GEOLOGIC NOTES

DIVISION OF GEOLOGY
STATE DEVELOPMENT BOARD
COLUMBIA, S. C.

MAY - JUNE 1959

Vol. 3 No. 3

THE LANDRUM MINE, EDGEFIELD COUNTY, SOUTH CAROLINA

By

L. L. Smith1/

Introduction

The Landrum mine and the adjoining Quattlebaum mine are located in northern Edgefield County 13 miles north of the town of Edgefield and 4 miles east of the village of Pleasant Lane (Fig. 1). The mine area is in the argillite facies of the Carolina slate group and is 15 miles northwest of the feather edge of the Tuscaloosa and Barnwell formations at the Fall Line. These mines are on a northeast-trending ridge immediately southeast of Sleepy Creek and are separated by a gap in the ridge, the Landrum mine being on the northeastern end of the ridge.

History

The Landrum and Quattlebaum mines were worked as early as 1856, but early history and production figures are largely unknown (Pardee & Park, 1948, p. 111). Some development work was carried on from 1932 to 1935, before which the mine was idle for some time. Production figures during this most recent work are not available. The mines have been idle since 1935.

Country Rock and Structure

The country rock on all of th Landrum property is a grey sericite phyllite with a very perfect cleavage. The country rock is cut by a complex system of joints so that the rock breaks up in angular fragments of varying size. In places it is stained reddish brown with iron.

Prospect pits and trenches on the Quattlebaum property reveal the country rock to be in part a darker more mafic facies of the Carolina slate. It weathers to a bright red soil in contrast to the grey soil from the more sericitic facies. A similar rock type occurs on the Mims property, one mile east of the Landrum mine.

The foliation of the country rock strikes N. 40 degrees E. and dips 65 to 89 degrees N. A ridge extending across the Quattlebaum-Landrum properties and striking approximately N. 60 degrees E. results from the superior resistance of the numerous quartz veins which cut the rock at obligue angles. Thus the trend of the ridge does not correspond in direction to the foliation of the rock as is the usual case in the Piedmont region.

1/ Head, Dept. of Geology, University of South Carolina.

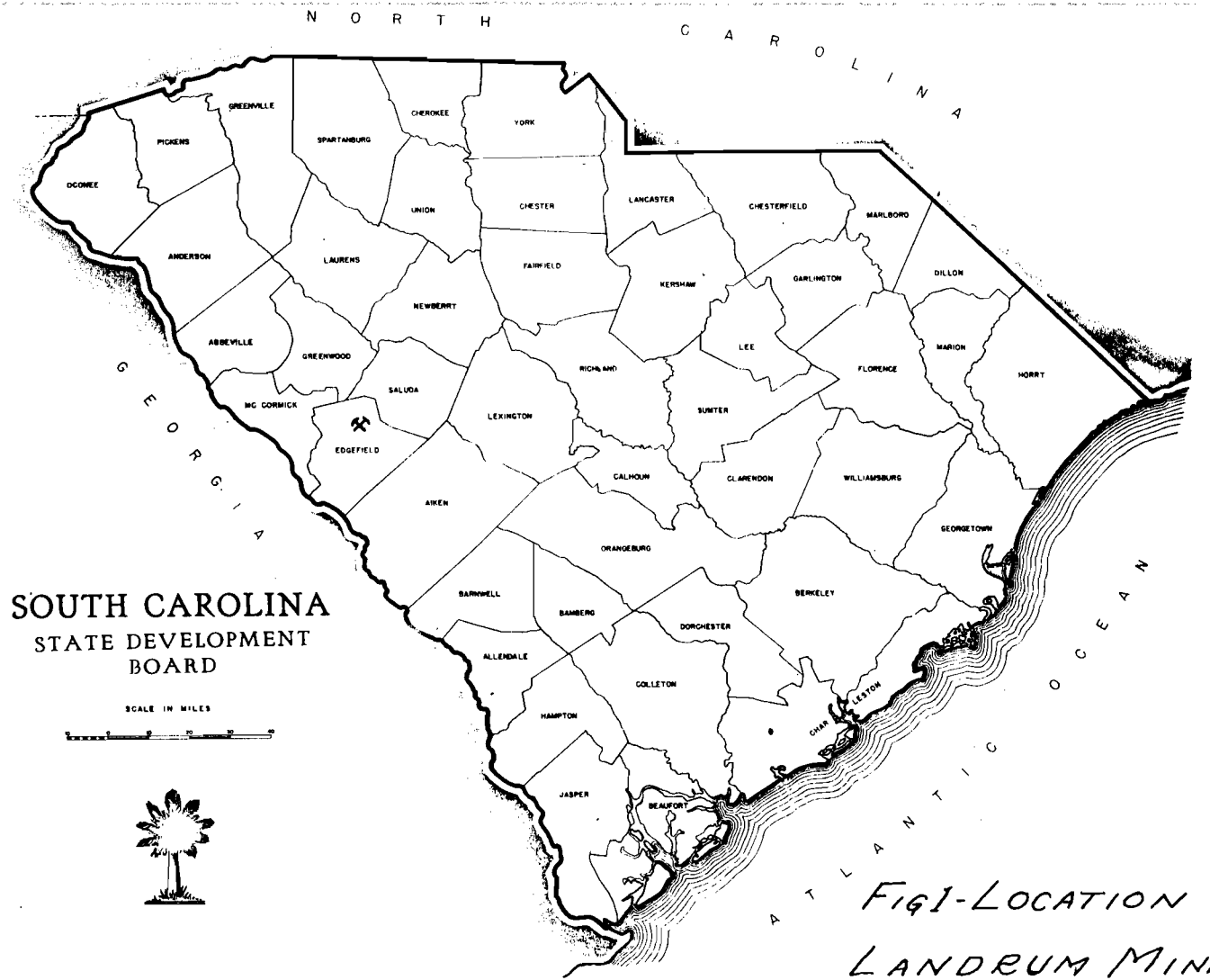

Fig1-Location of Landrum Mine

Quartz Veins

Quartz veins intersect the country rock at all angles. Single veins vary in thickness from an inch up to twenty feet and have lengths of a few feet up to about fifty feet.

The quartz is usually pure white except for iron stains along fractures and in vugs. The vugs are mostly due to the solution and removal of pyrite or to its oxidation to limonite.

The veins have almost every conceivable shape. The larger ones are mostly lens-shaped or tabular while the marjority of the others have various wedge-like forms.

The larger veins, which cut the country rock at an angle of about 20 degrees, occur in an overlapping succession with an echelon arrangement. Their dip is near vertical and their strike about N. 60 degrees E. The walls of these veins may be quite sharp, but in places the transition is somewhat gradual. Some of these larger veins are connected by means of stringers and small wedgelike masses of quartz which follow the general fracture system.

The mine tunnel reveals another pronounced and definite vein system. These veins are nearly horizontal and have a slight northerly dip. In the hanging wall of the open cut at the tunnel entrance, two such veins, each about two feet thick, are spaced about four feet apart. Again in the No. 1 cross cut (Fig. 2) into the foot wall a large vein of undetermined thickness seems to be of this type.

Zones of country rock complexly intersected by quartz stringers and wedges commonly occur on either side of the larger quartz veins. In most cases these zones are about one half quartz and one half slate. The slate is commonly rendered soft and talcose and the zones terminate abruptly against hard country rock within a few feet of the quartz veins. In places, however, as on the hanging wall side in Nos. 3 and 4 cross cuts, the large quartz veins appear to be sharply separated from the country rock, although in No. 4 cross cut, development had not proceeded far enough to verify this. Surface evidence indicates that conditions similar to those seen in the mine continue for 1,600 ft. throughout the extent of the mineralized zone.

Examination of the Quattlebaum property for a distance of ½ mile west of the Landrum mine indicated that conditions on this property are similar to those on the Landrum property except for differences in the country rock previously noted.

From the few exposures at the Mims property it appeared that the quartz veins are here better defined with fewer stringers and wedges and are thus lacking in the zones

OF MIXED QUARTZ AND SLATE. THIS SITUATION IS DOUBTLESS DUE TO THE LESS JOINTED CHARACTER OF THE COUNTRY ROCK. THE WRITER VENTURES THE OPINION THAT THE GOLD HERE OCCURS IN GREATER AMOUNT NEAR OR WITHIN THE QUARTZ VEINS RATHER THAN IN THE WALL ROCK SINCE THERE WAS LESS OPPORTUNITY FOR THE GOLD-BEARING SOLUTIONS TO PENETRATE THE LESS FRACTURED COUNTRY ROCK.

MINERALIZATION

THE GOLD WAS UNDOUBTEDLY DEPOSITED BY THE SAME SOLUTIONS WHICH DEPOSITED THE QUARTZ. ALTHOUGH THE GOLD IS FOR THE MOST PART TOO FINE TO BE SEEN WITH THE UNAIDED EYE IT IS BELIEVED TO HAVE BEEN ORIGINALLY LARGELY ASSOCIATED WITH PYRITE, THROUGHOUT WHICH IT WAS INTIMATELY DISSEMINATED. THE PYRITE IN TURN WAS ASSOCIATED WITH QUARTZ, AND ITS SUBSEQUENT DECAY HAS LEFT LIMONITE. THUS, HIGHLY STAINED ROCK IS LIKEWISE HIGH IN GOLD CONTENT. SINCE THERE IS COMMONLY A FAIRLY SHARP BOUNDARY BETWEEN PRACTICALLY UNIMPREGNATED COUNTRY ROCK AND THE SLATE CARRYING 1/3 TO 1/2 OR MORE QUARTZ, THE HANGING WALL AND FOOTWALL BOUNDARIES WERE DRAWN BETWEEN THESE TWO ZONES. THIS BOUNDARY IS ASSUMED TO MARK THE LIMITS OF ROCK WHICH CARRIES APPRECIABLE VALUES IN GOLD.

PROBABLY MUCH OF THE GOLD WAS R DISTRIBUTED AND SUBSEQUENTLY DEPOSITED ALONG JOINTS AND FRACTURES IN THE COUNTRY ROCK IN PROXIMITY TO THE QUARTZ VEINS AND VEINLETS. PANNING TESTS INDICATED THAT WHILE MOST OF THE GOLD IS FREE, A VARYING AMOUNT IS STILL CONTAINED IN THE SULPHIDES. THE PROPORTION OF FREE GOLD WOULD BE EXPECTED TO DECREASE WITH INCREASE IN DEPTH BELOW THE ZONE OF WEATHERING.

SAMPLING

THE DRIFT (SEE MAP) HAS BEEN DRIVEN MOSTLY IN THE SLATE WALL ROCK OR IN THE INTERMIXED ZONE LYING ON THE FOOT WALL SIDE OF THE EN ECHELON VEIN SYSTEM. OBVIOUSLY IT WAS EASIER TO DRIFT THROUGH THESE ROCKS THAN IT WOULD BE TO DRIVE ALONG THE NEARLY SOLID QUARTZ.

IN SAMPLING, CARE WAS TAKEN TO OBTAIN AN AVERAGE OF THE WHOLE ROCK ADJACENT TO PLACES WHERE THE SAMPLES WERE TAKEN. THE MATERIAL SHOWN ON THE MAP AS MIXED CAROLINA SLATE AND QUARTZ, AND INCLUDED BETWEEN THE ASSUMED FOOT AND HANGING WALLS, IS ABOUT ONE HALF COUNTRY ROCK AND ONE HALF QUARTZ. CONSIDERABLE DIFFICULTY WAS EXPERIENCED IN OBTAINING EQUAL PROPORTIONS OF EACH KIND OF THESE ROCKS. CHANNEL SAMPLES CONSISTED OF THREE-FOOT STRIPS. ALONG THE DRIFT, STRIPS WERE CHANNELLED VERTICALLY AND ALONG THE CROSS CUTS THEY WERE EXTENDED HORIZONTALLY. IN EACH CASE THE CHANNEL SAMPLE GAVE A SECTION ACROSS THE STRUCTURE OF THE ROCK. THE SAMPLES WERE CRUSHED IN IRON MORTARS, DRIED, AND ONE QUARTER OF EACH SELECTED FOR ASSAY.

FEW SAMPLES WERE TAKEN ALONG THE DRIFT FOR THE FIRST 100 FEET BECAUSE THE ROCK IS MOSTLY COUNTRY ROCK WITH FEW QUARTZ VEINS AND PRESUMABLY IS LOW IN GOLD.

The assays indicate that the average tenor of the mineralized rock is between $5.00 and $6.00 per ton. Assuming the lode to be 1600 feet in length, ninety feet wide, and to extend to a depth of 300 feet, the deposit would carry over 1,500,000 cubic yards of ore. This figure would be increased if ore is found to extend to greater depths. It is believed that the Landrum gold deposit offers future possibilities.

REFERENCES

Pardee, J. T. and Park, C. F. Jr.; Gold deposits of the southern Piedmont: U. S. Geol. Survey Prof. Paper 213.

SAMPLES

Sample No.	Location	Rock Type	Assay* Gold oz/ton
1	No. 0 cross cut, 6-9 ft. north of center line of drift	Country rock and quartz about half and half of each	1.12
2	No. 0 cross cut, 14-17 ft. north of center line of drift	Country rock with three 2-inch quartz stringers	0.02
3	10 ft. east of No. 0 cross cut, along hanging wall of drift	Mostly quartz with some country rock	0.10
4	20 ft. east of No. 0 cross cut, along foot wall of drift	Same as No. 3	0.32
5	No. 1 cross cut, 5-8 ft. north of center line of drift	Same as No. 1	0.08
6	No. 1 cross cut, 10-13 ft. north of center line of drift	Two-thirds rust stained country rock and about one-third quartz	0.10
7	No. 1 cross cut, 5-8 ft. south of center line of drift	Two-thirds quartz and soft country rock	0.14
8	No. 1 cross cut, 10-13 ft. south of center line of drift	Two-thirds country rock and one-third quartz	0.56
9	15 ft. east of No. 1 cross cut, along hanging wall of drift	Country rock with few quartz stringers	0.04
10	30 ft. east of No. 1 cross cut, along foot wall of drift	Mostly country rock	0.04

* Assays by Bennetts' Chemical Laboratory, 1131 Market Street, Tacoma, Washington, June 14, 1932.

SAMPLES (CONT'D)

SAMPLE No.	LOCATION	ROCK TYPE	ASSAY GOLD OZ/TON
11	No. 2 CROSS CUT, 5-8 FT. NORTH OF CENTER LINE OF DRIFT	SOLID QUARTZ	0.18
12	No. 2 CROSS CUT, 10-13 FT. NORTH OF CENTER LINE OF DRIFT	SAME AS No. 8	0.04
13	No. 2 CROSS CUT, 4-6 FT. SOUTH OF CENTER LINE OF DRIFT	SAME AS No. 1	0.20
14	10 FT. EAST OF No. 2 CROSS CUT ALONG HANGING WALL OF DRIFT	SAME AS No. 3	0.02
15	20 FT. EAST OF No. 2 CROSS CUT ALONG HANGING WALL OF DRIFT	SOLID QUARTZ	0.10
16	30 FT. EAST OF No. 2 CROSS CUT ALONG HANGING WALL OF DRIFT	SOLID QUARTZ	0.02
17	40 FT. EAST OF No. 2 CROSS CUT ALONG HANGING WALL OF DRIFT	SAME AS No. 1	0.02
18	No. 3 CROSS CUT, 5-8 FT. NORTH OF CENTER LINE OF DRIFT	QUARTZ, MUCH FRACTURED AND CONTAINING SOME SHREDS OF COUNTRY ROCK	0.38
19	No. 3 CROSS CUT, 5-8 FT. SOUTH OF CENTER LINE OF DRIFT	SAME AS No. 1	0.04

SAMPLES (CONT'D)

Sample No.	Location	Rock Type	Assay Gold oz/ton
20	10 ft. east of No. 3 cross cut along hanging wall of drift	Same as No. 18	0.04
21	20 ft. east of No. 3 cross cut along hanging wall of drift	Similar to No. 20. Quartz a little more rusty	0.46
22	No. 4 cross cut, 5-8 ft. north of center line of drift	Solid quartz	0.90
23	No. 4 cross cut, 10-13 ft. north of center line of drift	Solid fresh white quartz with few fractures	0.96
24	From roof of drift by No. 4 cross cut	Same as No. 20	0.76
25	10 ft. east of No. 4 cross cut along hanging wall of drift	Same as No. 24	0.50
26	20 ft. east of No. 4 cross cut along hanging wall of drift	Same as No. 24	0.24
27	From east face of drift	Mixed quartz and schist. The drift is here driven through the fractured quartz and soft talcose schist, lying on foot wall side of quartz vein	0.28
28	From floor of No. 1 cross cut, 8-10 ft. south of center line of drift	Solid quartz. From 2 to 3 foot thick flat-lying vein in floor of drift	0.18

SAMPLES (CONT'D)

SAMPLE No.	LOCATION	ROCK TYPE	ASSAY GOLD OZ/TON
29	NORTH SIDE OF OPEN CUT, 50 FT. WEST OF NO. 0 CROSS CUT. TEN FOOT CHANNEL SAMPLE TAKEN VERTICALLY FROM SIDE OF WORKING	SAME AS NO. 1	0.08
30	FROM SURFACE TRENCH ABOUT 255 FT. EAST OF EAST END OF DRIFT	3 FT. QUARTZ VEIN AND A 6 FT. MIXED ZONE. SAMPLE FROM MIDDLE OF MIXED ZONE.	0.22
31	FROM SURFACE TRENCH ABOUT 400 FT. EAST OF EAST END OF DRIFT	SOLID QUARTZ. NOTE: THIS TRENCH APPEARS TO BE OUT OF LINE OF STRIKE OF MAIN MINERALIZED ZONE.	0.06
32	FROM SURFACE TRENCH ABOUT 875 FT. EAST OF EAST DRIFT	SOLID QUARTZ	0.02
33	FROM SURFACE TRENCH ABOUT 1400 FT. EAST OF EAST END OF DRIFT	RUSTY AND VUGGY SOLID QUARTZ	0.10
34	FROM TEST PIT ON CREST OF RIDGE ON QUATTLEBAUM PROPERTY, 100 YDS. WEST OF ROAD. (SEE MAP)	SOLID QUARTZ	0.04
35	FROM OLD SHAFT ON QUATTLEBAUM PROPERTY NEAR ROAD	1 FT. OF QUARTZ AND 1 FT. OF COUNTRY ROCK	0.04

SAMPLES (CONT'D)

Sample No.	Location	Rock Type	Assay Gold oz/ton
36	From a 60 ft. surface trench on Mims property	Same as No. 9	0.06
37	From old shaft along road on Mims property	Same as No. 1	0.08
38	A sample taken from Landrum mine dump representing a composite of the last ore mined.		0.24

GEOLOGIC INVESTIGATIONS IN ORANGEBURG COUNTY, S. C.

W. K. POOSER, A GRADUATE STUDENT AT THE UNIVERSITY OF KANSAS, IS UNDERTAKING GEOLOGIC FIELD INVESTIGATIONS IN ORANGEBURG COUNTY, S. C., THIS SUMMER ON BEHALF OF THE COUNTY AND THE DIVISION OF GEOLOGY, STATE DEVELOPMENT BOARD. A GEOLOGIC MAP OF THE COUNTY WILL BE PREPARED, AND THE MINERAL RESOURCE POTENTIAL WILL BE SURVEYED. IN MAPPING, PARTICULAR EMPHASIS WILL BE PLACED ON THE RECOGNITION AND CORRELATION OF THE NEARLY FLAT-LYING TERTIARY FORMATIONS THAT COVER MOST OF THE COUNTY. THE POWER AUGER DRILL OF THE DIVISION OF GEOLOGY WILL BE USED TO TRACE FORMATIONS THAT NORMALLY ARE COVERED BY SOIL AND OTHER SURFICIAL DEPOSITS. CORRELATIONS BETWEEN HOLES AND BETWEEN HOLES AND OUTCROPS ARE BASED ON LITHOLOGIC CHARACTERISTICS, DRILLING CHARACTERISTICS, AND ON PALEONTOLOGICAL EVIDENCE. EXPERIENCE HAS SHOWN THAT GOOD FOSSIL COLLECTIONS (PARTICULARLY MICROFAUNA) CAN BE OBTAINED WITH THE DRILL FROM FORMATIONS THAT COMMONLY CROP OUT SO POORLY AS TO PROVIDE FEW IF ANY SPECIMENS. IT IS THOUGHT THAT EXTENSIVE USE OF THE DRILL WILL MAKE AVAILABLE MORE AND BETTER INFORMATION THAN HAS BEEN AVAILABLE TO GEOLOGISTS WORKING IN THE SOUTH CAROLINA COASTAL PLAIN IN THE PAST.

IT IS HOPED THAT THE SUMMER'S WORK IN ORANGEBURG COUNTY WILL THROW ADDITIONAL LIGHT ON THE FOLLOWING STRATIGRAPHIC PROBLEMS:

(1) RELATION OF THE CASTLE HAYNE LIMESTONE TO THE SANTEE LIMESTONE.
(2) RELATION OF THE CONGAREE AND MCBEAN FORMATIONS TO THE SANTEE AND CASTLE HAYNE LIMESTONES DOWN DIP.
(3) PRESENCE OR ABSENCE OF A UNIT OF WILCOX AGE (BLACK MINGO FORMATION?)
(4) LOCATION OF THE UPDIP LIMIT OF THE BLACK CREEK FORMATION (UPPER CRETACEOUS).
(5) IS OSTREA SELLAEFORMIS AS RELIABLE IN THE ATLANTIC COASTAL PLAIN AS IN THE GULF COASTAL PLAIN?
(6) IS THE WARLEY HILL MARL (MIDDLE CLAIBORNE) A VALID FORMATION?
(7) EXTENT AND VALIDITY OF THE HAWTHORNE FORMATION (MIOCENE) IN UPDIP AREAS.
(8) ARE THE GRAVELS THAT OCCUR IN SOME UPLAND AREAS PART OF A SINGLE WIDESPREAD DEPOSIT OR DO THEY REPRESENT SEVERAL LOCAL ALLUVIAL DEPOSITS?
(9) GENESIS AND CORRELATION OF THE WIDESPREAD BLANKET OF ORANGE-RED CLAYEY SAND SURFICIAL DEPOSITS.
(10) EXTENT AND RELATION OF THE MCBEAN (UPPER CLAIBORNE) AND BARNWELL (JACKSON) FORMATIONS IN NORTHWESTERN ORANGEBURG COUNTY.

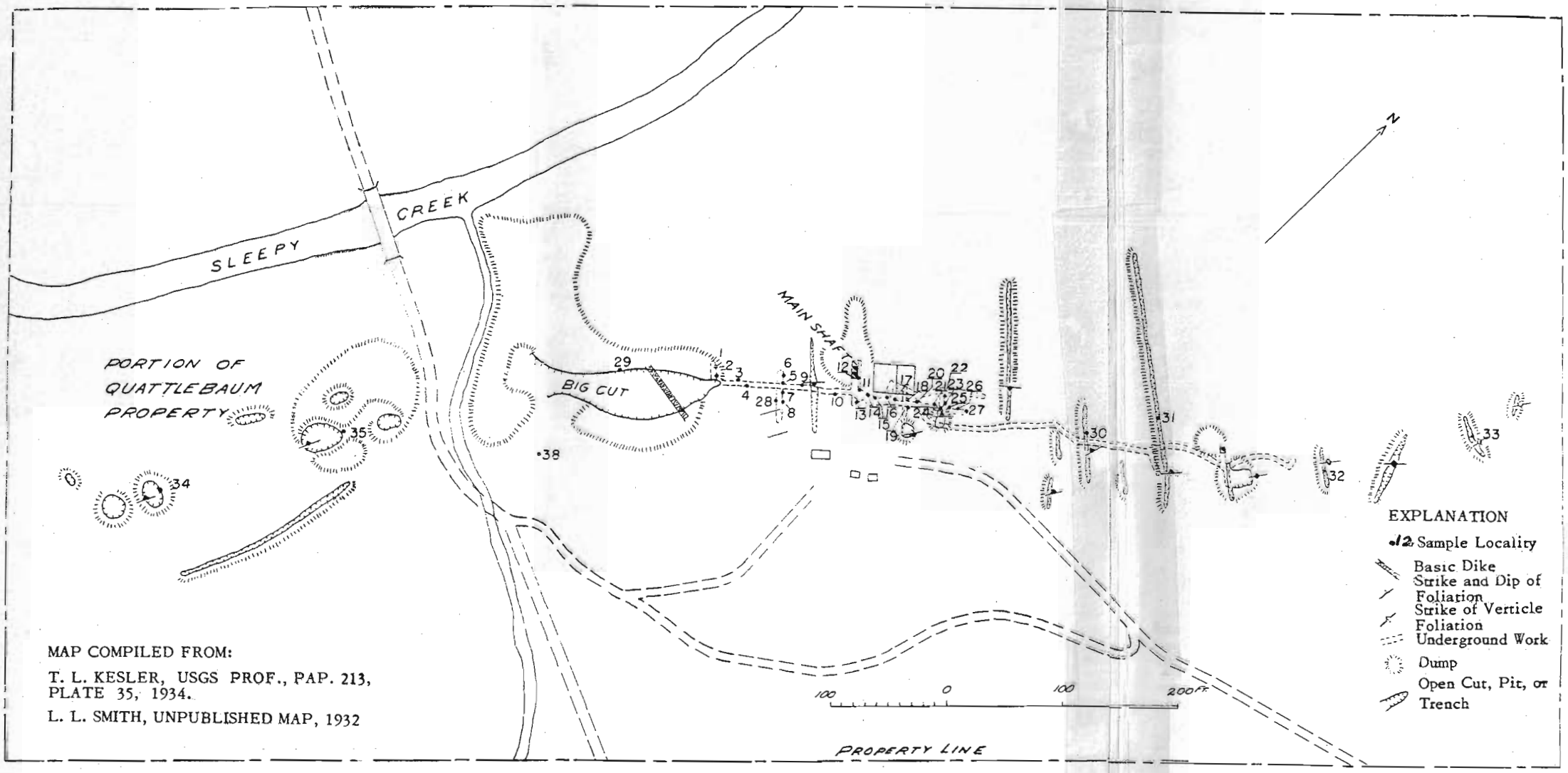

FIG 2 MAP OF LANDRUM MINE, EDGEFIELD CO., S.C.