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Serpentine and Associated Minerals of Gillespie
and Blanco Counties, Texas

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The largest serpentine mass of the Central Mineral region of Texas is located in northeastern Gillespie County and northwestern Blanco County about 1.5 miles south of the Llano County line. The western end of the serpentine pass is about 25.5 miles from Llano by road, 20 miles of which is hard surfaced, and about 24.5 miles from Fredericksburg, 19 miles of which is hard surfaced. The eastern end of the mass is about 24 miles from Marble Falls by road, which is unimproved, and about 30 miles from Fredericksburg by road, 12 miles of which is hard surfaced. These towns are the nearest railroad points to this serpentine with the exception of Kingsland which is north of Llano River which at this point is not bridged. The presence of this mass of pre-Cambrian serpentine and the occurrence of chromite and asbestos in it have been known for many years. The desirability of this serpentine as a building stone has become apparent within the past few years.

This serpentine mass is about 21 miles airline from the Colorado River Authority's Buchanan and Inks dams on Colorado River which are now producing cheap power. At present, however, no power line is closer than 5 miles to this serpentine.

The writer, from September, 1939, to May, 1940, has been mapping the geology of Gillespie County, using aerial photographs as a base. A sufficient overlap of the Gillespie County photographs into Blanco County has permitted mapping of the entire serpentine mass in these two counties. Chromite is a deficiency mineral which is now in special demand, and for that reason it is deemed advisable to present information about this serpentine mass at this time, in advance of the county report which eventually will be issued.

This serpentine mass, shown on the accompanying map, is 3.5 miles long in an east-west direction and averages about two-thirds of a mile across in a north-south direction. At each end of the mass there are important lobes of serpentine extending northward. Faulting has offset the borders of the mass to some extent. This faulting is probably of the same age as that which dropped the Paleozoic rocks against the pre-Cambrian rocks at the western edge of the map. This serpentine probably originated by alteration of a basic intrusion. No recognizable remnants of the original rock are found within the serpentine mass. Some hornblendites along the northern border of the mass may be related to the original intrusion.

The original igneous rock from which the serpentine formed intruded a series of pre-Cambrian gray granite gneisses and Packsaddle schists. For the most part these rocks are roughly parallel to the boundaries of the intrusive. Along most of the southern border of the intrusive a narrow band of the schist series consisting mostly of amphibolite and talc schists separates the serpentine from the gneiss. The extreme southeastern portion of the mass was intruded directly into the gneiss. The inclusions within the serpentine are predominantly of Packsaddle schist except in the southeastern portion of the mass where they are of gneiss. This intrusive apparently followed the less competent Packsaddle schist even beneath where it can now be seen, as evidenced by inclusions of Packsaddle schist and the absence of inclusions of gneiss except as noted above.

CHROMITE

Chromite was seen at three localities in this serpentine mass. These are shown on the map. The largest amount of chromite present, amounting to about a ton, is shown as the westernmost occurrence on the map. This chromite is scattered over the surface around several shallow prospect holes. No chromite was seen in place.

The Bureau county file, which contains miscellaneous unpublished information, has the following analyses of this chromite.¹

Analyses of chromite from Pierce Smith ranch, Gillespie County

Southwest Laboratories File No. 31, San Antonio, Dec. 23, 1932. Laboratory No. 16776:

	Percent		Percent
SiO ₂ (fused)	8.40	K ₂ O	0.20
Cr ₂ O ₃	49.40	H ₂ O+ and -	2.10
Fe ₂ O ₃	12.00	CO ₂	trace
FeO	6.00	TiO ₂	0.14
MgO	2.84	P ₂ O ₅	0.11
CaO	0.30	NiO	1.02
Na ₂ O	0.60		100.51 (Correct total is 83.11. Author.)
Gold	0.09 oz.		
Silver	trace		
Platinum	trace		

¹Information from C. L. Baker, October 12, 1934.

Colorado Assaying Company, Denver, August 1, 1933:

	Percent
Cr ₂ O ₃	39.4

C. O. Parker and Company, Denver, Folio 134, July 1, 1933:

Cr ₂ O ₃	38.15
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Ledoux and Company, New York, July 24, 1933. No. 435641:

Chromium	27.50
Cr ₂ O ₃	40.19

This locality is now known as the Ferrill Smith ranch. To the east, see map, on this ranch about 200 pounds of chromite is scattered about the surface.

The third locality is on the Gould Davis ranch where about half a tone of chromite is scattered about the surface. No chromite was seen in place. A few stringers of magnetite, however, were seen cutting through the serpentine at this locality.

This serpentine mass was not investigated in the minute detail that would be necessary to locate all of the chromite present. However, it is believed that any sizable amounts of chromite would be known to the ranchers of this area, who were very cooperative in pointing out all prospect holes and known chromite occurrences.

From the examination made of this area it is concluded that insufficient chromite is in sight to warrant prospecting during normal times. However, chromite has a tendency to be aggregated in masses which might not be exposed at the surface, and if chromite were to become unavailable from other sources then it would be advisable to conduct a drilling campaign to locate any masses that might be present. The most favorable portion of this mass for prospecting is probably the northern portion since the dip of the serpentine is to the south and any gravitational segregation would cause the chromite to migrate toward the bottom of the serpentine which is to the north.

MAGNETITE

Magnetite is abundant as small grains scattered throughout the serpentine. Stringers of magnetite were noted in the serpentine near the chromite locality on the Gould Davis ranch. A prospect hole along the northern margin of the serpentine reveals 21 inches of magnetite in a schistose rock within a few feet of the serpentine and apparently parallel to it. The length of this magnetite stringer has not been delineated.

NICKEL

On the Gould Davis ranch a shallow prospect hole, see map, mostly within an inclusion in the serpentine reveals the presence of the secondary nickel mineral zaratorite. The analyses of the chromite ore previously given show nickel to be present. Along the entire northeast-trending edge of the serpentine mass near this locality there is a zone of honey-combed, somewhat iron-stained quartz. The dump of a prospect hole in this material did not reveal any mineralization. From the nature of the material on the dump it is believed that the prospect hole was entirely within an oxidized and leached zone and that any sulphides, if originally present, have been removed. This zone should be prospected at depth by drilling.

ASBESTOS

A small amount of asbestos is present in the serpentine usually associated with inclusions of schist. A prospect hole on the Gould Davis ranch revealing some asbestos is shown on the map. The type and grade of this asbestos has not been determined. In no place, however, was enough asbestos seen to be commercial. The writer again wishes to mention that the entire serpentine mass was not investigated in detail and that commercial deposits could possibly exist.

SOAPSTONE

Talc schist is present at many places around the periphery of the serpentine mass and is also found as inclusions within the serpentine. Most of this talc schist appears to be a mixture of talc with other silicate minerals and is properly classified as soapstone. This soapstone has been used locally for hearthstones and chimneys and stands heat changes without deterioration. This soapstone has not been used for grinding; consequently nothing is known about its desirability for the many uses for which ground soapstone is used. Most of the large soapstone deposits are located south of the area mapped.

During an investigation of building stone in central Texas, made by the Bureau of Economic Geology and Engineering Research, soapstone in this general area was sampled and the following properties determined:

Sample G-6 from C. Althaus ranch

Crushing strength, pounds per square inch - 3720
Specific gravity - 2.811
Absorption - 0.35 percent

BUILDING STONE

This serpentine mass contains a wide assortment of shades of green ranging from light yellowish greens through deep greens to very dark rocks having a greenish cast. Two terrazo chip quarries have been opened in the western end of the serpentine mass. Serpentine from a mass in Llano County has been used to surface newly constructed highways of that area. The serpentine produces an excellent nonskid driving surface, having a minimum of glare, thus reducing eye strain during the day and yet is light enough in color to furnish a nicely visible surface for night driving.

In general the serpentine mass is much jointed which reduces the amount of stone that can be produced for saw blocks. With careful selection of quarry sites it should be possible, however, to produce large-sized blocks for sawing.

