

University of Texas Bulletin

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Bureau of Economic Geology and Technology
J. A. UDDEN, Director

TEXAS GRANITES

BY

J. P. NASH

Testing Engineer, Bureau of Economic Geology and Technology



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Plate 1. Texas State Capitol Building, Austin. Built with red granite from Granite Mountain, Burnet County.

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The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston

Cultivated mind is the guardian genius of democracy. . . . It is the only dictator that freemen acknowledge and the only security that freemen desire.

Mirabeau B. Lamar

TEXAS GRANITES

By J. P. NASH.

It has been said that the granite deposits in the central part of Texas contain more varied and serviceable granite than any equal area in the United States. While this is perhaps a debatable statement, it is certain that there is a wide range of colors and textures from which it is possible to obtain granite for almost any purpose for which that stone is now used. This material is found in the central part of the state, principally in Burnet, Llano, and Gillespie counties. The development of the granite quarrying has been rather slow, due to the fact that, for the most part, the material is located at considerable distance from the railroad; and also because of the lack of capital. In the case of the gray granites, the most accessible quarry is 6 miles from the railroad, while others are as much as 12 miles distant. The coarse-grained red and pink granite deposits are somewhat more fortunately distributed, being within close proximity to a railroad, but these are perhaps the least desirable of all the granites for monumental and building stones.

The coarse-grained red granite is the most widely known, and to many this rock represents the typical Texas granite. It is true that more of this stone is produced in one year than of all other Texas granites, to date. This is a coarse red and pink granite, hard, and with a high resistance to compression. While it has been used for building and monumental work, the chief use to which it is now put is for Government jetty work along the Gulf of Mexico. Thousands of tons have also been used in the construction of the Galveston sea wall. It is admirably suited for this purpose, being heavy and highly resistant to the corrosive action of sea water.

The gray granites are of varying shades and textures, but the only types now being worked are the rather fine-grained light and the dark gray stone. Their chief use at the present time is

for monuments, for which purpose they are well suited. For polished surfaces for inscription, they are especially suited, as the lettering shows in remarkable contrast. These gray granites are comparatively easily worked; at least as easily as the average granite in the United States. The grain of the stone is finer than the average Barre stone, and somewhat coarser than the finer-grained granite from Quincy, Mass. The Texas gray granites are said to be equal, if not superior, to the eastern granites, but it is necessary that they be selected with some care. This is due to the fact that most of the stone already taken out has been from close to the surface, the deepest quarry being at the present time only 50 feet. If the stock is not carefully selected, the quarrymen are apt to ship stone that contains streaks, thus injuring the reputation of the material.

In Gillespie County is located a deposit of a rich red granite which is an excellent stone for polishing, as this brings out the color to good effect. This is a medium-grained stone, and is found in immense deposits in this county. Like the gray granites, it also has the disadvantage of being away from the railroad, the nearest workable stone being about 4 miles from Fredericksburg, the nearest shipping point.

In spite of the unfavorable locations of these Texas granites, there is produced yearly more than 200,000 cubic feet, the equipment necessary for this production representing an investment of approximately \$300,000. The greater part of this output is of the red granite from Granite Mountain. The quarry at Granite Mountain up to date has produced more than 3,000,000 tons of stone. It is now operated by Darragh Brothers. It was opened in 1882 for the purpose of obtaining stone for the construction of the Texas State Capitol building at Austin, which is the largest state capitol in the United States, and cost \$3,000,000 in public lands. The stone has weathered well, and shows no signs of disintegration. For massive work of this kind, in the bright Texas sun, the stone seems well suited, as it reduces the glare. It has also been extensively used for the bases of buildings, and, when tool faced, develops a very pleasant delicate pink color. The base of the Austin postoffice is a good example. A large number of monuments and tombstones have been cut

from this stone. For this latter purpose, however, it is questionable if some of the finer-grained granites would not have been better suited; but this is a matter of individual taste. By far the largest tonnage of this stone goes into the construction of jetties, breakwaters, and other wave-resistant structures.

The greater proportion of the gray granites of Llano County is used in monuments of various kinds. The fact that all the stone must be hauled in wagons to the railroad over dirt roads eliminates them from most of the building stone business. Besides this, the freight rate is rather high on such material. A large quantity of stone is quarried that is suitable building stone, but it is cast into a dump in order that the monumental stone may be extracted. This increases the cost of the stone, and, when combined with poor shipping facilities and unfavorable freight rates, the final cost is practically the same as, and, in places 300 miles away, more than that of the eastern stone. Many of the gray granites should make excellent stone blocks for heavy traffic pavements. For instance, a close-grained granite from Tom Norton's place had a compressive strength of more than 20,000 pounds per square inch, a hardness when tested in the Dorry hardness machine of 18.8, and a toughness of 15 in the Page impact toughness machine. Some granite paving blocks were laid in Houston about 9 years ago, and are said to be still giving satisfaction.

As a building stone, the chief use of the granites has been for the lower courses of county courthouses and postoffices in the state.

The red granite of Gillespie County is used exclusively for monumental work, especially for polished work, as the polishing brings out the rich red color. For rough cut building stone, this stone is not so desirable, as the stone is rather dull for this use.

There are a number of other deposits of workable granite in the state, in Mason and San Saba counties. One quarry in Mason County is now operating to a limited extent, but the stone must be hauled 17 miles before it is loaded on the cars. These deposits are too far from the railroad to be a commercial success. In West Texas there are located several unworked granites, as at Iron Mountain and on Captain Jason James's ranch in Brew-

ster County. The writer is indebted to Mr. George A. Parkinson, laboratory assistant, for a considerable amount of the above information.

A number of tests of the granites mentioned above are given in the following table:

No.	Sp. gr.	Absorption		Compressive strength lbs. per sq. in.	Remarks
		Wt. per cu. ft.	per cent by volume		
<i>Burnet County</i>					
1	2.64	164.5	....	18,700	Coarse-grained red granite
<i>Gillespie County</i>					
2	2.62	163.0	0.32	23,950	Deep red, medium-grained granite
<i>Llano County</i>					
3	2.66	166.0	0.48	20,645	Fine-grained gray granite. (Chemical analysis below)
4	2.65	165.0	0.42	17,475	Gray granite
5	2.64	164.5	0.47	18,125	Dark gray, fine grained granite. (Chem. anal. below)
6	2.65	165.0	0.42	17,067	Same as above.
7	2.64	164.5	0.50	17,145	Fine-grained gray granite
8	2.64	164.5	0.61	25,400	Called opal granite, but is a pinkish, hard feldspar porphyry, in which is bedded hard, lustrous, bluish quartz
<i>Mason County</i>					
9	2.63	164.0	0.83	19,525	Gray granite

The specific gravity and absorption tests were made on a

small piece of the stone weighing about half an ounce. The compression tests were made on 2-in. cubes.

Chemical analyses on several of the above granites were as follows:

	3	5	8	10
Silica	70.20	72.80	74.90	78.00
Alumina	17.36	15.40	11.10	12.35
Peroxide of iron.....	1.32	2.15	1.60	1.30
Protoxide of iron.....	1.90	0.40	1.50	....
Lime	1.46	1.60	0.20	0.15
Magnesia	0.20	1.00	....	0.60
Sodium oxide.....	4.30	2.70	8.50	3.40
Potassium oxide	2.90	2.30	....	4.34
Phosphoric acid.....	0.06	0.05	....	0.04
Manganese dioxide .....	....	....	1.90	....
Water	0.70	0.45	0.30	0.20
Titanic acid .....	....	....	0.50	....
	100.40	98.85	100.50	100.38

The locations of the quarries, on samples from which the tests given above were made, are as follows. These include all the quarries now being operated in Texas.

Burnet County

1. Granite Mountain, owned by Darragh Brothers, of Burnet, and Catterson, of New York, but operated by Darragh Brothers. Main body of material covers 180 acres with an average height of 100 feet above the railroad.

Gillespie County

2. Quarry is located 4 miles north of Fredericksburg, and is owned and operated by Nagel Brothers, of Fredericksburg.

Llano County

3. Gray granite quarry located 6 miles southwest of Llano, owned by G. A. Parkinson, but operated by Gooch & Company, Waco, Texas.

4. Located 8 miles west of Llano, on property of Jeff. Slator,

but the quarry is operated by Charles Frazier, known as the Frazier Granite Company.

5. This quarry is located $10\frac{1}{2}$ miles southwest of Llano on the Stewart property, but operated by Fred Kothe.

6. Same quarry as above.

7. Tom Norton's quarry, located 11 miles southwest of Llano, on the Charles Moss property.

8. Four miles northeast of Llano is located the quarry of James Finley Company, but this quarry is only operated intermittently. This is what is called the opal granite.

Frank Teich also operates a quarry 6 miles southwest of Llano on the property of Steve Moss. This is a fine-grained gray granite.

Mason County

9. This quarry is located 5 miles south of Pontotoc, and 17 miles northwest of Llano, in Mason County, on the Newsom property. The quarry is operated by Z. A. Blodgett, of Llano, and the stone is hauled to Llano to be shipped.

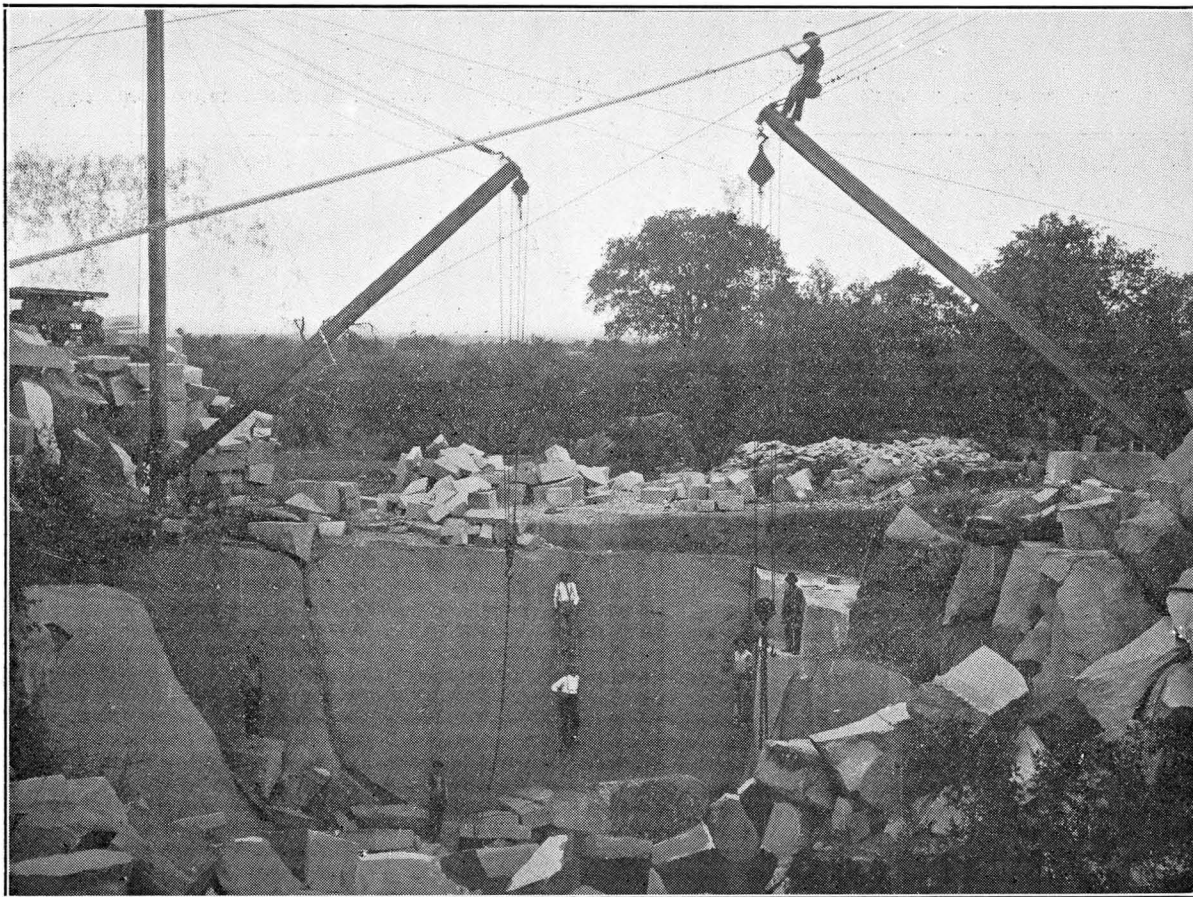


Plate 2. Gray granite quarry operated by Gooch & Company, 6 miles southwest of Llano, Llano County.

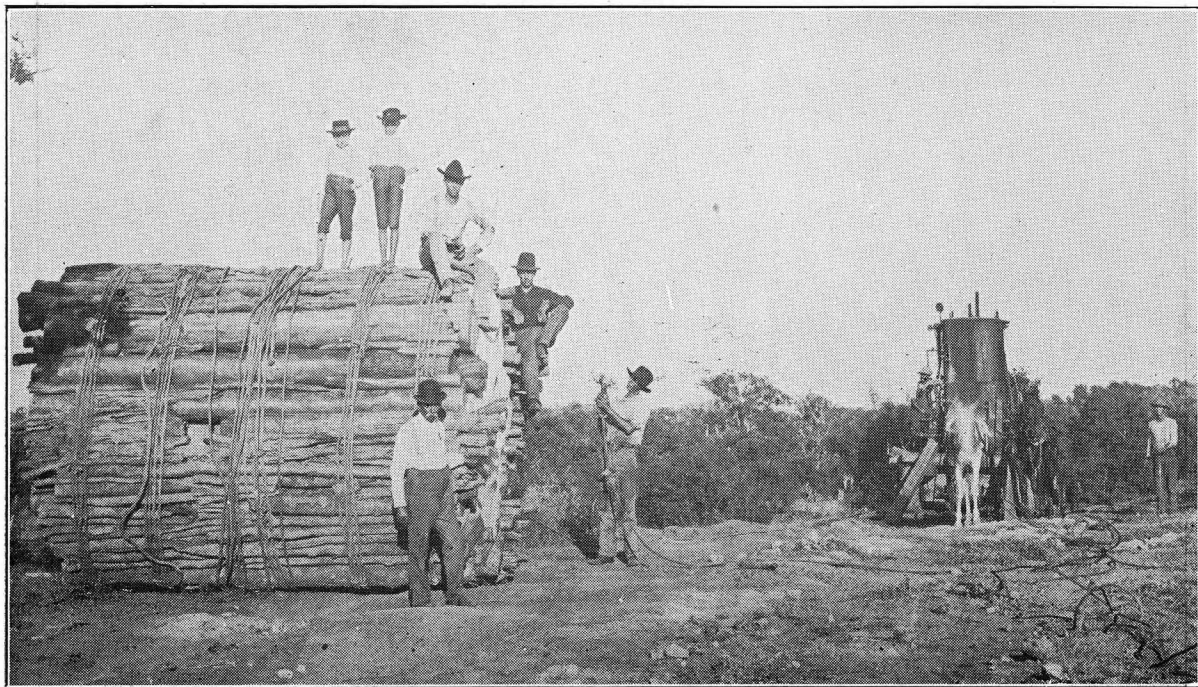


Plate 3. The Llano quarrymen experience considerable difficulty getting their granite to the market. Rolling a 35-ton block eight miles to Llano for shipment.

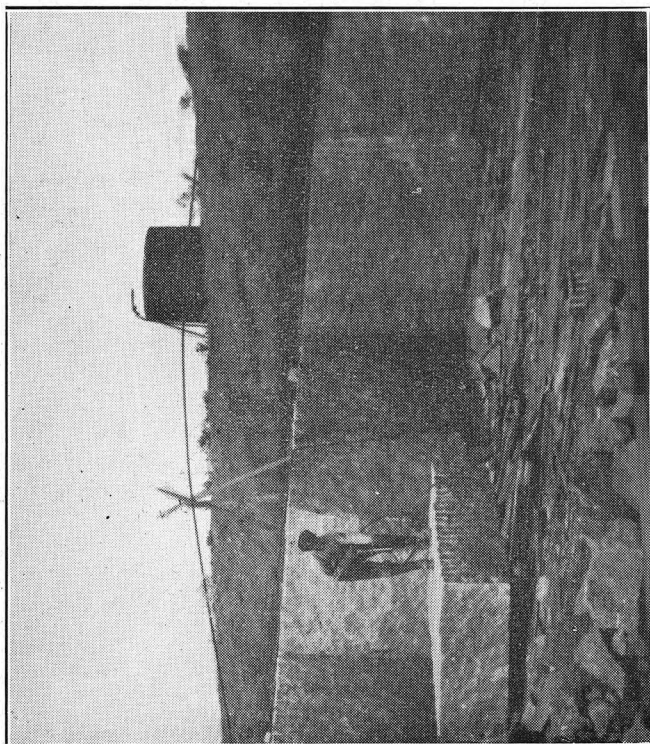


Plate 4. Taking blocks of red granite out of Granite Mountain,
Burnet County.



Plate 5. Darragh Brothers' quarry at Granite Mountain, Burnet County.

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The Composition of Texas Coals and Lignites and the Use of Producer Gas in Texas. Wm. B. Phillips, S. H. Worrell, and Drury McN. Phillips. University of Texas Bulletin No. 189, July, 1911. (Out of print.)

A Reconnaissance Report on the Geology of the Oil and Gas Fields of Wichita and Clay Counties. J. A. Udden, assisted by Drury McN. Phillips. University of Texas Bulletin No. 246, September, 1912. Price, 50 cents.

The Fuels Used in Texas. Wm. B. Phillips and S. H. Worrell. University of Texas Bulletin No. 307, December 22, 1913. Price, 40 cents.

The Deep Boring at Spur. J. A. Udden. University of Texas Bulletin No. 363, October 5, 1914. (Out of print.)

The Mineral Resources of Texas. Wm. B. Phillips. University of Texas Bulletin No. 365, October 15, 1914. Price, 50 cents.

Potash in the Texas Permian. J. A. Udden. University of Texas Bulletin No. 17, March 20, 1915. Price, 10 cents.

Geology and Underground Waters of the Northern Llano Estacado. Charles Laurence Baker. University of Texas Bulletin No. 57, October 10, 1915. Few remaining copies at 75 cents each.

Road Materials of Texas. James P. Nash. University of Texas Bulletin No. 62, November 5, 1915. Price, 20 cents.

Origin of Texas Red Beds. Charles Laurence Baker. University of Texas Bulletin No. 29, May 20, 1916. Price, 5 cents.

Annual Report for the Year 1915. M. E. Stiles; Geological Maps in Texas, J. A. Udden. University of Texas Bulletin No. 35, June 20, 1916.

Review of the Geology of Texas (with map). J. A. Udden, C. L. Baker, Emil Böse. University of Texas Bulletin No. 44, 1916. Price, in paper cover, 70 cents; bound in cloth, 90 cents.

Contributions to the Knowledge of Rhythofenia from the Permian of West Texas. Emil Böse. University of Texas Bulletin No. 55, October 1, 1916. Price, 15 cents.

The Thrall Oil Field. J. A. Udden, H. P. Bybee. University of Texas Bulletin No. 66, November 25, 1916. Price 40 cents.

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