

ASSOCIATION
OF
MISSOURI GEOLOGISTS

FIRST ANNUAL FIELD TRIP
OCT. 10-11, 1954

SPONSORED BY ST. JOSEPH LEAD COMPANY
BONNE TERRE, MISSOURI

WELCOME MESSAGE BY J. S. BROWN
Chief Geologist, St. Joseph Lead Co.

The Geological Staff of the St. Joseph Lead Company is honored by selection for leadership of the First Annual Field Meeting of this Association. It seems fitting, moreover, that this should be held in the region of the State's oldest outcropping rock formations, widely known to the profession through the excellent publications of the Missouri Geological Survey, First, Second, and Third, or present eras. One of the more important contributions of the Third Survey is the report of Buckley and Buehler on the "Disseminated Lead Deposits of St. Francois and Washington Counties", 1908. Since that date, no comprehensive geological study of the lead district has been made in spite of its phenomenal production and the enormous amount of information accumulated. Such a study is now being conducted by our staff and, although not complete, has yielded substantial results. We hope to continue the present practice of making available to the public such of these results as seem to be of general interest or value, and can be released without prejudice to the Company's large financial stake in this important industry. It is our pleasure to present some of this information on this occasion to you who are concerned, as we are, with the mineral industry of this State and area.

ASSOCIATION OF MISSOURI GEOLOGISTS

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	J. S. Brown - St. Joseph Lead Company
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	N. S. Hinchey - Washington University
	R. C. Valenta - General Refractories Co.

ST. JOSEPH LEAD COMPANY GEOLOGY STAFF

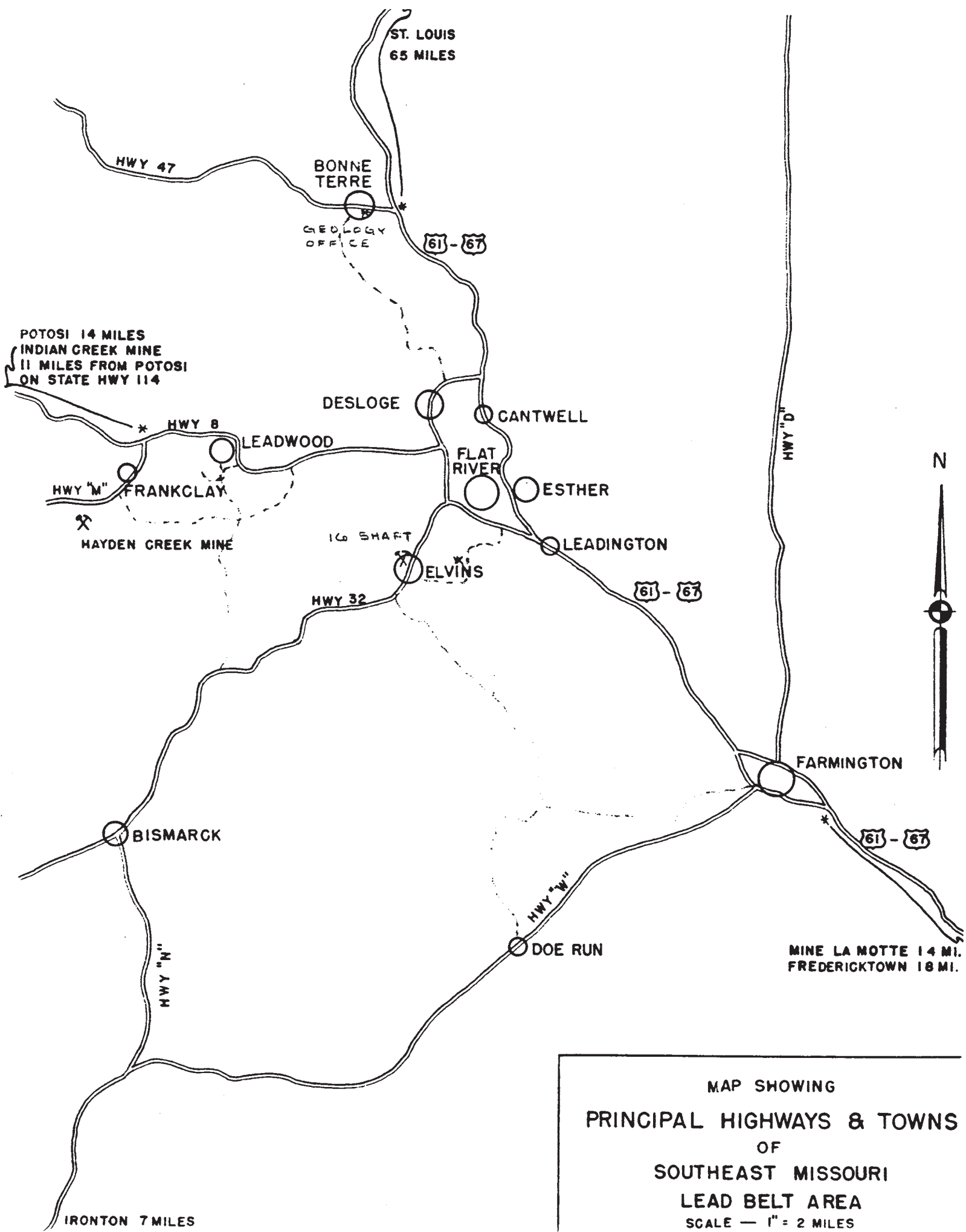
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Ralph Henry		

Sunday, October 10

- 8:00 A.M. - Assembly and Registration, Geology office, St. Joseph Lead Company, Bonne Terre, Missouri.
- 8:30 A.M.
- 3:30 P.M. - Surface Field Trip over parts of St. Francois and Ste. Genevieve Counties. Lunch will be eaten in the field with box lunches provided for those who have reserved them. See page 4 for the trip route and description of the stops.
- 6:30 P.M. - Dinner at the Masonic Hall in Bonne Terre, one block west of the Geology office.
- 8:00 P.M. - Business meeting and discussion period. Open house in the St. Joe Geology office.

Monday, October 11

- 7:30 A.M. - Meet at collar of No. 16 shaft (#8 mine) in Elvins for underground trip. See page 7 for a description of the stops. Lunch underground with box lunches for those who have reserved them.
- 2:00 P.M. - A visit to the diamond drill core house has been planned for those who wish to see these facilities.



MAP SHOWING
 PRINCIPAL HIGHWAYS & TOWNS
 OF
 SOUTHEAST MISSOURI
 LEAD BELT AREA
 SCALE — 1" = 2 MILES

ASSOCIATION OF MISSOURI GEOLOGISTS

Route of Surface Field Trip, Sunday, October 10, 1954

STOP NO. 1 - Bonne Terre Rock Quarry. Derby-Doerun formation exposed. Approximately 580 feet above the Lamotte and 20-40 feet above the top of the Davis. The view to the east is across the Farmington anticline.

STOP NO. 2 - Along creek north of Bonne Terre. The Big River Fault zone cuts off the thick upper Bonneterre beds seen in driving north and drops the Davis shale about 75 feet. Rubbled Bonneterre dolomite in the fault zone is exposed in the railroad cut.

- - -

A good exposure of Davis shale may be seen on the right at the point where the route enters Highway 67, between stops 2 and 3.

STOP NO. 3 - Bonne Terre Golf Course. Davis-Bonneterre contact exposed in a ditch. A drill hole nearby shows the Bonneterre resting on Lamotte 398 feet below this point.

- - -

Traveling east through East Bonne Terre, the hill-tops are Davis to the East Bonne Terre School; then the road is on the Bonneterre formation to a point east of Jaydee, getting lower and lower in the section. Thick-bedded upper Bonneterre beds are exposed on the east approach of the Big River bridge.

STOP NO. 4 - Just east of Terre Bleue creek bridge. Outcrop of limestone in the middle Bonneterre about 150 feet above the Lamotte.

STOP NO. 5 - On Andrews Branch, east of Jaydee. Lower sandy, glauconitic Bonneterre in contact with Lamotte.

- - -

East along the new road to Thurman (Highway C), thence north, the road crosses the Lamotte outcrop in the middle of the Farmington anticline. At the ford crossing Fourche a du Clos, there is an exposure of cross-bedded Lamotte. Just north of the ford, a fault brings in thin-bedded middle Bonneterre for a short distance.

STOP NO. 6 - Section of Lamotte to Potosi along Fourche a du Clos creek, west of Lawrenceton. This section is on the east flank of the Farmington anticline. The three main divisions of the Bonneterre recognized in the Lead Belt are found here also. These are: a lower thin-bedded glauconitic dolomite zone; a middle, thin to medium-bedded, limestone zone, and an upper, thick-bedded, oolitic dolomite zone. Good sections of the Davis and Derby-Doerun and a good exposure of the lower Potosi.

- - -

Travel along Bonneterre outcrop to the southeast along Highway C to Junction with Route 32.

- STOP NO. 7 - Excellent exposure of the Ste. Genevieve Fault zone along the Missouri-Illinois Railroad. Lamotte set against Potosi. A total displacement of 1100 +. Going east along the railroad there are successive exposures of Lamotte, Potosi, Jefferson City and Roubidoux.

- - -

Travel west along Route 32 to Millers Station, turning south off 32 just before crossing the railroad.

- STOP NO. 8 - Pre-Cambrian granite outcrops and Lamotte overlying granite in Jonca creek. This is the center of the Farmington anticline.

- - -

Return to Highway 32 and proceed to the Highway 32 bridge over the railroad just west of the Flat River business district.

- STOP NO. 9 - Exposure of Davis formation in railroad cut beneath the bridge. Approximately 440 feet above the Lamotte. Several edgewise conglomerate layers are interbedded with the shale.

- - -

Follow Highway 32 through Elvins to the Zephyr gasoline station.

- STOP NO. 10 - The Davis formation type section is exposed along the railroad through Flat River, Rivermines and Elvins. At this stop, the "marble boulder" zone is well exposed. It is 63 feet below the Davis-Derby-Doerun contact, which is exposed 100 yards to the south.

- - -

Go back through Flat River and Desloge (along the spur section of Highway 32 leading toward Andrews Motel) and turn left just beyond the Imperial gas station. Cross the Big River bridge and turn right into the Valley Dolomite Company Quarry.

- STOP NO. 11 - An excellent exposure of the topmost beds of the Bonnetterre within 75 feet of the Davis. This rock is burned and sold to steel companies for basic open hearth furnace linings.

BONNE TERRE QUADRANGLE
(After Buckley)

STE. GENEVIEVE QUADRANGLE
(After Weller & St. Clair)

ROUBIDOUX (ORD.) - 60 feet

Sandstone and chert with minor dolomite and shale.

GASCONADE (CAMB.) - 250-300 feet

Crystalline dolomite and chert. Gunter sand at base. Chert beds and nodules, some dense, some cryptozoan, some cellular and rosy. Thin bed, dolomite.

EMINENCE - 120 feet /

Mapped with Potosi. Gray, Cryst. dolomite and chert. Massive beds. Lighter colored and more coarse than Potosi and druse almost absent.

POTOSI - 380 feet /

Dolomite and chert. Heavy chert druse.

POTOSI - 160-200 feet

Cryst. brown dolomite with quartz druse and honeycomb chert.

DERBY-DOERUN - 90-100 feet

Doerun 50-60 feet - dolomite, shaly and locally with small quartz druse; thin bedded.

Derby 38-40 feet - Massive dolomite similar to Bonneterre

DERBY-DOERUN - 70' north to 15' south

Dolomite, mostly like Flat River Derby with thick, massive beds.

DAVIS - 170 feet /

Shale, dolomite and limestone. Many conglomerate beds, often of edgewise variety; "Marble-boulder" bed 63 feet from top.

DAVIS - 65-80 feet

Shale and dolomite. No good conglomerate beds. Shale green to yellow and gray. Dolomite beds vary in thickness.

BONNETERRE - 360-400 feet

Dolomite and limestone. Sandy, shaly, clauconitic and thin bedded near bottom. More massive and purer toward top, tending to be oolitic.

BONNETERRE - 390 feet /

Dolomite with some limestone and shale. Sandy, shaly, glauconitic and thin bedded at base. Most limestone in lower half. Thicker bedded and oolitic toward top.

LAMOTTE - 0-250 feet

Sandstone and minor dolomitic sand; some shale, much cross-bedding.

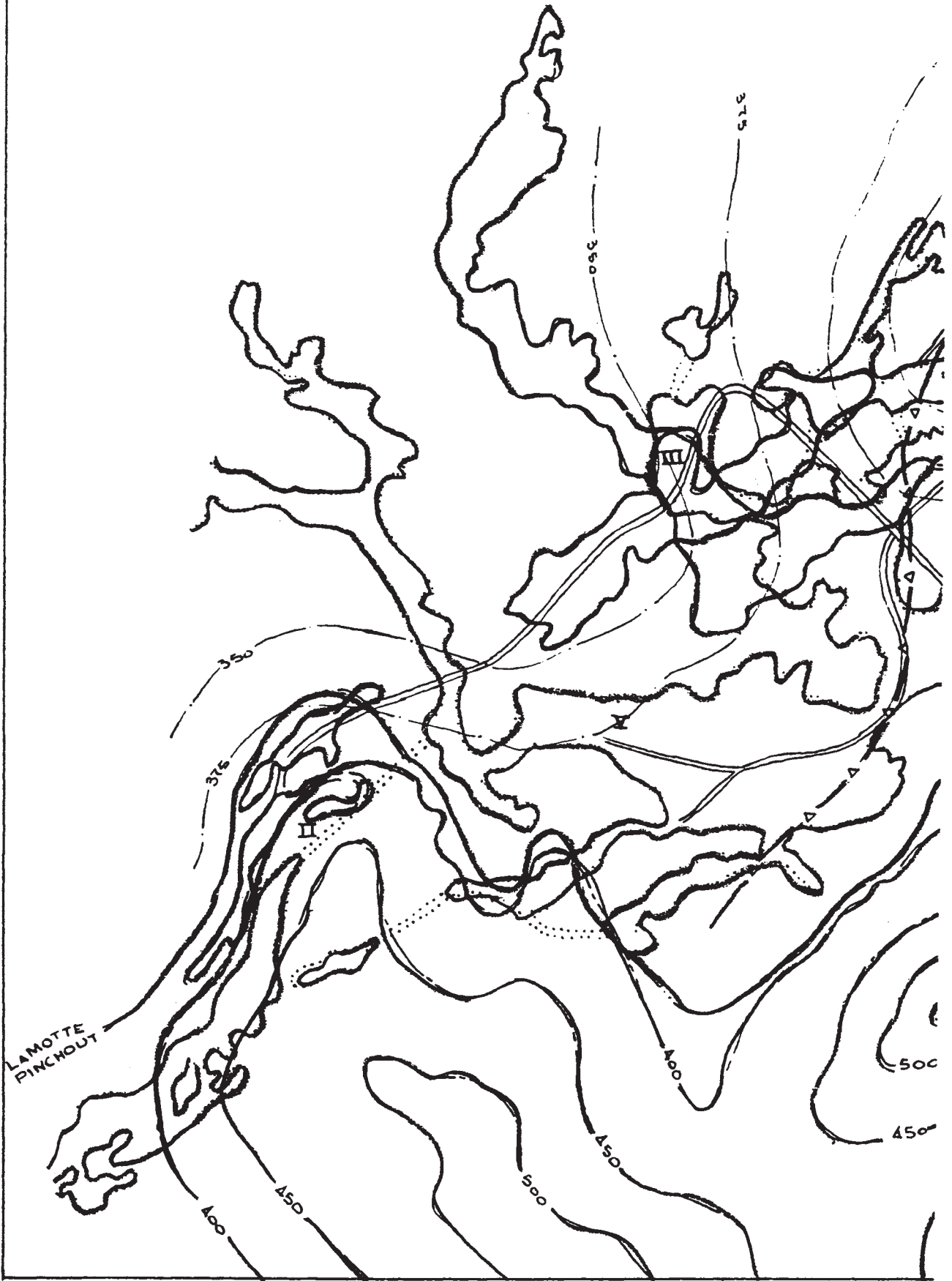
LAMOTTE - 0-500 feet

Sandstone, some sandy shale and dolomite. Good cross-bedding.

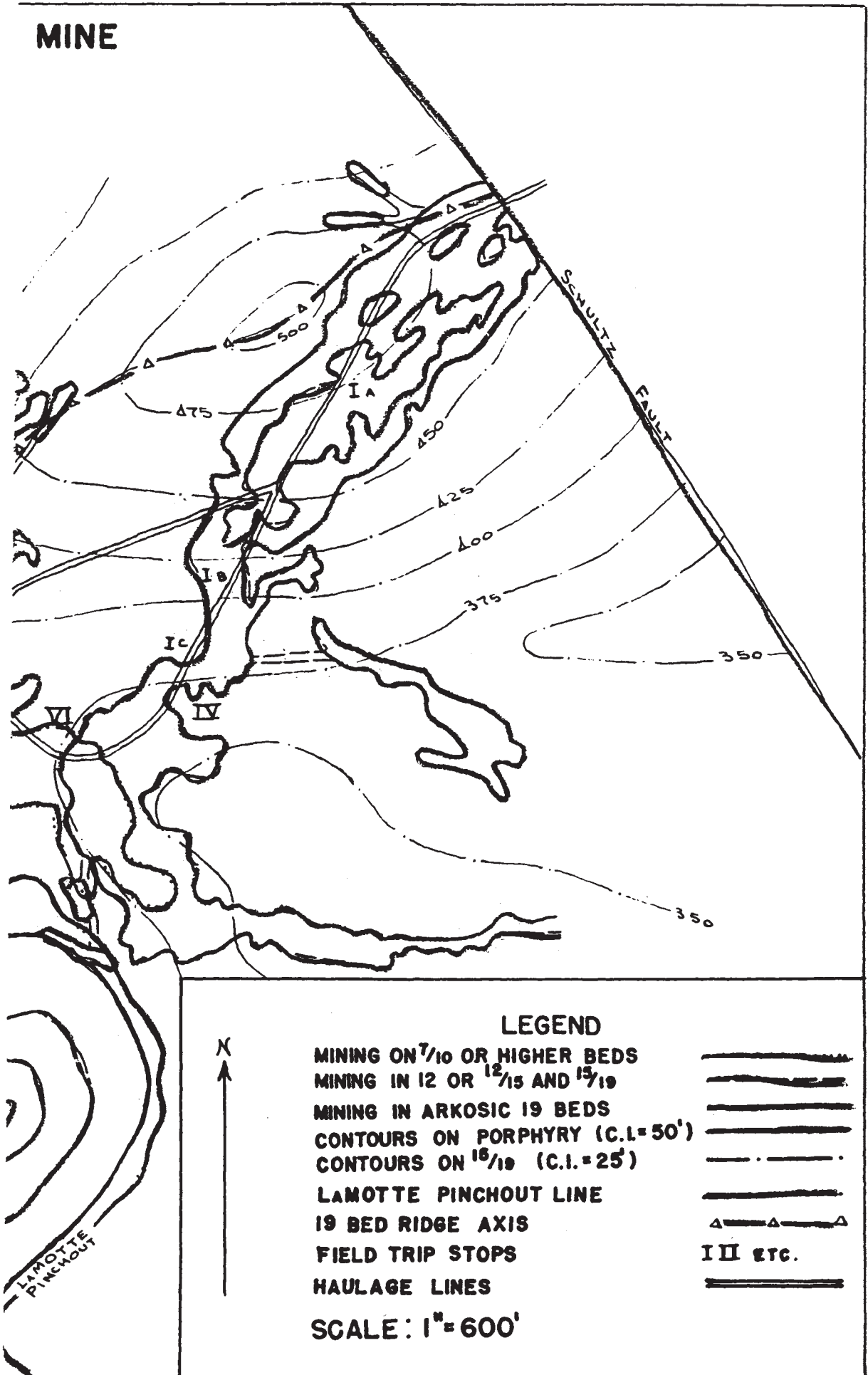
GRANITE & PORPHYRY - (Pre-Cambrian)

GRANITE & PORPHYRY - (Pre-Cambrian)

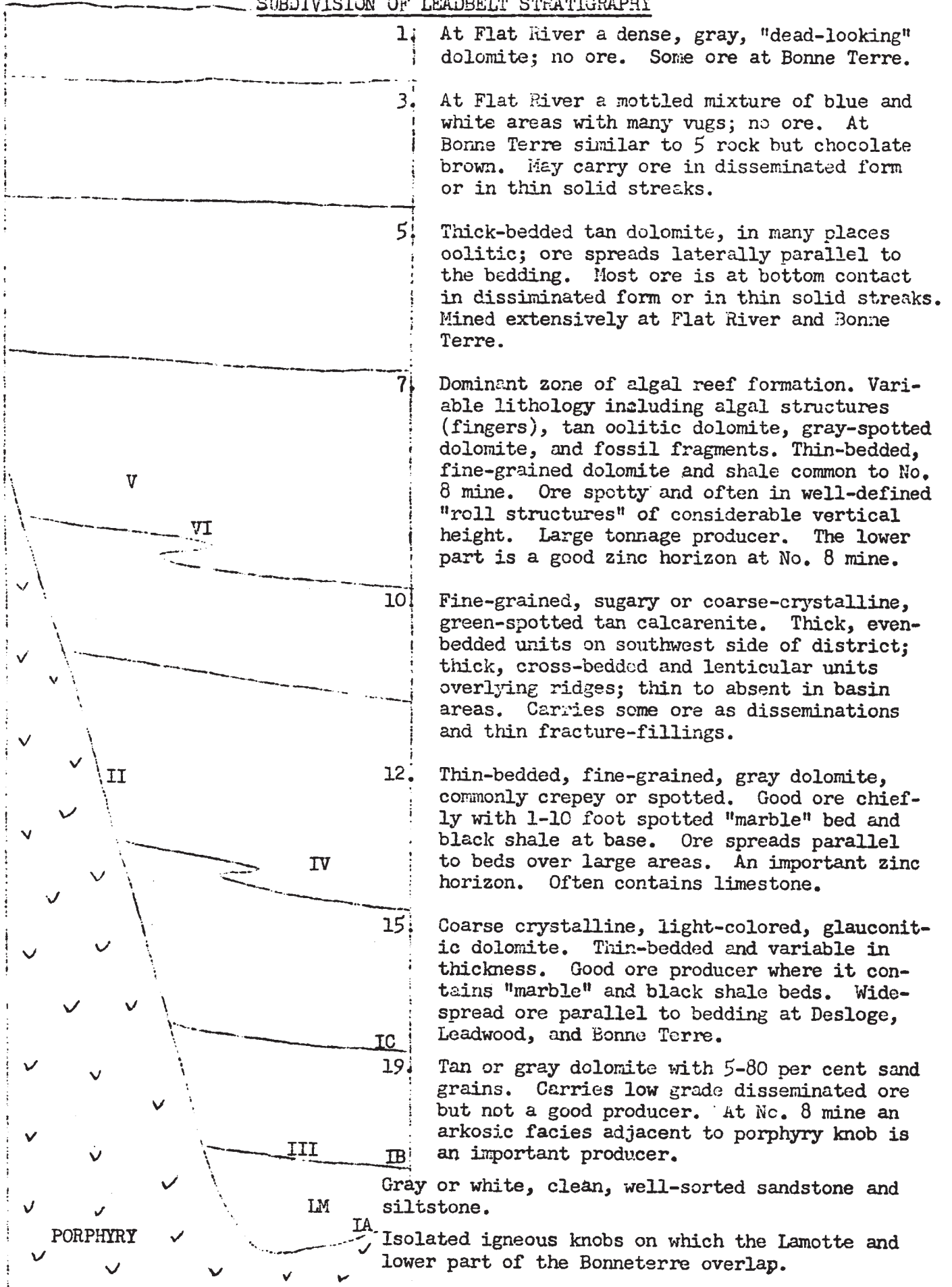
INDEX MAP — NO.8



MINE



SUBDIVISION OF LEADBELT STRATIGRAPHY



SCHEDULE FOR UNDERGROUND FIELD TRIP: NO. 8 MINE

To reach No. 8 Mine: Take highway 32 south out of Flat River. Turn right at gray-shingled Methodist Church (1 block south of Elvins city limits sign) on Hampton Avenue. Follow Hampton three blocks to blacktop street on right at 60° angle to Hampton (see chat pile 1 block north). Follow blacktop about two blocks to mine.

Stop No. 1 Cross section of 15/19/Lamotte ridge.

- a. Lamotte over porphyry. Drift heading S30W. Exposure is about 100 feet east of crest of Lamotte ridge. Lamotte here is about 30 feet thick, 19 bed is about 55 feet thick.
- b. 19/Lamotte. Crest of ridge several hundred feet to northwest. Contact marked by thin conglomeratic zone with porphyry pebbles. Lamotte thickness unknown; 19 bed about 45 feet thick.
- c. 12/15/19 contact on southeast flank of ridge. "Marble zone above" 19. 15 bed thickens to west, is absent to east. 19 bed about 30 feet thick; the Lamotte, a short distance to the south, is 220 feet thick. The lead seam at the back is mined to the northwest. The 12 bed here is about 60 feet thick with a thick section of 10 overlying it on the high to the northwest, but with no 10 in the basin to the southeast.

Stop No. 2 Porphyry stope. Uppermost of three levels of mining on northwest flank of porphyry knob. To the south 500 feet the porphyry stands 100 feet higher than where seen in this stope. The stope is upslope from both the Lamotte and 19 pinchout lines. The spotted dolomite is one of the many varied phases of the 12 bed.

Stop No. 3 Sand Mine. The occurrence at No. 8 mine is the only one within the Lead Belt proper at which extensive mining has been done at the base of the 19 bed. The Lamotte contact is at or near the floor. The 19 host rock is a coarse-grained, poorly sorted, arkosic, dolomitic sand. This phase is a thin tongue filling a low on the Lamotte. The porphyry cobble bed, seen at places on the back, marks the upper contact of the ore. The porphyry cobble bed and the 19/Lamotte contact are useful marker beds in making isopach maps of the orebody. Well-formed galena crystals are common in vugs.

Stop No. 4 286 Stope. This is an old stope where later prospecting led to discovery of more ore in the back. The back ore is mined from a trapeze platform. Locally, this is known as "trap mining".

The steeply dipping 12/19 contact is seen at the southeast side of the stope. Most of the earlier mining as well as the back ore is in the 12 zone.

Stop No. 5 3728 Stope. This area is mined on a series of small reefs, giving long, narrow, high stopes separated by unmined areas of barren tan dolomite. Individual reefs are 40-50 feet wide, 500-600 feet long, and up to 30 feet high. Reef rock with fingers (algal structures) oriented vertically is considered to be in place. Rock at the edge of the reef in which oriented fingers cannot be seen is probably reef detritus. Later brecciation due to compaction or differential movement was most prominent at the edges of the reefs, resulting in

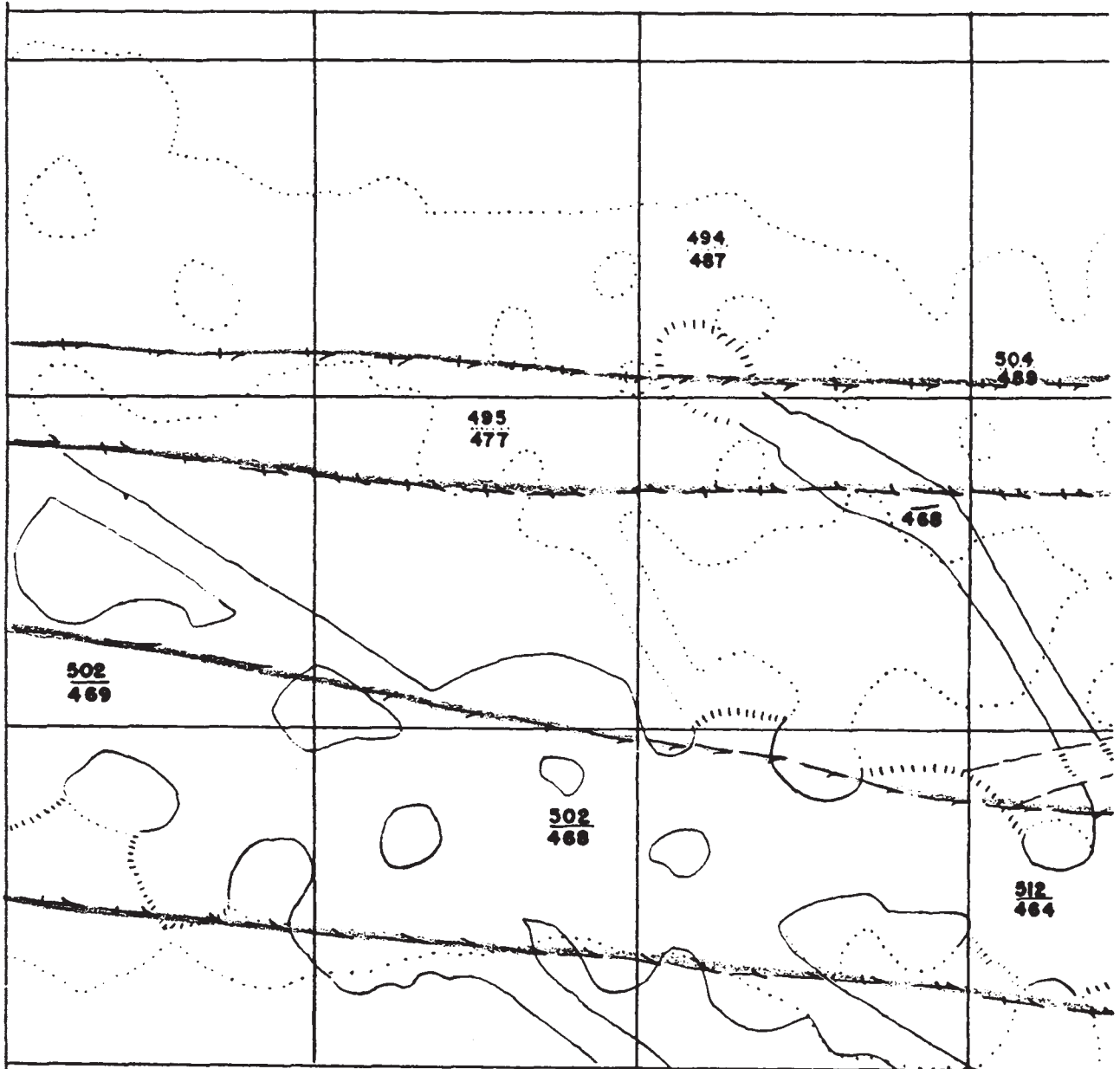
more extensive mineralization along the flanks of the reefs. Attendant solution also make this zone vuggy, with numerous good galena and calcite crystals in the vugs. The rock above the reefs is fine-grained, thin-bedded, shaly dolomite interbedded with thin zones of organic carbonate (now dolomite). In this rock ore spreads parallel to bedding over the entire reef and inter-reef area. The floor of the stope is approximately 20 feet above the base of the 7. It is over the crest of the tan ridge. The high back is about 20 feet below the 5/7 contact.

Stop No. 6 960 Stope. Coming into this stope the track ditch cuts across the upper part of the 10 bed. Units within the 10 dip steeply to the southeast, although the 7/10 contact dips only slightly to the southeast.

Within the stope the 7/10 contact is seen at or near the floor. The fine-grained, thin-bedded 7 rock is the off-ridge phase as contrasted with the reef phase seen at Stop 5. Brecciation due to penecontemporaneous slumping is common.

Considerable fine-grained zinc is present.

Stop No. 7 4587 Stope. This is the area of well-developed fan structures described by Tarr in his 1936 paper. Ore is at and just above the 12/19 contact. Thick beds of "marble" fan out into a few inches of black shale. Ore is associated with the black shale. The steeply dipping beds at the back are cross-bedded tan units like those seen at the preceding stop.



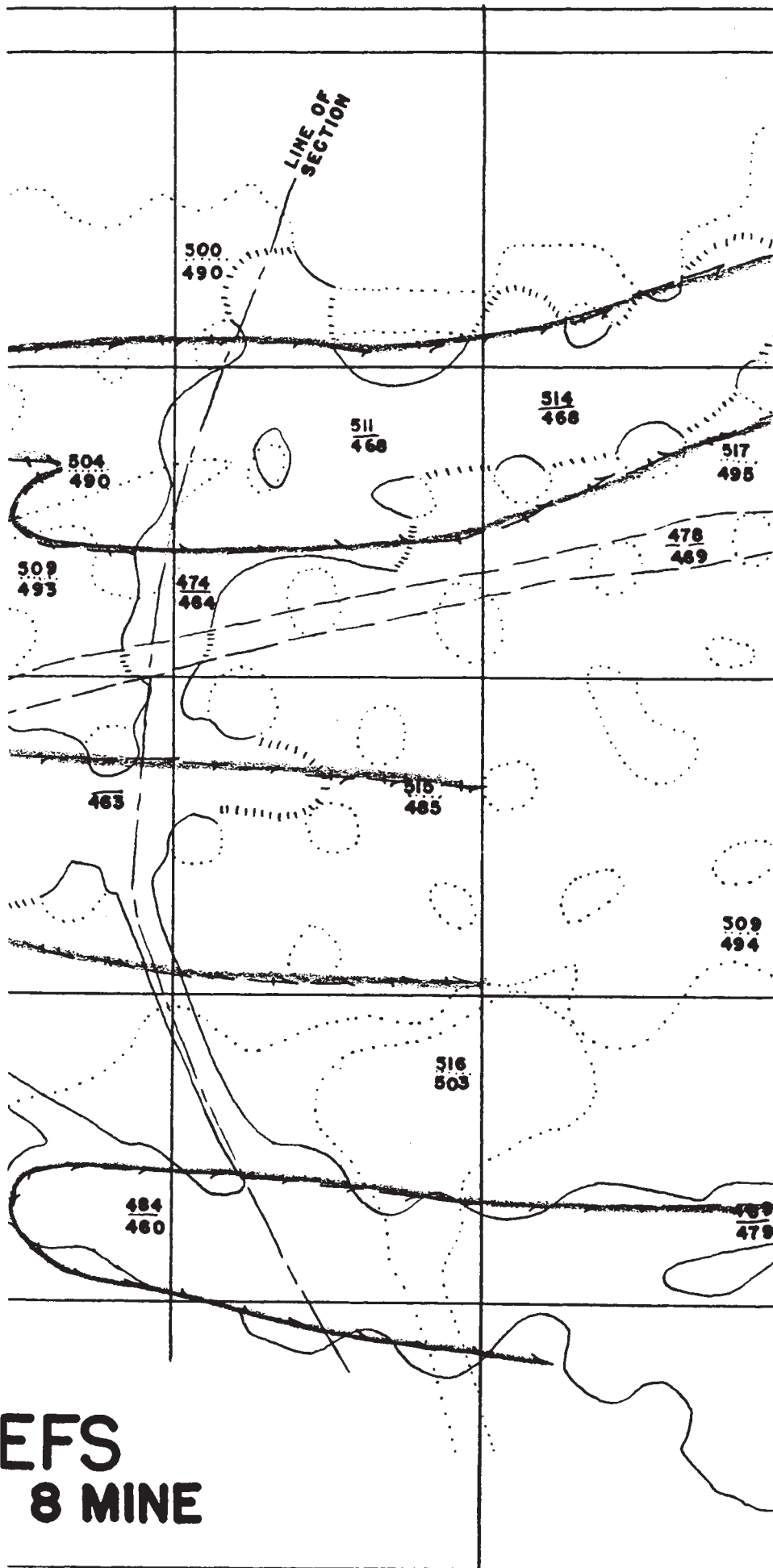
LEGEND

- MAIN MINING LEVEL —————
- HIGHER MINING LEVEL
- INTERMEDIATE LEVEL - - - - -
- BLUFF JOINING LEVELS |||||
- ELEVATION 512
- BACK FLOOR 464
- OUTLINE OF REEF
- MAPPED =====
- INFERRED =====
- SECTION OF REEF =====
- CALCARENITE [stippled]
- SHALY DOLOMITE [horizontal hatched]

SCALE: HORIZ. 1" = 50'
 VERT. 1" = 25'

F.G.S. SEPT. 1954

**ALGAL REEFS
 3728 STOPE — NO**



**EFS
8 MINE**

