

TRIP F-3

Base Metal Ore Deposits of southern Hancock County, Maine

by

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Assemble in private cars at 6:45 AM at Rangeley Inn Parking lot on Sunday October 4, 1970 - or - in shopping center on south side of Bucksport on U.S. Route 1 at 10:15.

This trip will visit two base metal properties in southern Hancock County, the Harborside Mine of the Callahan Mining Co. and the Blackhawk Property near Blue Hill. These localities represent two possible examples of base metal sulphide deposits representative of the ore prospect environments of the southern volcanic belt of Maine.

The geology and ore deposits of the area are presently under study. D.B. Stewart of the U.S. Geological Survey is continuing work in the Castine 15' minute series quadrangle and the islands to the south and west. E.S. Cheney has just completed work on geology of the Blue Hill-Castine District. Previous work includes a prospect evaluation of the Hancock County deposits by R.S. Young in 1962, and P.S. Wingard studied the area as an unpublished Ph. D. thesis (Univ. of Illinois) in 1961. Maine Geological Survey personnel have conducted numerous field studies in the area during the last decade.

The author wishes to acknowledge the assistance of staff members of the Callahan Mining Co. and Blackhawk Mines, ltd. for their assistance in obtaining permission to visit the properties and offering technical assistance.

General Geology

The area is underlain by a 30 mile wide belt of Ordovician(?) to Lower Devonian age folded and faulted metasedimentary and metavolcanic rocks, including meta-fragmental volcanic rocks. That were intruded by plutonic rocks of the Bays-of-Maine complex, mostly mafic in character, and Devonian age granite.

Although an absolute stratigraphic section has not been established, there are indications of the following series of rocks:

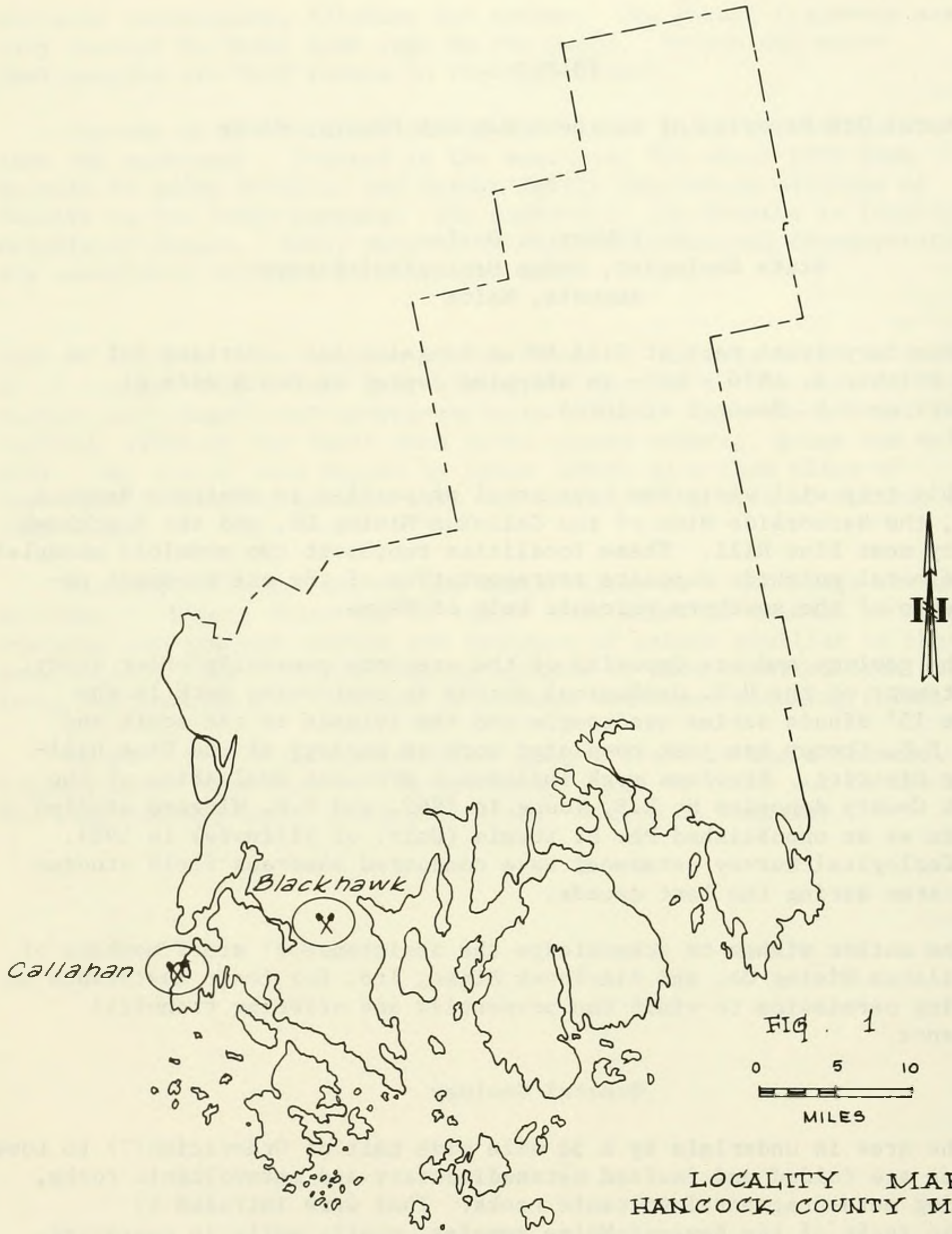


FIG. 1
0 5 10
MILES
LOCALITY MAP
HANCOCK COUNTY MAINE

	Granitic intrusion with mafic dikes	(Acadian Orogeny)
Devonian		
Silurian	Castine formation	Metasediments and felsic metavolcanics.
	Ellsworth schist	Metasediments, quartzite metavolcanics.
Ordovician (?)	Penobscot black slate	Black, sulphitic slate, minor metasandstone.

Early Devonian (Acadian) regional metamorphism developed many south-westerly plunging folds. This event was followed, according to Cheney, "with the generation of northeasterly and northerly trending faults of moderate displacement that cut all of the metasedimentary units." Contact metamorphic aureoles have altered and deformed the surrounding metasediments. As a result of intrusion of the porphyritic, leucocratic quartz monzonite stocks.

With the exception of the massive replacement (?) deposit at the Harborside Mine, all of the Fe-Zn-Cu-Pb sulphide prospects which have been examined in the district occur within the contact aureoles surrounding the granitic plutons, (from Cheney, 1969).

Description of Deposits

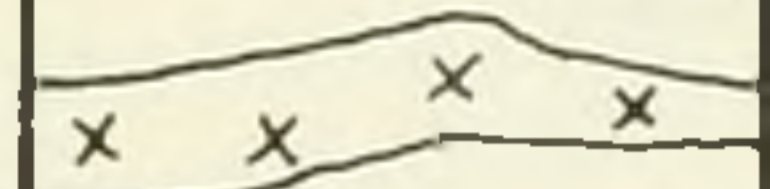
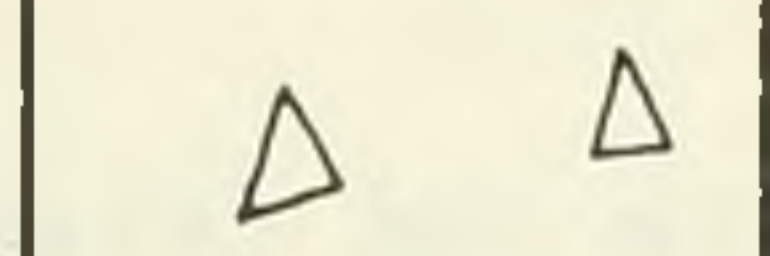
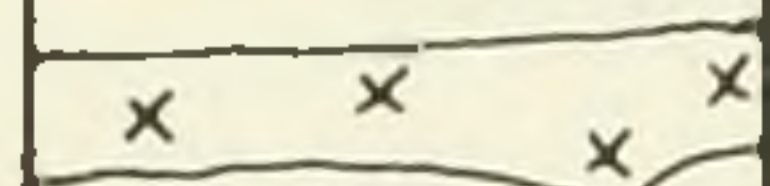
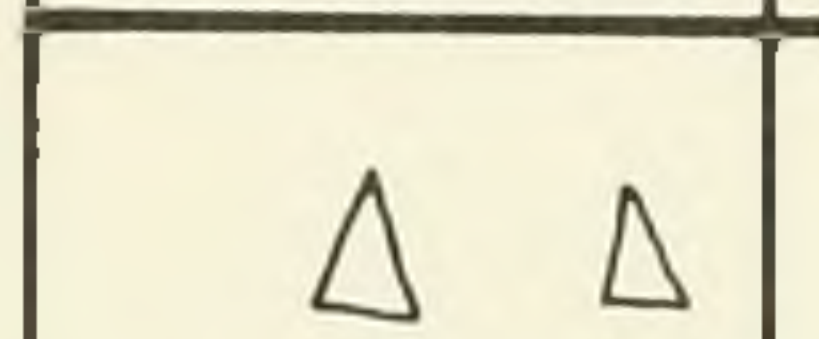
The two deposits to be visited on Trip F-3 are presumed to occur in radically different environments. The Harborside Mine at Cape Rosier is producing from a disseminated, massive replacement suite of sulphide minerals occurring within a section of silicious, highly altered and sheared metavolcanic rocks of the Castine formation. Cheney (1969) describes the Blackhawk Mine in Blue Hill Township, "the stratabound copper and zinc deposits....occur within a quartzite-bearing interval of the Ellsworth schist next to the northern margin of the Sedgwick pluton.

Harborside Mine. This property is located on the northshore of the Cape Rosier Peninsula close to Penobscot Bay (Figure 2). It is an open pit and adit operation, producing 750 tons per day of copper-zinc ore. A concentrating plant is located on the property, with separate zinc and copper concentrates shipped to contract smelters.

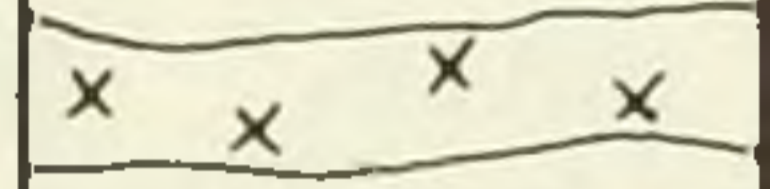
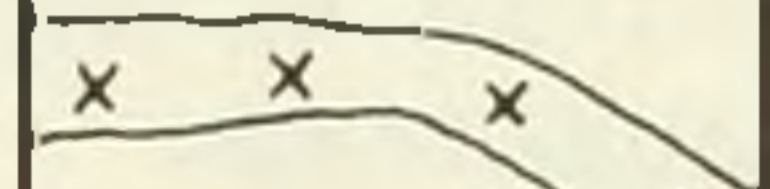
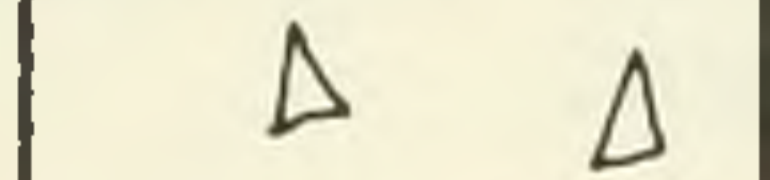
Pyrite, chalcopyrite and sphalerite are the ore minerals, occurring within a talc-chlorite-carbonate unit in the Castine formation. This unit is 120'-200' thick, wedging out (?) with depth. Figure 2 shows the stratigraphic relations of the mine area. The section strikes N.N.E. and dips S.E. at a moderate angle. The talc ore zone dips 45° at the surface, shallowing to 20°-25° with depth. The sulphides are present as fine,

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4

Fragmental: Various fragment types and sizes in a siliceous matrix

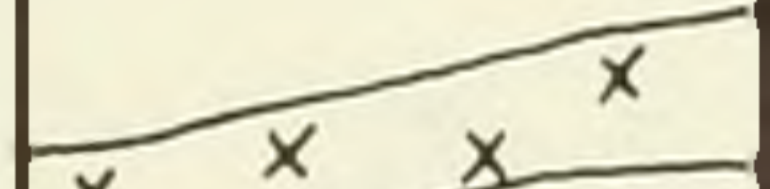


Hanging Wall rhyolite breccia: angular rhyolite fragments in a chlorite to rhyolite matrix. Cut by numerous fine grained diorite dikes. Average thickness of zone: 325 feet

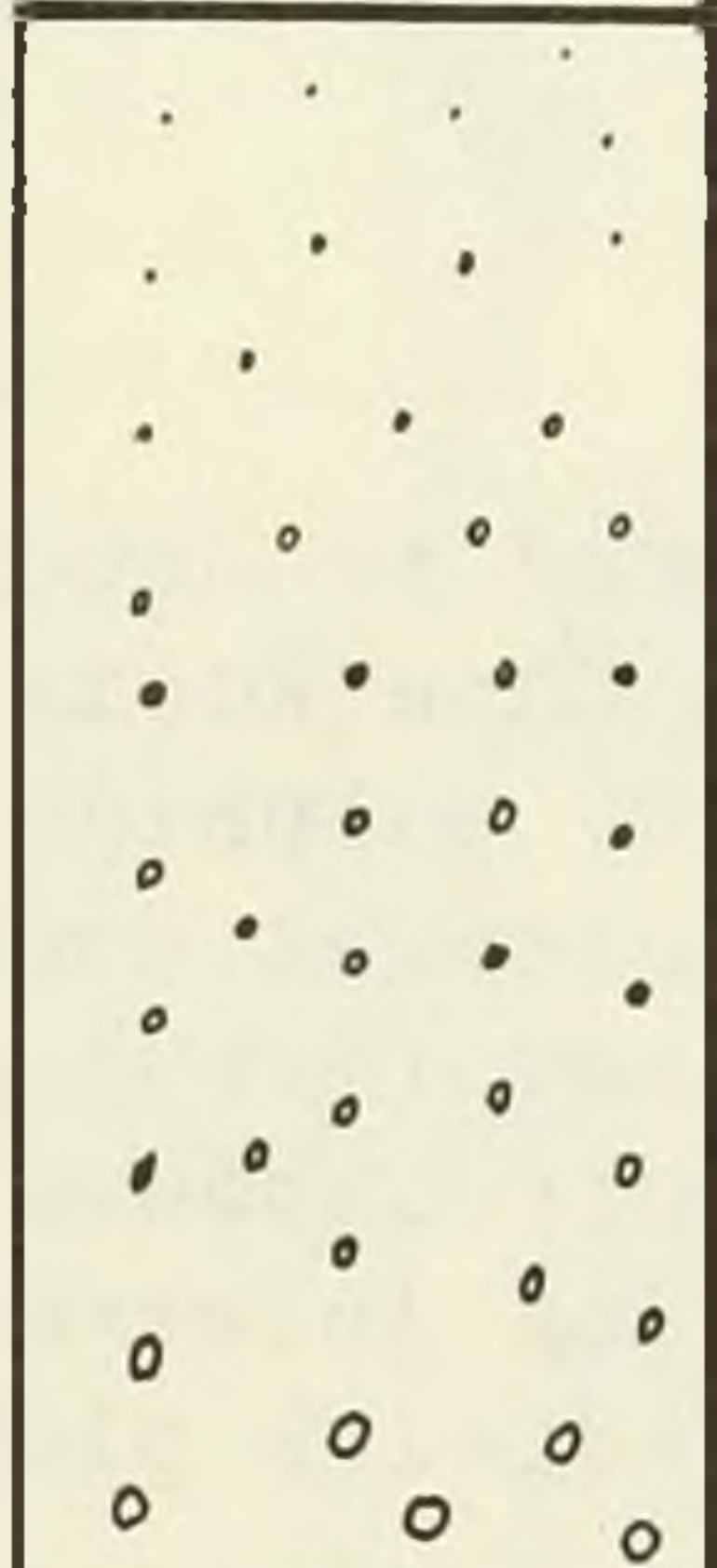


Talc - chlorite - carbonate ore zone: sphalerite - chalcopyrite - galena.

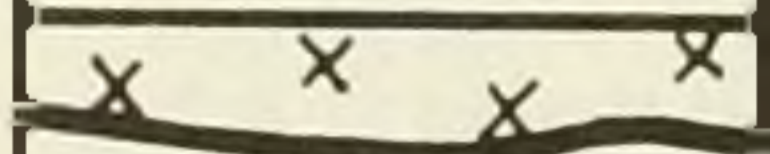
Cut by fine grained diorite dikes. Zone varies from 120'-200' thick



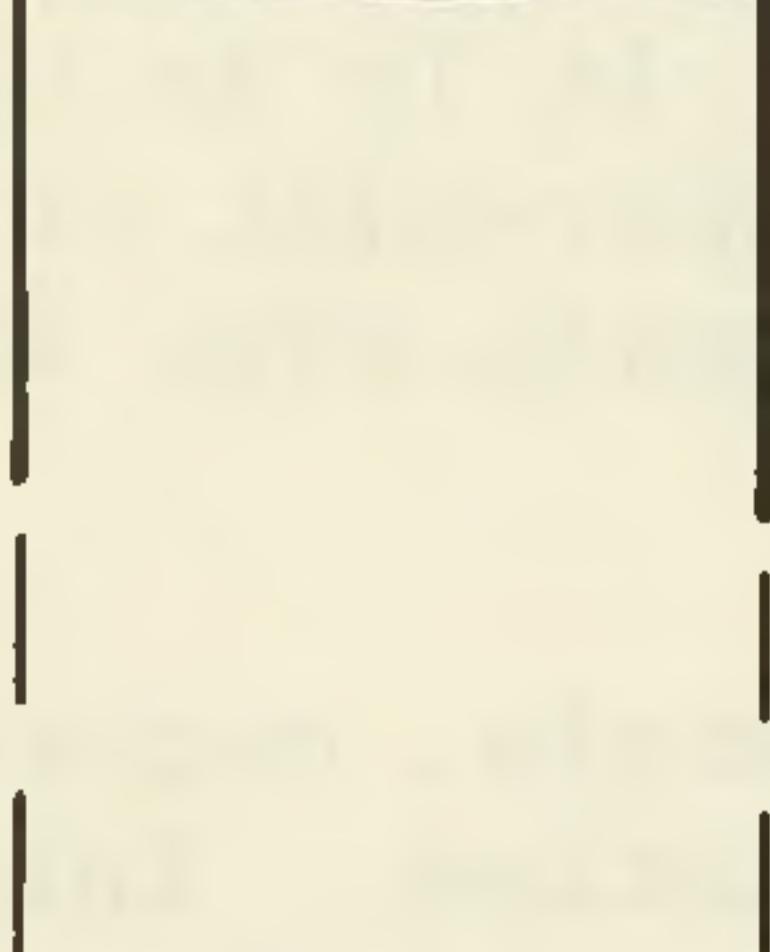
Fragmental: rounded to angular fragments of various types and sizes in a chloritic matrix. Smaller fragments at the top. Zone varies from 150'-250' thick



Course grained diorite



Fragmental: various fragment types and sizes in a siliceous matrix.



PENOBSCOT MINE GEOLOGIC COLUMN
FROM CALLAHAN MINING CORPORATION
GEOLOGY DEPARTMENT

dip varies from 45°-20°

SCALE: 1" = 100'

1970

fracture-filling stringers, discrete grains and massive replacement ore bands up to tens of feet wide. Most ore bands contain both zinc and copper ore, but the principal main pit ore band is predominately sphalerite.

The hanging wall of the ore zone is an extremely tough, light greenish gray rhyolite-rhyolite breccia, a common unit in the upper one-half of the Castine formation. The ore boundary is quite sharp at the breccia-talc carbonate. There is also a sharp contact with the presumed underlying dark colored, dense diorite. This latter unit composes the 'footwall' ore cutoff.

The present pit is approximately 600' in diameter, 200' depth, with a T.D. or 350' estimated. An adit at the 180' level in the northwest wall of the pit has exposed a high-grade copper-zinc stringer. This stringer is being mined as a modified cut and fill, shrinkage operation.

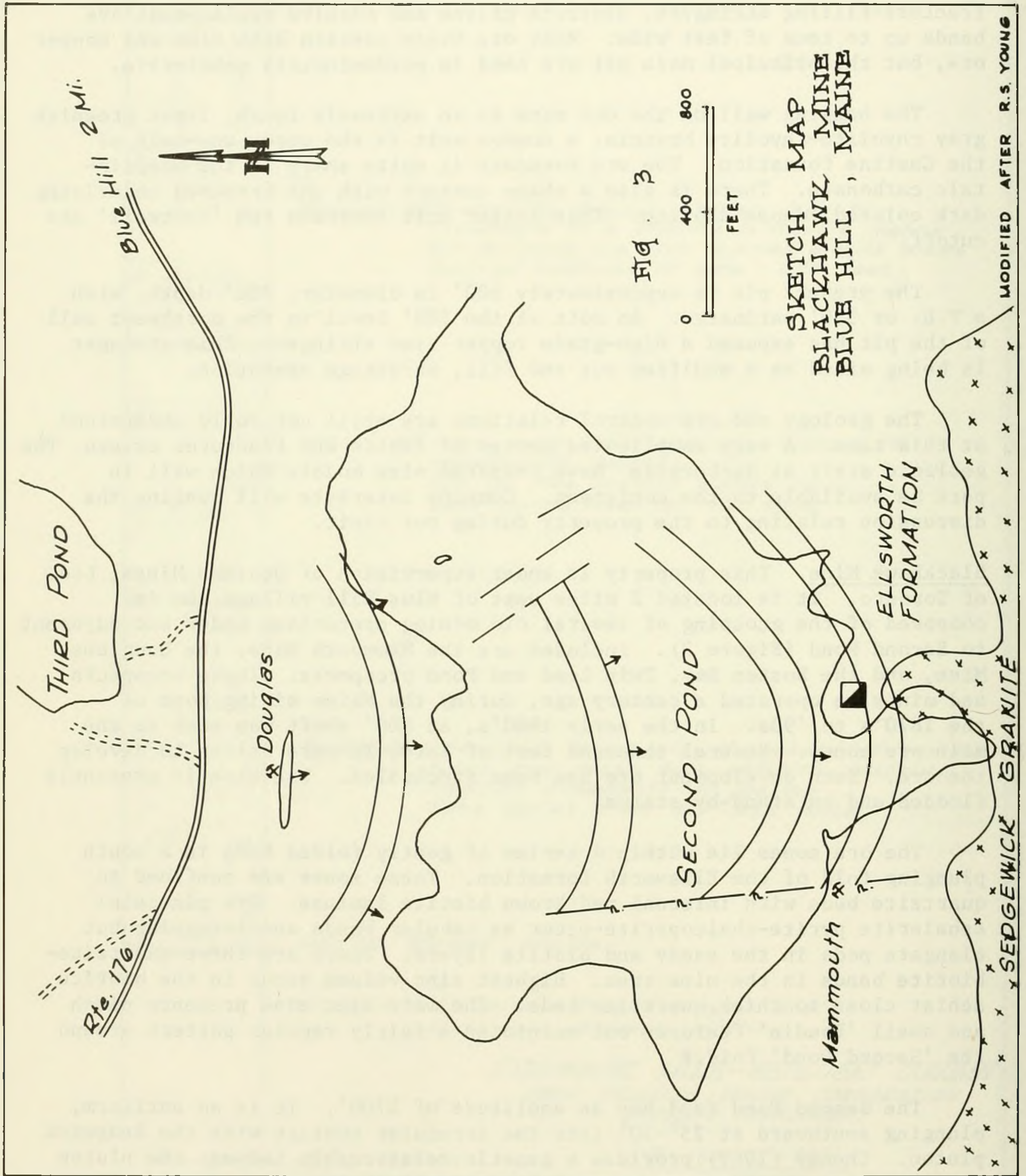
The geology and ore control relations are still not fully understood at this time. A very complicated series of faults and fractures exists. The geologic staff at Harborside have prepared mine models which will in part be available to the conferees. Company interests will confine the discussion relating to the property during our visit.

Blackhawk Mine. This property is under supervision of Denison Mines, Ltd. of Toronto. It is located 2 miles west of Blue Hill village and is composed of the grouping of several old mining operations under and adjacent to Second Pond (Figure 3). Included are the Mammouth Mine, the Douglass Mine, and the Boston Bay, Twin Lead and Pond prospects. These prospects and mines were operated a century ago, during the Maine mining boom of the 1870's to '90s. In the early 1960's, an 800' shaft was sunk to the main ore zones. Several thousand feet of laterals were driven to develop the ore. Such development ore has been stockpiled. The mine is presently flooded and on stand-by status.

The ore zones lie within a series of gently folded beds in a south plunging fold of the Ellsworth formation. These zones are confined to quartzite beds with internal red-brown biotite laminae. Ore minerals: sphalerite pyrite-chalcopyrite-occur as tabular bands and irregular but elongate pods in the sandy and biotite layers. There are three quartzite-biotite bands in the mine area. Highest zinc values occur in the biotite schist close to thick quartzite beds. The main zinc zone presents pinch and swell 'Boudin' features but maintains a fairly regular pattern around the 'Second Pond' fold.*

The Second Pond fold has an amplitude of 1700'. It is an antiform, plunging southward at 25°-30° into the irregular contact with the Sedgwick pluton. Cheney (1969) provides a genetic relationship between the pluton and the metal sulphides. The open file report at the Maine Survey office is the best description of the mine area.

* New term



The author has noted several localities underground where a green-colored coarse phaneritic igneous rock, similar in texture to the Sedgwick pluton, contain pyrite and chalcoppyrite, as irregular stringers and blebs.

TRIP SCHEDULE

Depart Rangeley	0645 hours
Arrive Bucksport	1015 hours
Depart Bucksport	1025 hours
	Outcrops of rusty weathering Penobscot formation just east of Bucksport.
Arrive Harborside	1120 hours
	Outcrops of Castine formation occur from S. Penobscot to mine.
Callahan Mine visit	1120-1400 hours
	Lunch time in ore pit.
Depart Harborside	1410 hours
Arrive Blackhawk Mine	1430 hours
Mine area examination	1430-1545 hours
Additional outcrop and old pit examination	1545-- hours
B.Y.O.D. supper at South Blue Hill	1730 hours

REFERENCES

- Chapman, C.A., 1962, Bays of Maine igneous complex: Geol. Soc. Amer. Bull., V. 73, p. 883-888.
- Cheney, E.S., 1969, Geology of the Blue Hill-Castine mining district, southwestern Hancock County, Maine: Maine Geol. Surv., open file report (in press, 1971), Augusta, Maine 148p-and plates.
- Doyle, R.G., (as editor) with others, 1967, preliminary geologic map of Maine: Maine Geol. Surv., Augusta, Maine.
- Hussey, A.M. II, and Austin, M.B., 1958, Maine metal mines and prospects: Maine Geol. Surv., Min. Res. Index No. 3, 53p.
- Wingard, P.S., 1961 Geology of the Castine-Blue Hill area, Maine: unpublished Ph. D. dissertation, University of Illinois, 147p.
- Young, R.S., 1962, Prospect evaluations, Hancock County, Maine: Maine Geol. Surv., Special Econ. Studies Ser. No. 2, 113p.