

## BARITE EVALUATION -- EASTERN AND WESTERN NEWFOUNDLAND

by

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### SUMMARY

A survey of barite occurrences in eastern and western Newfoundland was carried out during the 1982 field season. Work on the east coast consisted primarily of a coastline survey along the shores of Trinity Bay (Colliers Point to Sunnyside) and Placentia Bay (Trinny Cove to Arnold's Cove). Bedrock exposure along the coast is excellent and consists mainly of late Precambrian volcanic and sedimentary rocks. Numerous, narrow (<20 cm) barite veins were identified on the Trinity Bay section of coastline. They appear to occupy small fissures and are commonly associated with quartz and (or) calcite. The most promising area, the Bellevue Peninsula, has at least six barite zones or vein systems which cut arkosic sandstone of the Snows Pond Formation. The widest veins are located in the Tickle Point - Tickle Cove area of the Bellevue Peninsula. Some of these coincide with air photographic lineaments interpreted to be faults.

Work on the west coast was carried out in selected areas in the Codroy - St. George's Carboniferous basin and on the Port au Port Peninsula. It consisted mainly of detailed prospecting and mapping along streams. Stream sediment geochemical surveys conducted in 1973 and 1974 (Davenport *et al.*, 1975; McArthur *et al.*, 1975) indicated that the silts in parts of these streams contained anomalous amounts of barium, copper, zinc, and lead. As a result of the follow-up program, several new mineral showings were identified. Most are located in areas underlain by shales and sandstones of the Lower Mississippian Anguille Group, while others are hosted by the basal limestones of the overlying Mississippian Codroy Group.

### AVALON PENINSULA - Results

Barite is widely distributed throughout the Isthmus of Avalon and along the east coast of Placentia Bay (Figure 1). It occurs in veins with or without quartz and calcite. It also occurs as a late mineral in the La Manche galena-calcite vein, and as a very minor gangue mineral at the Silver Cliff lead-zinc-silver deposit near Argentia (Chute, 1939). The veins cut strata of every age in the area, from the oldest Connecting Point Group of late Precambrian age to the various lower Cambrian formations. The veins are remarkably similar in appearance. Most are salmon pink and consist of bladed or tabular crystal aggregates. Contacts with their host rocks are usually sharp with little or no wall rock alteration. The veins range in thickness from a few centimetres to one metre. Joints near the veins are commonly filled with barite.

One notable exception is the Collier Point vein where the width, as measured by McArthur (1973), showed a maximum thickness of 3.6 m. About 5000 t of barite was produced from this deposit between 1902-04 and in 1980 J. Tyler Mining Ltd. produced about 9000 t from a surface open cut before operations ceased. The vein dips approximately vertically and is in sharp contact with the wall rock, which consists of gray-green arkose of the Hodgwater Group. Recent attempts to exploit the deposit have exposed the vein for about 600 m along its 160° strike. The thickness of this newly exposed section ranges up to 1 m.

Road construction to the prospect uncovered a new vein within 150 m of the old vein and parallel with it. It has

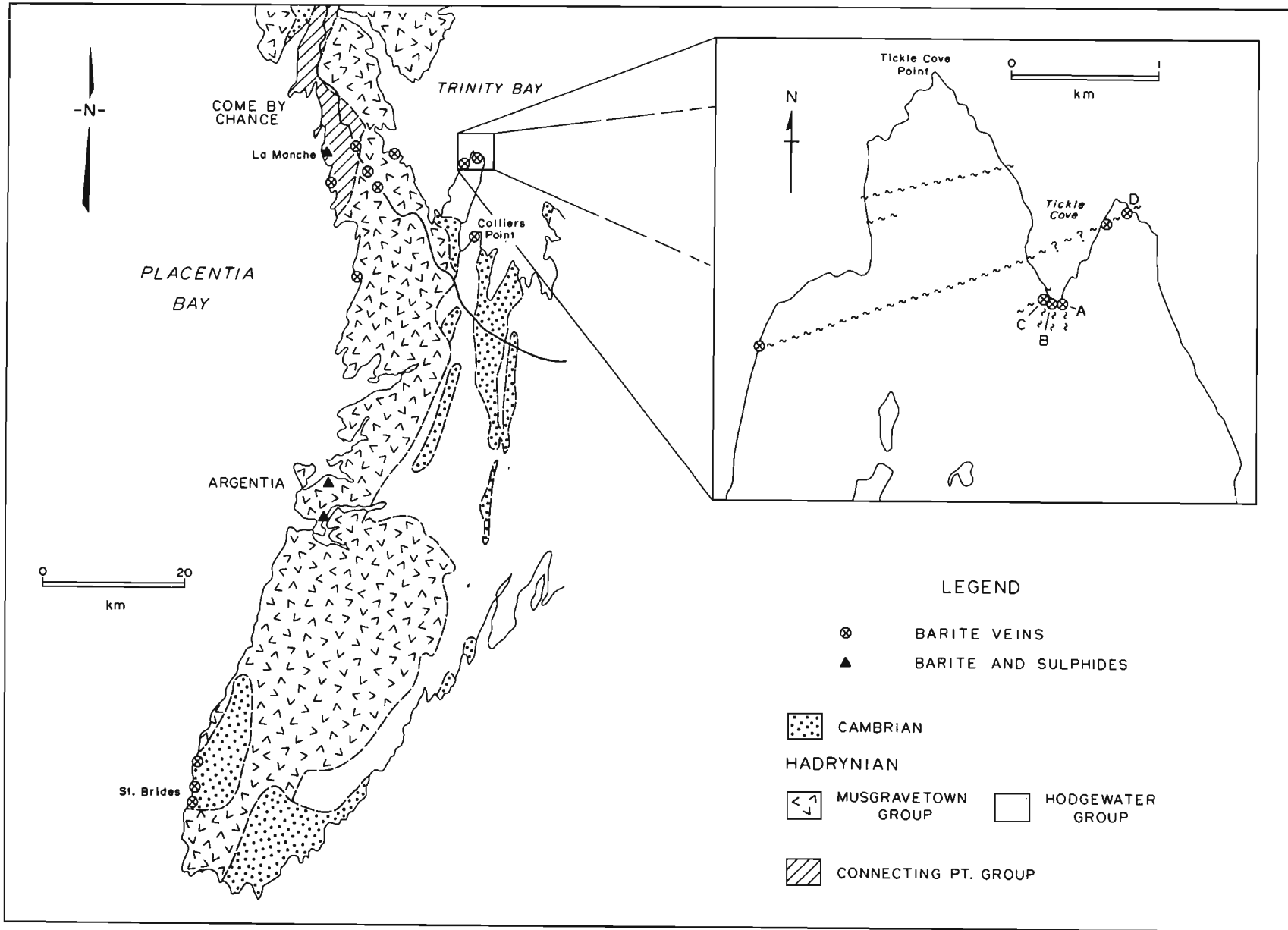


Figure 1: Barite occurrences on the western Avalon (modified after McArthur, 1973) - insert shows occurrences in the Tickle Cove area of the Bellevue Peninsula.

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been traced along strike for 100 m and has a maximum thickness of about 35 cm.

The Bellevue Peninsula constitutes a promising yet relatively unexplored area for barite. The coastal survey identified several veins containing barite, calcite and quartz. The proportion of barite ranges from 30% to 100%.

The widest veins are located in the Tickle Point - Tickle Cove area of the Bellevue Peninsula (Figure 2). In Tickle Cove, a small indentation near the northern tip of the peninsula, three narrow subparallel barite veins occur in close proximity. The following is a description of these veins going from west to east:

VEIN A - A pink and white barite vein exposed in a 4.5 m cliff. The vein has a maximum width of 30 cm at the top pinching to 3 cm at the base of the cliff. The host rock is a highly fractured, green, crossbedded arkose with gray silty lenses. The vein strikes  $180^{\circ}$  and dips W at  $75^{\circ}$ . On the vein's hanging wall side, narrow veinlets of barite intersect the main vein at acute angles.

The vein appears to be localized along a steeply dipping fault structure which cuts across the gently (southward) dipping bedrock.

VEIN B - The vein consists of pink and white bladed crystals of barite exposed in a 4 m cliff. The vein dips vertically, and can be traced inland ( $190^{\circ}$ ) for about 8 m before it is obscured by cobbles and boulders. It maintains a consistent 15 cm thickness and contacts with its arkosic host are very sharp.

VEIN C - This vein is 70 cm wide at beach level, strikes  $020^{\circ}$ , and dips  $80^{\circ}$ W. It consists of pink and white barite, some in bladed crystal form, and quartz. The vein narrows to about 10 cm at the top of a 9 m cliff. The vein occurs in flat-lying green arkose which is highly fractured at the footwall contact. The hanging wall is much less disturbed and contains narrow stringers of barite which parallel the main vein. What appears to be an extension of the barite-quartz vein structure was traced northward beneath the waters of the cove for several metres. A sample of this submarine zone shows a dendritic pattern of narrow barite and quartz veinlets (average <1 cm wide), giving the host arkosic sandstone a brecciated appearance.

A zone of 8 narrow barite veins occurs on the extreme western side of Tickle Cove. They vary in width from 1 to 6 cm, with an average width of 2.5 cm. The veins strike about  $240^{\circ}$  and dip vertically. A northeast striking fault marks the northwest limit of barite mineralization in this area.

VEIN D - This vein appeared on a 1:253,440 scale geological map by McCartney (1967) and was described by McArthur (1972). The vein consists of barite, quartz, and chlorite. It occurs at the eastern extremity of a fault zone which forms a prominent lineament across the tip of the Bellevue Peninsula trending  $070^{\circ}$ . The vein varies in width from 2.1 m at the base of a 15 m cliff to 1 m near the

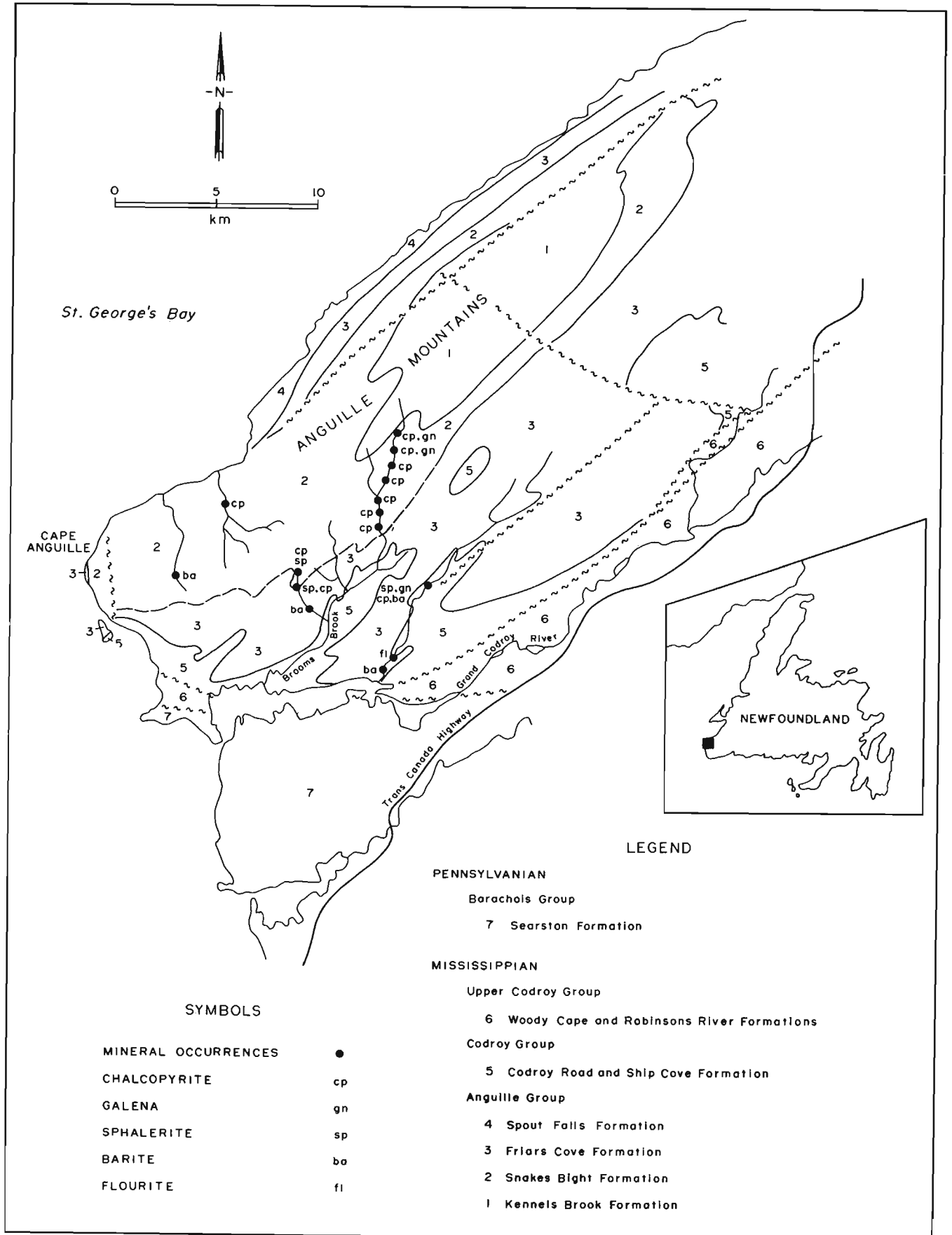


Figure 2: Sketch map showing location of mineral showings in the Codroy - Anguille Mountains area (geology after Knight, 1974).

top. The barite tends to be concentrated on both sides of the vein, and makes up approximately 33% of vein constituents.

ST. BRIDES AREA - Barite

Two barite veins were examined in the St. Brides area on the eastern side of Placentia Bay. The widest is exposed in a small cove about 0.7 km southeast of Cross Point. The vein consists of white to salmon-pink barite occurring as bladed crystal aggregates. Approximately halfway up a 25 m cliff, it has its maximum width of 1.5 m. At beach level, the vein is split into two sections, 0.4 m and 1.0 m wide, respectively. The two limbs are separated by a 0.7 m section of red shale. At the top of the cliff the vein narrows to 0.3 m and cannot be traced inland. The vein strikes  $020^{\circ}$  and dips  $80^{\circ}$  to the southeast. The host rocks are Eocambrian red shales and siltstones. In a 15 m wide zone immediately west of the vein, these rocks are tightly folded into isoclinal and recumbent folds. To the east of the vein, there is no evidence of folding. A distinct 30 cm wide quartzite bed was traced on both sides of the vein. It shows little of the axial planar cleavage seen in the less competent, folded shales and siltstones.

The Cuslett barite vein is located about 0.5 km north of the community of Cuslett on the east shore of Placentia Bay. The vein consists of well developed bladed crystals exposed along a 30 m high cliff. The vein's maximum width (1 m) is 4 m above low water mark, with a minimum width (6-7 cm) halfway up the cliff, widening to 0.5 m at the top. The vein is traceable for 8 m from low water mark to the base of the cliff. It is not traceable inland. The vein strikes  $052^{\circ}$  and dips vertically. The host rock is pebble conglomerate consisting of subrounded to rounded feldspar, quartz, sedimentary and volcanic pebbles.

Other Results

A zone of lead mineralization was discovered on the north tip of Loon Point about 1 km west of the community of Bellevue. Galena and pyrite occur as blebs and disseminations in quartz and calcite fracture fillings in a zone of brecciated siltstone that is oriented at  $080^{\circ}/85^{\circ}$ N. The attitude of the bedding in the area of the showing is  $140^{\circ}/18^{\circ}$ SW. The mineralization is sporadic and can be traced for about 8 m along the strike of the zone.

WEST COAST - Results (Barite)

The results of follow-up work on geochemical stream sediment anomalies for barite (and base metals) in the Codroy - St. George's Carboniferous basin are summarized in Table 1, which includes the NTS sheet reference and UTM coordinates for all new mineral showings.

Nearly all of the barite that was identified in Carboniferous strata occurs as narrow veins ranging in thickness up to 20 cm. Barite with quartz and calcite were observed in brecciated zones in Anguille Group sandstones. Narrow veins of mixed barite and calcite were also noted in Ship Cove limestone of the Codroy Group. In one showing, on Brooms Brook, barite mixed with calcite occurs as gangue in narrow mineralized fractures containing sphalerite, chalcopryite, and galena in Ship Cove limestone. On Table Mountain, an area which showed anomalous amounts of barium in both stream and lake sediments, narrow veinlets of barite cut red and gray sandstones of the Anguille Group.

Approximately 1.5 km inland from the south shore of Picadilly Bay on the Port au Port Peninsula, pink and white bladed crystals of barite occur with celestite in vuggy Codroy Group limestone along a 15 m section of a stream bed. The

TABLE I LOCATION AND DESCRIPTION OF NEW MINERAL SHOWINGS

UTM GRID REFERENCE	HOST ROCK	MINERALS	REMARKS
330250E 5305500N NTS 110/14	sandstone, Anguille Group	barite	Pink and white barite and calcite veins in a zone of brecciated sandstone. Zone trends 040°/75°NW. Vein is 20 cm wide at the top of a 5 m cliff and is reduced to stringers at the base. Estimated 50% barite, 50% calcite.
329750E 5305800N NTS 110/14	sandstone, Anguille Group	chalcopyrite	Finely disseminated chalcopyrite in thin films of calcite on fracture planes in folded and highly fractured sandstone. Mineralized zone trends 035°/vertical.
329450E 5306600N NTS 110/14	black shales, Anguille Group	chalcopyrite, sphalerite	Lenses of sulfides (<1 cm) occur in laminated mudstones in several zones along a 400 m section of a stream. Chalcopyrite also occurs as blebs and disseminations associated with calcite veins.
334350E 5312900N NTS 110/14	black shales, Anguille Group	galena, chalcopyrite	Disseminated galena and chalcopyrite in narrow veins of calcite in fractured shales.
334100F 5312500N NTS 110/14	black shales, Anguille Group	galena, sphalerite, chalcopyrite, pyrite	Banded (pyrite-rich) sulfides in shales; also minute blebs of galena and pyrite in fault breccia trending 120°/75°E. Sulfides also associated with thin limy bands (5-8 cm) in shales.
334000E 5312450N NTS 110/14	limestone - shale, Anguille Group	barite	Thin barite veins (max. 6 cm) with calcite. The veins are associated with thin (max. 8 cm) shale bands in an interbedded shale and limestone zone which strikes 038°/55°SE.
334050E 5311950N NTS 110/14	sandstone, Anguille Group	chalcopyrite	Clots of chalcopyrite up to 1 cm in diameter associated with quartz and minor calcite in a brecciated zone in tightly folded sandstone. Zone is 1 m wide, not traceable along 020° strike.
333900E 5311350N NTS 110/14	black shales, Anguille Group	galena, chalcopyrite	Blebs and dissemination in black shales; also nodules of massive sulfide (mainly pyrite). 15 m section of shales exposed on east bank of stream. Attitude of bedding 045°/65°S.
333300E 5310650N NTS 110/14	black shales, Anguille Group	chalcopyrite, pyrite	Banded sulfide in a zone of rusty (weathered) shales. Pyrite crystal aggregates 2 cm in diameter; calcite veins normal to bedding.
333300E 5310350N NTS 110/14	black shales, Anguille Group	chalcopyrite, pyrite	Banded sulfides (pyrite-rich) in tightly folded black shales -- 020°/80°SE.
333500E 5310200N NTS 110/14	mudstone, Anguille Group	galena	Calcite vein with galena. Average width 3 cm, traceable for 5 m.
334950E 5306150N NTS 110/14	Ship Cove limestone, Codroy Group	sphalerite, galena, barite, pyrite	Fractures contain sphalerite, galena and chalcopyrite, with calcite and barite. Zone trends 160°/65°NE and can be traced 8 m along strike.
334150E 5304025N NTS 110/14	Ship Cove limestone, Codroy Group	fluorite	Small crystals of fluorite associated with calcite veins in limestone. Fluorite was observed in several localities along strike of the limestone for about 100 m. Fluorite also found in irregularly shaped vuggy blebs of calcite.
326150E 5310700N NTS 110/14	black shales, Anguille Group	chalcopyrite, pyrite	Thin bands of pyrite (<0.25 cm) and disseminated chalcopyrite occur in a zone of mudstone and siltstone along a 75 m section of Low Brook. Chalcopyrite is mainly associated with calcite- and quartz-filled fractures normal to the bedding.
358950E 5378700N NTS 12B/10	limestone, Table Head	galena	Galena occurs as minute crystals that protrude on the weathered surface of fracture planes in limestone.
359000E 5378750N NTS 12B/10	limestone, Codroy Group	barite, celestite	Mineralized float consisting of vuggy limestone with white and pink barite and blue celestite occur for 15 m along stream bed.
368250E 5378900N NTS 12B/10	conglomerate	galena, marcasite, pyrite	Blebs and disseminations in matrix of conglomerate. Subangular to rounded clasts of limestone, dolomite, and minor chert range from pebble to boulder size. Framework: clasts 90%, matrix (sandy) 10%. Poorly sorted. Galena associated with finer phase.

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mineralized float resembles that seen near other localities on the Port au Port Peninsula where small deposits of mixed barite and celestite are known to occur. Most notable of these is the Ronan deposit on Hooper's Brook near the community of Boswarlos. This deposit has been well delineated by diamond drilling (Johnson, 1954; McArthur, 1973). It is wedge-shaped longitudinally, lens shaped in cross-section, and contains about 135,000 t grading 35% BaSo<sub>4</sub> and 25% SrSo<sub>4</sub>. McArthur (1973) reported that metallurgical testing of representative bulk samples indicated solid solutions of barite in celestite and vice versa. The difficulty in separating the celestite from the barite was probably a factor in preventing the wartime development of the deposit as a source of strontium for pyrotechnics. The barite and celestite occur as partial or total replacements of the host Carboniferous Codroy Group strata.

### Other Results

Although the emphasis was on searching for barite, a number of base metal showings were also identified. Some of these were on streams that gave coincidental anomalies for copper, lead, zinc and barite in the 1973-74 geochemical surveys.

Chalcopyrite, sphalerite, and galena were observed in black shales and sandstones of the Anguille Group, in a number of localities along tributaries which flow off the Anguille Mountains into Brooms Brook. The shales host thin concordant bands of sulfide in addition to clots and disseminations of chalcopyrite, galena and rare sphalerite in calcite-filled discordant fractures. The host rocks are characteristically tightly folded and, since the streams usually crosscut the formations, it is likely that some of the mineralized black shales seen along the brook are repeated zones.

Sphalerite, galena, and chalcopyrite were observed in a zone of fractured limestone (Ship Cove) on Ryans Brook.

The zone has the attitude 160°/65°NE and can be traced for about 8 m along strike. The mineralization, along with barite and calcite, fills tension fractures along the axial plane of a tight fold.

A zone of fluorite mineralization was traced for about 100 m along the northwest bank of Ryans Brook. The zone follows the attitude (038°/30°SE) of the host Ship Cove limestone formation and consists of minute cubes of fluorite associated with irregularly shaped blebs and veinlets of calcite in the limestone. The calcite veins trend E - W and dip vertically. They range in thickness from <1 cm to 15 cm but the fluorite is restricted primarily to the larger veins and blebs of calcite.

Minor galena was observed with marcasite and pyrite about 1 km up Gilliam's Brook on the north shore of the Port au Port Peninsula. The mineralization occurs as blebs and disseminations in the sandy matrix of Carboniferous conglomerate-breccia. Subangular to rounded clasts of limestone and dolomite ranging from pebble to boulder size comprise 90% of the rock. The mineralization occurs in an area where Carboniferous Codroy Group rocks have been deposited in small grabens of the Ordovician Table Head limestone.

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