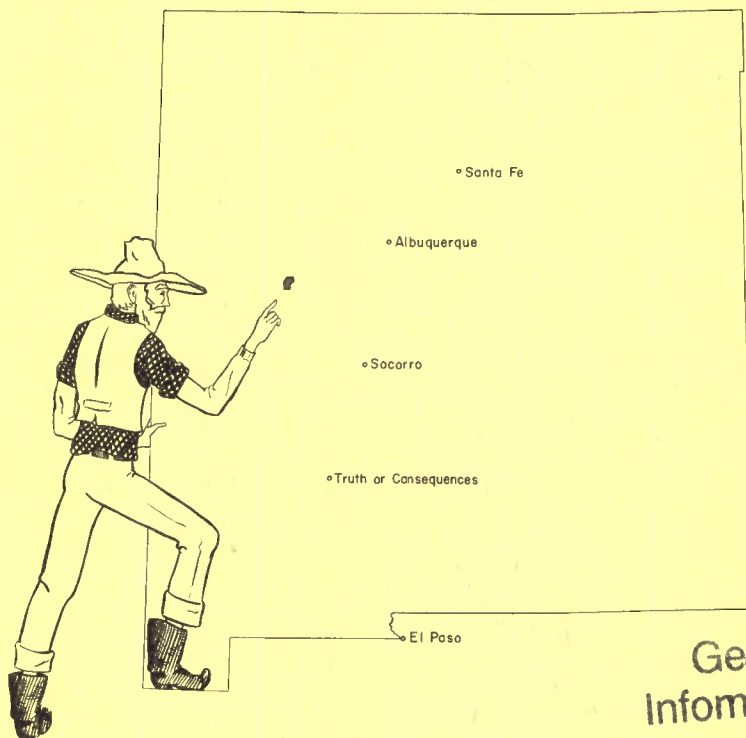


# CIRCULAR 36

## A DEPOSIT OF HIGH-CALCIUM LIME ROCK IN VALENCIA COUNTY, NEW MEXICO

by  
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Geotechnical  
Information Center

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY

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A deposit of high-calcium limestone of possible interest to persons concerned with the establishment of a cement plant or chemical industries requiring a high-calcium limestone as raw material, occurs in T. 6 N., R. 5 W., Valencia County, 34 miles west of Belen (fig 1). The locality is reached by unimproved road about 20 miles from U. S. Highway 66 and the Atchison, Topeka and Santa Fe Railway at Correo, which is 32 miles by highway from Albuquerque.

A single analysis representing a composite of two samples shows 97.5 percent calcium carbonate, or 95.9 percent lime (CaO) on a calcined or CO<sub>2</sub>-free basis, as calculated from the analysis. The deposit is 5 ½ miles long and averages over 1 mile in width. The thickness is variable, with a maximum of 150 feet. Although no drilling or other exploration has been done, it is estimated that the amount of material is in excess of 100 million tons. The size, grade, and proximity of this resource to the principal population center of New Mexico should make it attractive for industrial consideration.

The high-lime material is a travertine deposited by springs, which long since have ceased to be active (fig 2), on a floor of red shale and siltstone belonging to the Chinle formation of Triassic age. The travertine lies as a great blanket of varying thickness covering any irregularities that may have existed in the underlying surface. The travertine body is thick to the north and east but thins sharply to the west and less so to the south. The massive, heavy travertine accumulated on the relatively weak and yielding shale. Subsequent erosion removed the shale from around and underneath part of the travertine, so that blocks of heavy travertine slipped down over the soft shale. Therefore, the travertine body is almost entirely surrounded by landslides covered by blocks of travertine. Cliff slopes behind the landslides line the north and east slides. The travertine is a yellow-buff to white porous rock with a crackled surface that weathers to orange buff or yellow buff. The rock layers, which are commonly one-fourth to one-half inch thick, vary only slightly in color. In places the travertine is not banded. Layers of sand and shale or other insoluble materials were absent in the outcrops examined. In the southern part of the area, the travertine is covered by shallow alluvium.

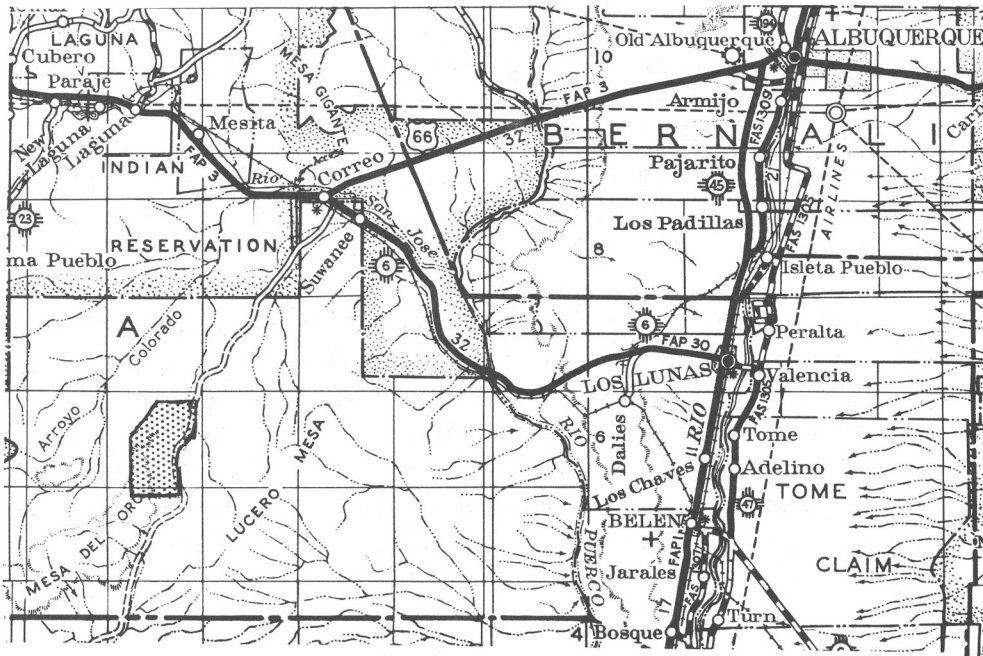


Figure 1.

Index map showing location of travertine deposits at north end of Mesa del Oro (stippled area).



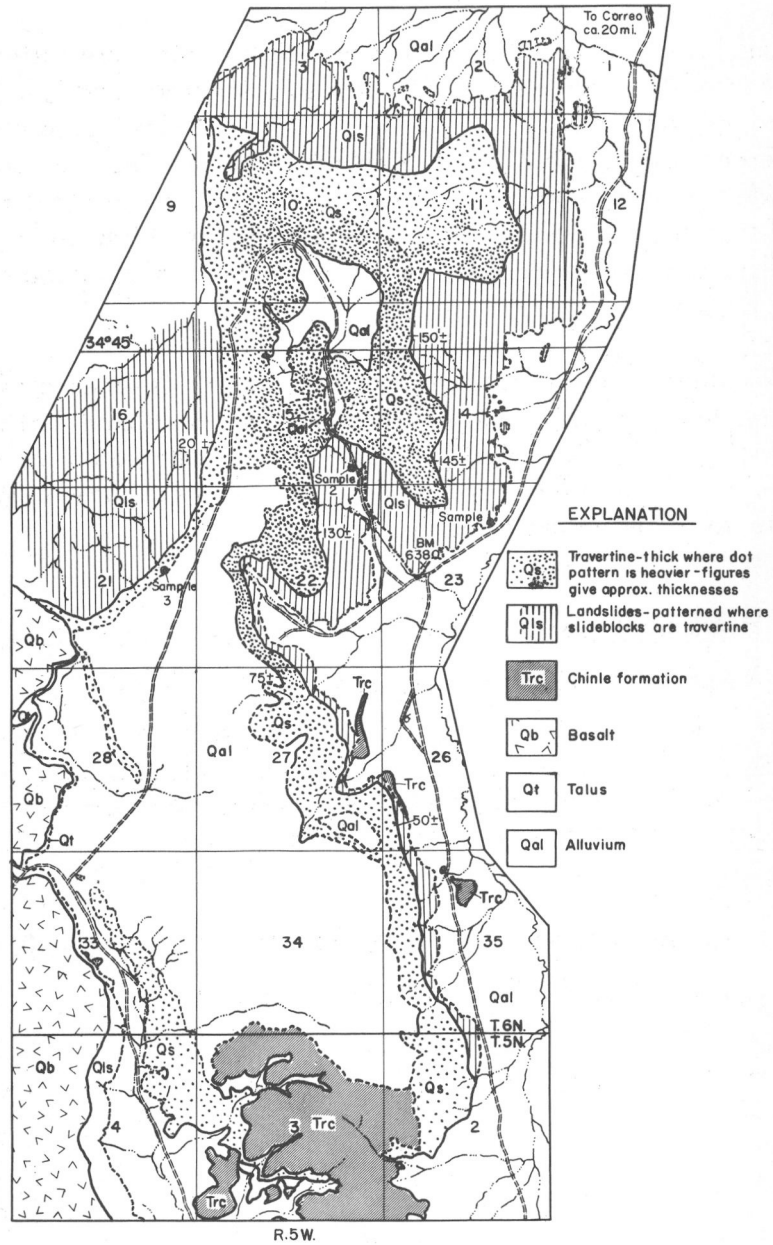


Figure 2.

Geologic map of travertine deposit on north end of Mesa del Oro, Valencia County, New Mexico.

Samples from three locations shown on the map were tested for content of insoluble material (fig 2). Two samples from landslide blocks near where the travertine is 150 feet thick were found to contain 0.3 and 1.3 percent by weight of insolubles respectively. The third sample, from the western margin where the travertine is only twenty feet thick, was found to contain 3 percent of insolubles, part of which was fine-grained silica. Insoluble material in the first two samples appeared to be mainly clay minerals.

A composite sample representing equal portions of samples 1 and 2 was analyzed chemically with the results shown in column 1 of the table below. In column 2, the analysis is shown as recalculated on the basis of complete elimination of CO<sub>2</sub> and H<sub>2</sub>O. No tests were made on material comparable to a commercially burned product.

TABLE 1. CHEMICAL ANALYSIS OF TRAVERTINE FROM T. 6 N., R. 5 W., VALENCIA COUNTY, NEW MEXICO\*

	(1)	(2)
SiO <sub>2</sub>	tr.	tr.
Al <sub>2</sub> O <sub>3</sub>	0.23	0.41
FeO & Fe <sub>2</sub> O <sub>3</sub> as Fe <sub>2</sub> O <sub>3</sub>	0.31	0.55
MgO	0.14	0.25
CaO	54.61	95.91
Na <sub>2</sub> O	1.30	2.29
K <sub>2</sub> O	0.33	0.59
H <sub>2</sub> O	0.66	-
CO <sub>2</sub>	42.68	-
	<hr/> 100.26	<hr/> 100.00

\* Analysis by V. C. Juan

Although a deposit of this size should not be judged solely on the basis of a single chemical analysis, this analysis may be taken to indicate that the lime content, on the fully burned basis, is in excess of 95 percent. Magnesia is less than 0.5 percent, and combined iron oxide is only slightly more than 0.5 percent. These quantities are well within the limits allowed for most uses of chemical lime or limestone for Portland cement. The unusual content of soda is unexplained.

### Availability of Water

Water supply in the area appears to be meager. As pointed out above; springs no longer exist in the area. Ground water has been sought by means of wells as much as 600 feet deep, none of which, produces more than a few gallons per minute of rather-poor-quality water. The well closest to the deposit, in sec. 26, T. 6 N., R. 5 W., is reportedly 623 feet deep. The water contains over 4,500 ppm dissolved solids, of which over 80 percent is calcium and sodium sulfate and bicarbonate. The water has a total hardness of 2,300 ppm. (See analysis, table 2.) Other wells in the area are not so deep; most of them produce only a few gallons per minute of water that averages over 1,000 ppm dissolved solids.

TABLE 2. ANALYSIS OF WATER FROM WELL IN SEC. 26, T. 6 N., R. 5 W., VALENCIA COUNTY, NEW MEXICO\* (Data in parts per million)

Silica (SiO <sub>2</sub> )	11
Calcium (Ca)	n.d.
Magnesium (Mg)	n.d.
Sodium (Na) and potassium (K)	476
Bicarbonate (HCO <sub>3</sub> )	432
Sulfate (SO <sub>4</sub> )	2,670
Chloride (Cl)	140
Fluoride (F)	1.7
Nitrate (NO <sub>3</sub> )	0.0
Dissolved solids Sum-ppm	n.d.(est. 4500+)
Hardness as CaCO <sub>3</sub>	
Total	2,300
Noncarbonate	1,950
Specific conductance (micromhos at 25°C)	4,680
Percent sodium	31

\* Analysis by U. S. Geological Survey, Quality of Water Branch, Albuquerque, New Mexico.