THE UNIVERSITY OF TEXAS AT AUSTIN
Bureau of Economic Geology
July 15, 1941
Typeset from original stencil, December 1979

MINERAL RESOURCE SURVEY
Circular No. 32

The information contained in this circular was gathered by a unit of the WPA State-Wide Mineralogical Survey of Texas, a project sponsored by The University of Texas, Bureau of Economic Geology. The purpose of this survey is to assemble information concerning mineral products and to gather other geological data and make it available to the public. With this information in the hands of the public, it is reasonable to suppose that industries of value to the State may be developed. The following report is based on work done in Mason County by Work Project No. 16843, from September 30, 1940, to June 7, 1941.

REPORT ON TIN AND MAGNESITE DEPOSITS IN MASON COUNTY, TEXAS*

John H. McCammon, Supervisor

INTRODUCTION

With tin near the top of the list of strategic metals, the main purpose of this project was to determine:

1. The geographic distribution of tin in Mason County.
2. The source of the tin.
3. The amount of placer and/or lode tin present per unit volume of sand or vein.

Secondary purposes were to determine what minerals, if any, occurred with the tin and what minerals occurred in the metamorphics rimming the granite, and to search for deposits of magnesite.

Two mimeographed maps are included in this circular. The first shows the areal outline of the fine-grained granite of the Streeter-Grit area with the location of placer tin indicated by an "x". In the second, the location and areal geology of the magnesite deposit is shown.

TIN

Streeter-Grit area. — In referring to the Streeter-Grit area, it is intended to include only the outcrop and the immediately adjoining areas of the fine-grained granite which trends NE-SW between the towns of Streeter and Grit. Streeter is 9.9 miles west of Mason on State Highway 29; Grit is 5.9 miles west on State Highway 151. The length of the fine-grained granite mass is about three miles and its maximum width is 1 to 1½ miles. Thus it presents an areal surface of 3 to 4½ square miles.

This granite outcrop may be pictured as a rectangle with the short ends roughly rounded. The map on page 7 indicates the arcuate contact with the pre-Cambrian Packsaddle schist to the NE and the SW. On the long side: the contact easterly is with coarse-grained granite (indicated to be older by the inclusions of it in the fine-grained granite as seen along the contact on Honey Creek) and westerly is with Cambrian Hickory sandstone.

At the outset, peripheral areas of the granite were prospected for tin-bearing zones. The older rocks in contact with the granite, especially zones bearing quartz and pegmatite veins, were examined. Drainages in these areas were panned. This technique, plus a search along pegmatites and quartz veins, failed to reveal a single occurrence of cassiterite (tin oxide) in the exposed metamorphics surrounding the fine-grained granite.

Prospecting with gold-pans was done also on the streams within the fine-grained granite. Success was immediate and the distributional pattern of the stream tin was worked out. Whether tin was present or not in the samples was proved in the field as follows: The heavy mineral residue was washed as clean as possible and put in a glass with shavings of zinc and dilute hydrochloric acid. A metallic coat forms on the cassiterite grains. Thus the familiar light gray, metallic luster quickly distinguishes cassiterite from other dark-to-black colored heavy minerals which may be present.

The problems of the source and the amount of the tin were then attacked. The source of the cassiterite appears to be the pegmatites. No cassiterite has been found in any localized granite area devoid of pegmatites and quartz veins. In the southwest corner of the Blount ranch, a pegmatite cuts the granite near its contact with the Packsaddle schist and the Hickory sandstone. Pulverization of a cubic foot of this vein, rich in tourmaline, biotite, and pink feldspar, yielded two very small fragments of cassiterite. The soil and rotten granite adjacent to the pegmatite yielded considerable detrital cassiterite.

Continued search along the quartz stringers and genetically related features failed to reveal any cassiterite in place, except for a few fragmentary crystals. Placer cassiterite, where found, always occurs in the vicinity of pegmatites and/or quartz veins. Some cassiterite may be disseminated in the granite close to the veins and pegmatites.

The possibility that cassiterite may have been concentrated in basal Hickory sandstone where it overlaps the granite was also investigated. However, pulverized and loose material from the Hickory sandstone just above the contact yielded no cassiterite. Nevertheless, it is still possible that the basal Hickory does contain cassiterite concentrated locally by the streams and creeks which were abrading the granite during initial Hickory time. However, one may appreciate the difficulty of locating the natural riffles or obstructions where cassiterite would lodge and accumulate on the relatively rough pre-Cambrian surface of the granite during deposition of basal Hickory sandstone. Geophysical techniques would seem, moreover, to offer little promise of success of locating

*Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 665-66-3-233.

such ancient placier enrichment, for any anomalies as a possible result of mineral concentration would be obscured by the presence throughout the Hickory of abundant hematite (iron oxide).

The cassiterite accumulation in the creeks of the fine-grained granite area may be the result of concentration of cassiterite from a considerable thickness of granite.

To ascertain the amount of cassiterite present per unit volume of stream sand and of soil, quantitative measurements were made in areas found to contain cassiterite during exploratory panning. A sluice box was used to recover the cassiterite from measured volumes of the stream sand and of the soil. The sluice box used was 12 feet long, 20 inches wide at the feed end, 8 inches wide at the exit, and 10 inches deep. Riffles ¾" wide and ½" thick, placed at right angles to the flow, effectively caught the cassiterite.

The quantitative results, with the location of the samples, are as follows:

Sample No.	Location	Pounds Cassiterite per Cu. Yd.
1	Blount ranch, tank stream sand.	1.855
2	Blount ranch, downstream 20 yards from tank, north bank of stream.	.008
3	Seaquist ranch, west prong of Honey Creek, soil on north bank 200 yards west of confluence.	.0018
4	Lamar Thaxton ranch, Dad's Springs Creek, 150 yards south of Dad's Springs (coarse-grained granite area).	.022
5	Blount ranch, 30 yards from tank downstream on right bank.	.097
6	Blount ranch, sand in draw on left bank of main creek, 35 yards north of granite-Packsaddle schist contact.	.038
7	Eppler ranch, stream sand from major north-south creek in pasture.	.0685
8	Blount ranch, soil on right bank of creek, 60 yards downstream from tank.	.0174
9	Blount ranch, soil of left bank of main stream on hillside, about 30 yards south of well.	.174
10	Blount ranch, alluvium on north bank of main creek.	.00054
11	Seaquist ranch, west prong of Honey Creek, 150 yards west of confluence.	.00236

The amount of cassiterite per cubic yard is very small. The alluvium deposits along the streams average 1 to 2 feet thick and are narrow. Moreover, no further consideration can be given to soil areas. The slight amount of cassiterite in the soil areas is of no economic value.

Placer cassiterite, with the exception of sample 4, occurs only in minute concentrations at a few places in the Katemcy coarse-grained granite mass. This granite extends roughly from Grit northeast toward McCulloch County. Cassiterite was found in this area on the following two properties:

Ranch owner	*Location*
Otto Hoffmann	7.8 miles north of Mason on the Mason-Brady highway
John Ruegner	9.5 miles north of Mason on crossroad from gravel pit on Mason-Brady highway to old Mason-Katemcy road.

Topaz, a fluorine containing mineral, is associated with some of the cassiterite localities in the fine-grained granite mass of the Streeter-Grit area. The area in the vicinity of the fluorite deposit on the Ferguson ranch south of Katemcy yielded no cassiterite.

Northeast quarter of Mason County. — To complete the outline of the geographic distribution of stream cassiterite, the northeastern quarter of the county was also investigated by panning of the major streams in that area. Willow, Stone, Herman, and Martin creeks, with their respective drainages, were worked for the heavy minerals. Especial attention was directed to Herman Creek, since in The University of Texas Bulletin No. 3401, The Geology of Texas, Vol. II, page 634, reference is made to the occurrence of stream cassiterite in Herman Creek, Mason County. Unfortunately this reference could not be substantiated in the field. Careful and detailed panning failed to yield any stream tin as ordinarily discerned by the zinc-hydrochloric acid reduction test. This statement, moreover, is applicable not only to Herman Creek but to all the above mentioned creeks.

MAGNESITE

Through the courtesy of Messrs. Gates and Koock of Streeter and Mason, Texas, the writer was shown an outcrop of a white, weather-resistant rock which a chemical analysis showed to contain magnesite and dolomite. The road log to this deposit is as follows: Follow State highway 29 and 151 north and west from courthouse 2.8 miles; turn right through gate at road material pit and left through a gate 50 yards. Follow dim field road to fence for 1.25 miles; follow upstream on foot 100 yards to deposit.

On the outcrop, this deposit of magnesite has a maximum length of 100 feet and is 50 feet in width. Since the surrounding chloritic schist is almost standing on end, one may expect a maximum thickness of approximately 50 feet. No greater surficial width or length can be expected, for a continuous trenching around the greatest perimeter gave the length and width as already stated. Test pits dug at right angles to the strike of the outcrop failed to reveal any soil-covered bodies of ore, either on the flanks or in the continuation of the strike of the deposit. The test pits were bottomed in Packsaddle schist in every case except one.

Along the northern prolongation of the strike of the magnesite a small lens of calcium carbonate marble was uncovered. This is perhaps significant, for it is, first of all, evidence of the rather easily weathered, magnesium-lacking marble. Secondly, the difference between the rates of weathering of magnesian and non-magnesian marbles may indicate that the top of the magnesite lens has only recently been open to erosion; otherwise the magnesite deposit would stand higher than it actually does.

The question of whether or not the magnesite lens has only recently been subjected to erosion is of value in consideration of the possible depth of the deposit. If, as it appears, only the top of the original lens is outcropping, then a possible depth of 50 feet may be expected. The actual depth, however, can be determined only by use of the core drill. The area of this lens is approximately 3550 square

feet. Taking fifty feet as the depth, then 177,500 cubic feet of ore are present. With 12.2 cubic feet to the ton as a factor, then an estimate of 14,550 tons may be made.

A chip sample taken from exposed magnesite boulders was analysed by the Bureau of Industrial Chemistry, The University of Texas, with results as follows:

	Percent
Insoluble in hydrocloric acid	9.39
Alumina and iron oxide	.38
Magnesium oxide	24.19
Calcium oxide	22.08
Ignition loss	43.96

Recalculation of this analysis into the minerals contained in the deposit gave the following:

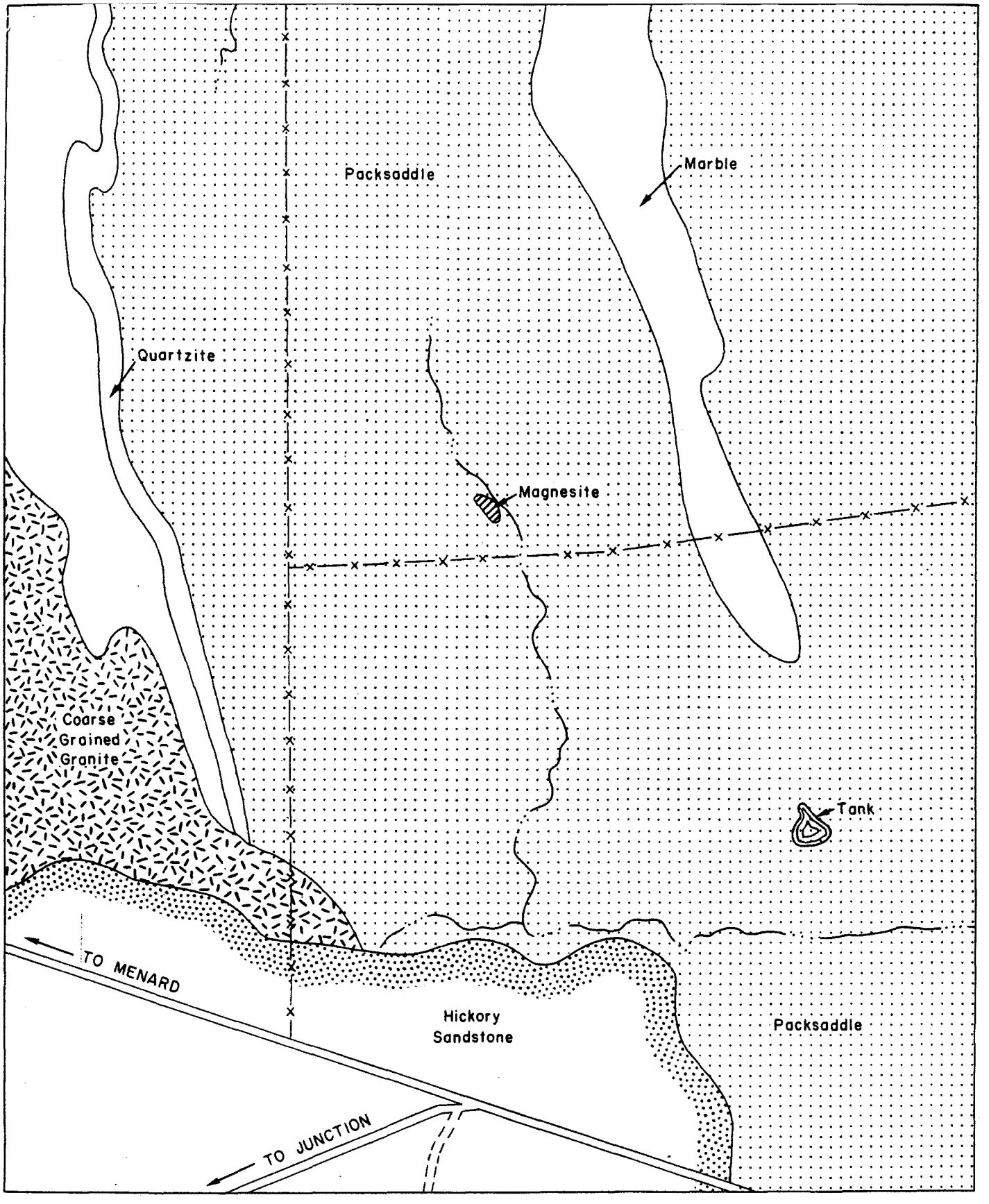
	Percent
Magnesite	17.70
Dolomite	72.80
Silicate minerals	9.50

During times of national emergency, such as exists at present, small tonnages of mixed magnesite-dolomite ores are of strategic value, not as a source of metallic magnesium in competition with the comparatively cheap magnesium chloride brine and carbo-thermionic brucite reduction processes, but as a refractory resource, thus conserving our chromium for the unique properties of that metal as a ferro-alloy.

It is possible that other deposits of magnesite, with or without dolomite, do occur in the extensive outcrops of Packsaddle schist in this county. As shown on the map of the location of the magnesite, a long band of marble outcrops 350 yards to the east of the magnesite. This marble is almost entirely lime with very little dolomite present. On the map showing the location of the cassiterite, the Packsaddle in contact with the fine-grained granite along the southwestern edge of the granite mass, is predominantly lime marble. The marble bands are almost vertical and of a very considerable thickness. Here again the marble is almost devoid of any magnesium minerals. But it is not impossible that the conditions necessary for the magnesitization of the described deposit are present elsewhere in the marble series of the Packsaddle. An extensive core-drilling program throughout the area might locate sizeable deposits of magnesite and dolomite.

ACKNOWLEDGMENT

The writer takes this opportunity to express his appreciation for the cooperation of ranch owners in Mason County, to County Judge Otis Shearer of Mason County, and to the crew. Without their full cooperation the survey could not have been carried on. Thanks are also due Dr. E. H. Sellards, Director of the Bureau of Economic Geology; Glen L. Evans, geologist-in-charge of the WPA Mineralogical Survey; and William N. McAnulty, State Supervisor of the Mineralogical Survey. Special thanks are due Dr. V. E. Barnes, geologist with the Bureau of Economic Geology, who frequently interrupted his field work in adjacent Gillespie County to visit the project in Mason County and give advice and direction to the work.

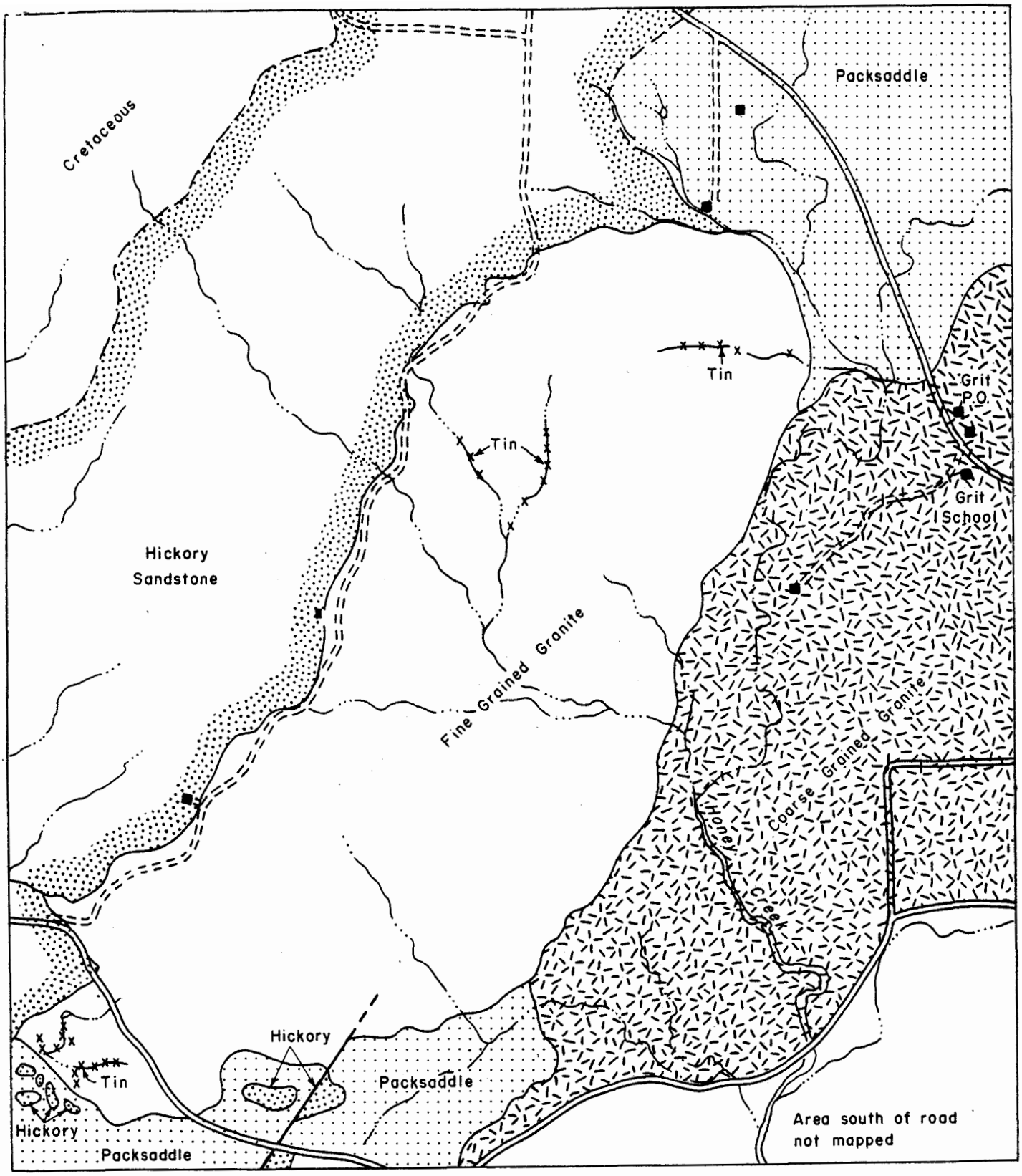


Aerial Photograph Base

Scale: 8 Inches = 1 Mile

MAP SHOWING LOCATION OF MAGNESITE DEPOSIT, 3 MILES NORTHWEST OF MASON

MASON COUNTY, TEXAS



MAP SHOWING LOCATION OF TIN IN STREETER-GRIT AREA

MASON COUNTY, TEXAS