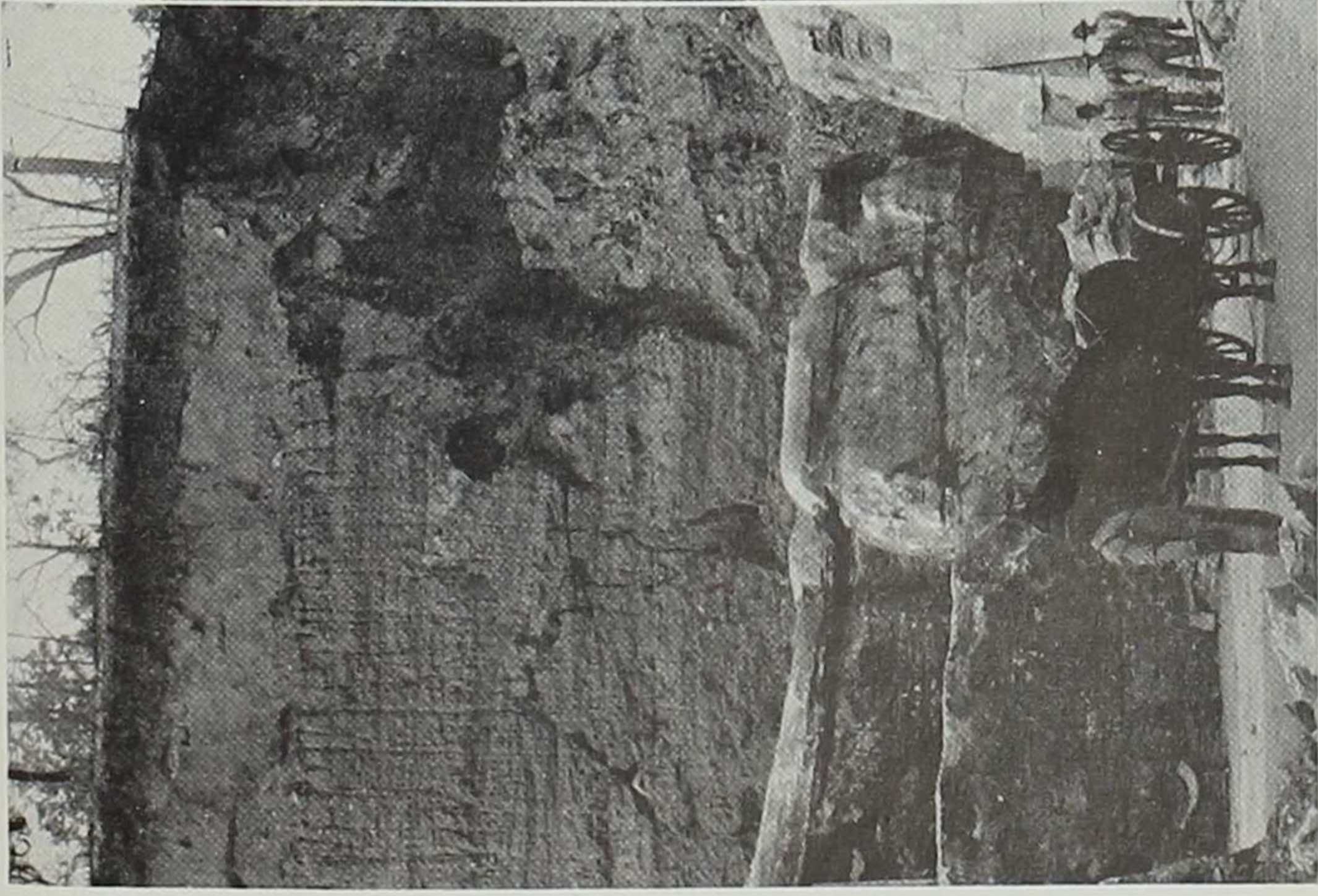


Cornell College chapel, Mt. Vernon  
(Niagaran limestone).

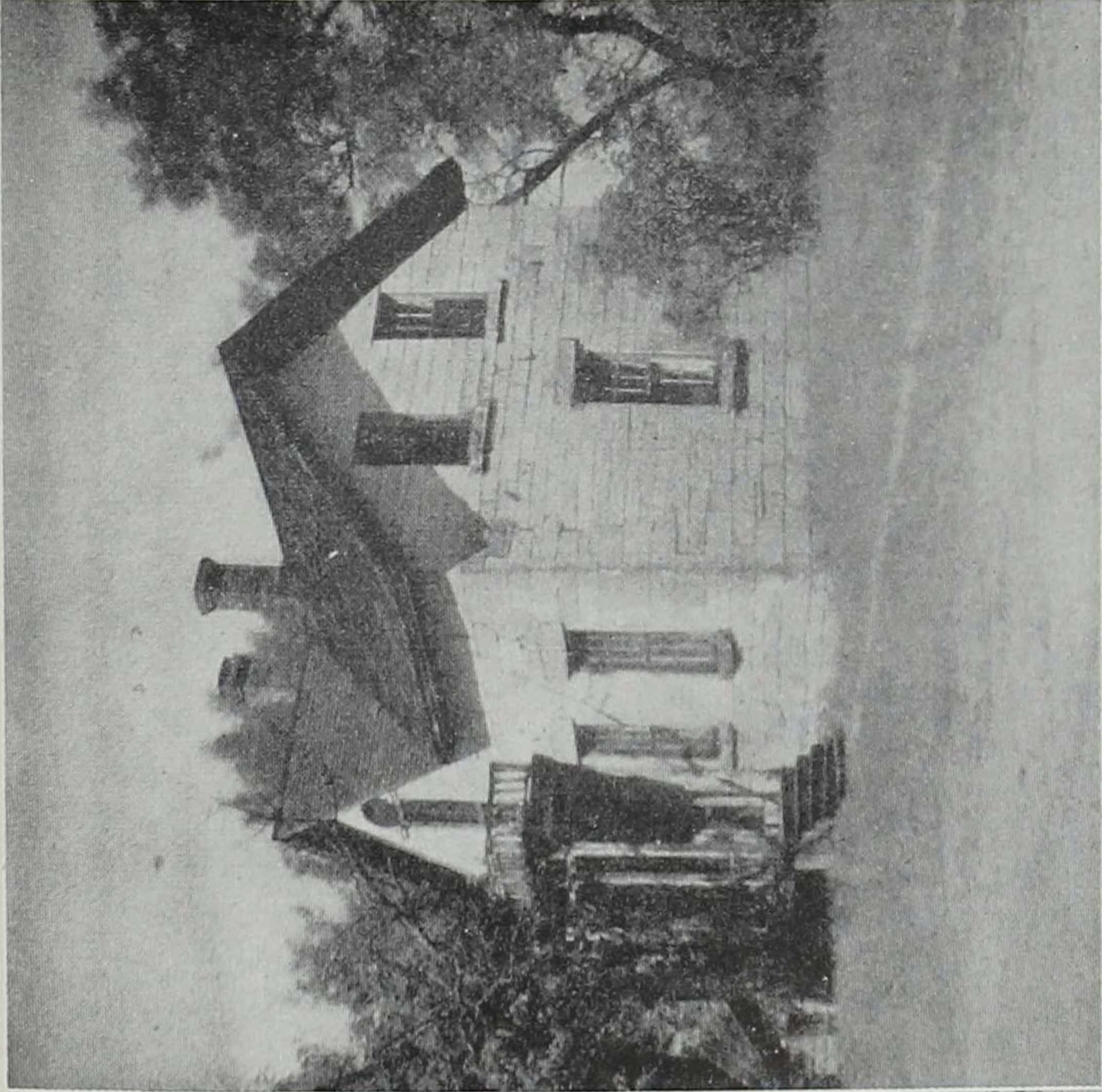


Botany Hall, Iowa State College, Ames (Niagaran limestone).



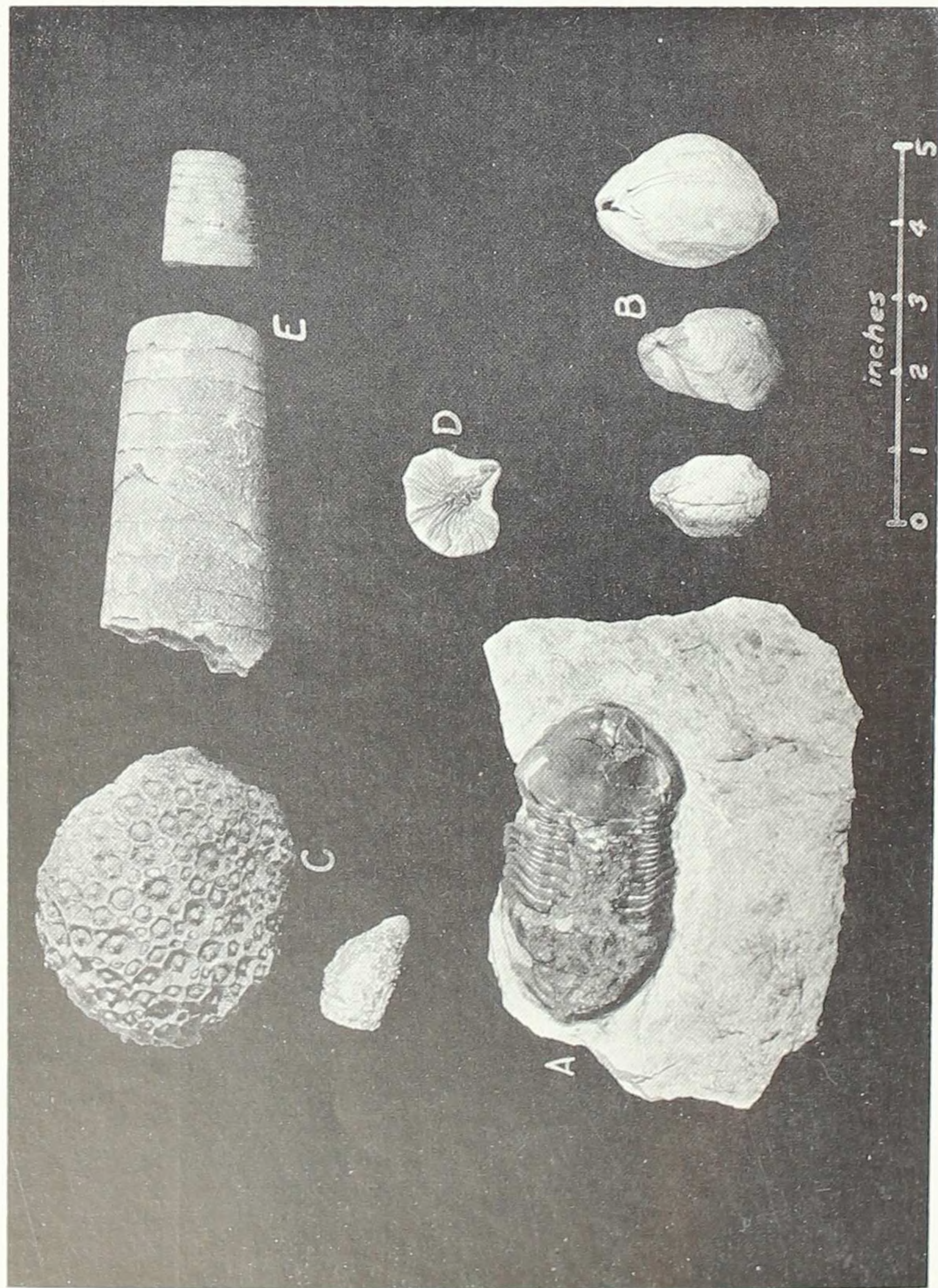


Gypsum bed, Fort Dodge (Fort Dodge).



Fort Dodge home, built of gypsum (Fort Dodge).





# FOSSILS FROM IOWA QUARRIES

- Fig. A Trilobite, from the Ordovician.  
 B Silurian brachiopods.  
 C Corals: a colony and a "horn" coral, Mississippian.  
 D Crinoid calyx, from Le Grand, Iowa.  
 E Parts of a cephalopod.



fifty miles in width in the north, extending from Winnebago County southwest to Muscatine County. There is much limestone in the system, and the Wapsipinicon and Cedar Valley formations have been extensively quarried for crushed rock. The large cement company quarries at Mason City get their rock from the Shell Rock formation of this system.

#### *Mississippian Formations*

Next higher in the succession is the Mississippian system, outcropping again in a broad band, up to approximately twenty-five miles in width, extending from Humboldt County in the north to Lee and Henry counties in the southeast. This system, with the maximum thickness of approximately 700 feet, also has much limestone which has been actively quarried and which is being quarried today, particularly for aggregate and roadstone. The Hampton, Burlington, and St. Louis are important limestone formations of the system. At Le Grand, there are notable large quarries, first opened almost 100 years ago. At the beginning, they produced building stone, then for many years crushed rock for use as railroad ballast. More recently, the production has been for aggregate, roadstone, and agricultural limestone. There are quarries in the Mississippian along the Skunk River north of Ames. Some stone has been used here from the earliest days, but there were no real quarries. Then beginning about



1935, a small quarry was opened. In 1939, the construction of the Ankeny ordnance plant was started, creating a great demand for roadstone. Other quarries were opened, and have continued production of roadstone and agricultural limestone through the years.

*Pennsylvanian Formations*

The rocks of the Pennsylvanian cover an area much larger than that of any other system. It includes most of the state south of the line extending northeastward from Harrison County to Webster County, thence southeastward to Lee County. In Iowa, the Pennsylvanian has a maximum thickness of about 1800 feet. Much of this is shale, but there is also limestone, particularly in the upper part, as well as sandstone and coal. The sandstone has been quarried as a building stone in some places, as at Red Rock on the Des Moines River. The limestone, more abundant in the upper part of the system, has been quarried in several places in the southern and southwestern counties. These quarries are operating today in the production of crushed rock. The extensive cement rock quarries in the vicinity of Earlham and Winterset produce from the Bethany Falls member. Other prominent producing limestone horizons are the Winterset, Marmaton, Oread and Deer Creek.

*Permian Formations*

Gypsum is the only material quarried from the Permian, all in the restricted area around Fort



Dodge. It is only because of the development of improved methods of removing the over-burden that it is now quarried rather than mined.

*Cretaceous Formations*

Finally, there is the Cretaceous system in the northwestern and western counties. This contains a soft chalky limestone which has recently been quarried for the production of agricultural limestone. The system also contains beds of conglomerate, a cemented gravel, which through weathering has reverted to the condition of gravel. This has been used for surfacing roads, and as aggregate, but the material has been secured from pits rather than quarries.

If space permitted, much could be told about the beginnings and development of quarrying at particular places. In his Iowa geological report of 1870 surveyor Charles A. White stated: "The quarries that have become most noted and from which large supplies of good material for distant transportation may be obtained are those of Anamosa, Johnson county, Le Claire, Le Grand, Keokuk, and Farley. . . . There are, of course, hundreds of other quarries in the State that are locally almost invaluable."

*Dubuque Quarries*

There are many interesting stories of the first quarry, of changes, perhaps of long-continued operation, or of gradual cessation. The river towns in particular all have their quarries which



have operated at one time or another. Dubuque, for example, has a long record. Quarrying of the abundant limestone in the vicinity must have started shortly after 1840. The Eagle Point Lime Company was quarrying rock from the Galena formation at Dubuque in 1899, and there were probably quarries at the location from the days of early settlement. Other important quarries in the city at the opening of the century were on Dodge and South streets, Eighth Street, Fourteenth, and at the crossing of the North Cascade Road and the Illinois Central Railroad. The Dodge Street quarries were those of Tibey, Burns and Saul, and James Rowan. Quoting from Volume 10 of the *Iowa Geological Survey Annual Report* (1899): "Throughout the city, and indeed throughout the area of the Galena, there are numerous other openings which from time to time are worked for stone." More recently, the Dubuque Stone Products Company operated the large quarry at Eagle Point, but this also is now abandoned.

*Jones County Quarries*

The great importance of the quarrying industry in the Silurian area has already been noted. Here again, much more might be said of eastern Iowa. Let us take Jones County as an example. As the early settlers came in, the cliffs along the Wapsipinicon River west of Anamosa attracted attention. The stone is in beds, not too thick, with relatively thin overburden, and relatively easy to



quarry. Even before Iowa became a state in 1846, the U. S. Army had used stone from this locality in the construction of military roads. In 1852, stone was hauled from the vicinity of Stone City and used in the construction of the first buildings at Cornell College. Between 1859, when shipments by rail began, and November, 1895, over 150,000 cars went out over the railroads. At \$20 per car, this had a value of more than \$3,000,000. The stone was shipped to all six states bordering Iowa, and the important railroads in the northwest used it extensively in the construction of bridges. Many of the early buildings at the Rock Island arsenal were made of it.

The Stone City quarries, owned at the turn of the century by H. Dearborn and Sons, were opened by H. Dearborn in 1869. Others, by name, toward 1900, were the Anamosa quarry, the first to ship by rail; Champion quarry No. 2, opened by Crouse, Shaw, and Weaver in 1866; John-ellen quarry, opened by J. A. Green in 1887. Stone for the penitentiary buildings at Anamosa first came from Champion No. 2, later from the State quarry, also in the Stone City area.

#### *Cedar County Quarries*

Cedar County was another center of quarrying activity in the Silurian area. The Gladfelter quarry at Cedar Valley, opened in 1887, was among the earliest in southeastern Iowa producing rock for the manufacture of lime. Another was



that of the Sugar Creek Lime Company at Lime City, opened a few years later. Building stone also was produced from these quarries.

In 1883, J. C. Bealer, "who as a practical bridge architect saw the great value of the stone at this point for bridge piers and all heavy masonry," (*Iowa Geological Survey Annual Report*, Vol. 11, p. 378, 1900), had opened the Bealer quarry at Cedar Valley, on the right bank of the Cedar River. In 1906, his quarries were reported as "the most noteworthy in Iowa, and among the largest in the Mississippi Valley."

The village of Cedar Valley developed around these quarries. Other quarries in operation in Cedar County in 1892 were McLeod's on the west bank of the Wapsipinicon, below Massilion; Frink's on Mill Creek north of Clarence; Burrough's on Rock Creek west of Tipton; Wallick's on a tributary of Baldwin Creek; Hecht's on Mill Creek north of Clarence; Cary's southwest of Tipton on Rock Creek.

#### *Quarries in the Devonian Area*

Several of the larger and older cities of the state, among them Waterloo, Mason City, Cedar Falls, Cedar Rapids, and Iowa City, are located in the Devonian area, and it can be accepted that quarries sprang up in the vicinity of each, as they were settled. The large quarries of the cement companies at Mason City were somewhat later in development, the Northwestern States Portland



Cement Company going into operation in 1908, the first in Iowa for cement rock, and the Lehigh Portland Cement Company in 1911. Farther south, there were many quarries operating in the vicinity of Iowa City long before the 1890's. The State quarry, located on the Iowa River a few miles northeast of North Liberty, supplied most of the stone for the Old Capitol at Iowa City.

*Des Moines County Quarries*

Des Moines County may be taken as an example of one area wherein Mississippian limestones were actively exploited in an early day. In 1893, every township was reported to have quarries supplying stone for local use, the largest in the vicinity of Burlington. There was a group of quarries taking stone from what was then the end of Division Street, including the Larin quarry at the corner of Amelia and Claim, the Hoppman quarry at the corner of Maple and May, the City quarry near Maiden Lane and Seventh, and the Loftus quarry at the corner of Seventh and Maple streets. These all had their beginnings during the later years of the last century.

*Madison County Quarries*

The lower part of the Pennsylvanian system is one dominantly of shale, sandstone, and coal, with only small amounts of limestone. It is the upper part of the system that supplies the limestone quarries of the south-central and southern parts of the state. Many of these are relatively late-