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BARITE-CELESTITE EVALUATION

(Project 4-4, Canada-Newfoundland Mineral Exploration & Evaluation Program)

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Barite and celestite deposits in Newfoundland were examined and evaluated during the 1972 and 1973 field seasons. Barite occurs in veins in Eastern Newfoundland, as a gangue mineral in the Buchans polymetallic ores, and in close association with celestite in numerous small scattered deposits on the Port au Port Peninsula (Figure 1).

The barite at Buchans has the greatest economic potential for development, particularly for the drilling mud market. The Buchans ore contains 25% barite and the mill tailings average approximately 40% BaSO_4 . Until 1965, the tailings were released into the Buchans River and settled in Red Indian Lake. From mine production, it is estimated that the lake contains about 3 million tons of barite. At the mouth of the Buchans River, the tailings appear to be naturally beneficiated considerably above their original 40% BaSO_4 content. Since 1965, the tailings have been retained in settling ponds where there are estimated to be approximately 500,000 tons of recoverable barite.

In Eastern Newfoundland, barite occurs in vein deposits at Trinity and Placentia Bays as the primary mineral in high grade veins (eg. Collier Bay Mine) and as an accessory mineral (eg. old LaManche lead mine and St. Lawrence fluorite mines). Several new veins have been reported and described in road cuts of the Trans Canada Highway between the Bellevue intersection and LaManche station. The veins are generally less than 2 feet thick and therefore have no economic potential. Only the vein at the Collier Bay Mine, which varies in thickness up to 12 feet, may be commercially interesting.

On the Port au Port Peninsula, numerous small deposits of mixed barite - celestite occur in and near the Aguathuna limestone quarry. In the fall of 1972, 500 feet of diamond drilling were completed on the Ronan deposit (Figure 2) to obtain a representative bulk sample of the deposit for beneficiation testing and to check the 1942-43 drilling results.

M.A.K. Grice at the Atlantic Industrial Research Institute in Halifax is working on a mineral separation process for the Ronan barite-celestite ore. Preliminary results indicate a limited amount of solid solution between the 2 minerals which probably rules out the possibility of a heavy media separation. Flootation, however, will produce excellent celestite concentrates

if the high celestite zones of the deposit ore are used for feed. This would be practical if selective mining of the deposit is possible. To date, floatation has not been successful in producing a high-grade celestite concentrate when a bulk sample of the whole deposit is used.

One of the most promising potential uses for the Port au Port celestite is in the manufacture of ceramic permanent magnets. Both strontium hexaferrite and barium hexaferrite are used for magnets with the strontium hexaferrite being superior; however, it is hoped that strontium hexaferrite with barium and calcium impurities will produce magnets with good magnetic properties. One batch of magnets have been made and successfully tested using a high grade celestite concentrate from the Ronan deposit and Wabush iron ore. Magnets are presently being made from lower grade celestite concentrates.

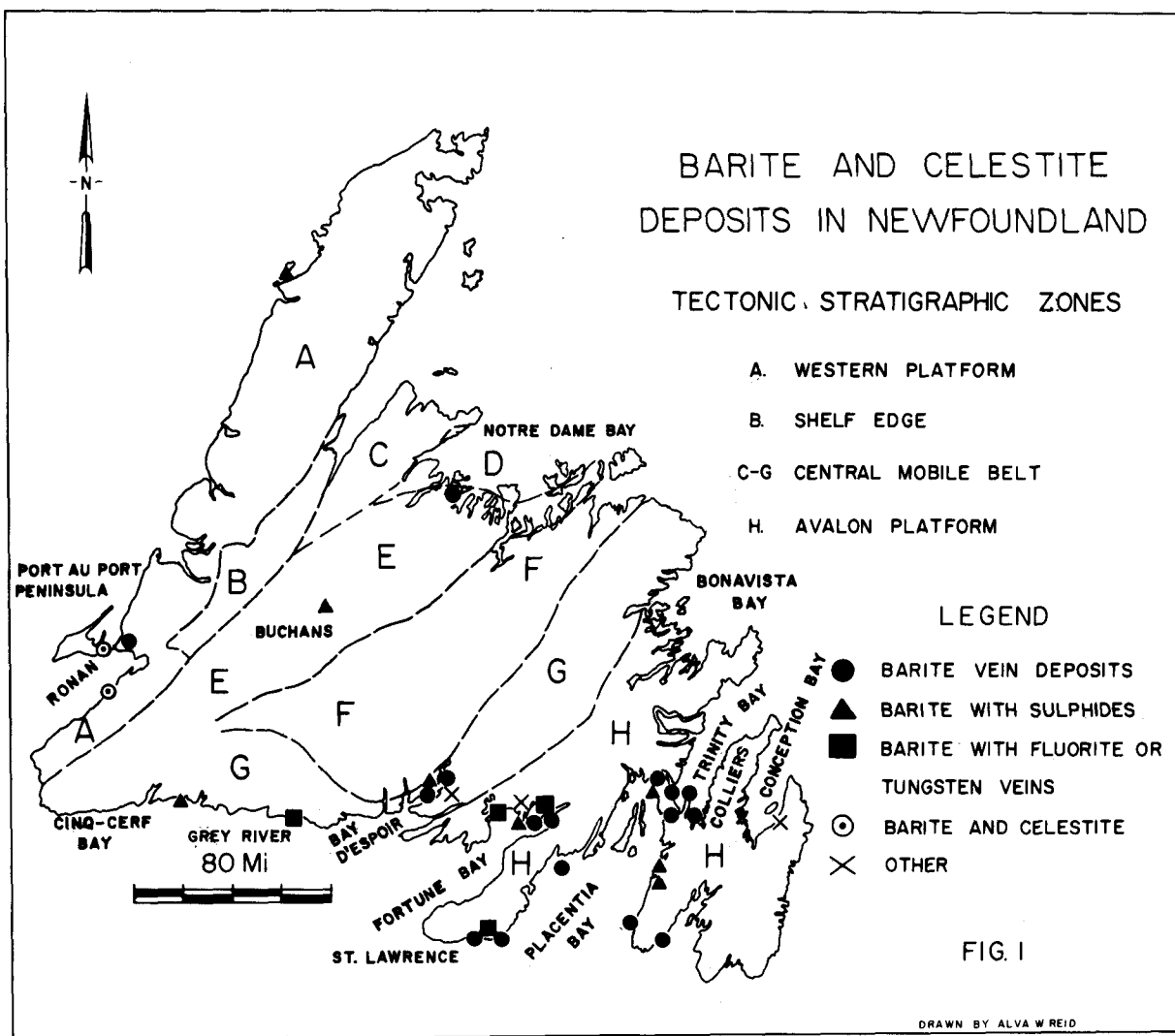
The Carboniferous areas and to a lesser extent the Ordovician carbonate areas of the Port au Port Peninsula were considered to have a potential for additional small barite-celestite deposits as well as base metal sulphides and were examined in the 1973 program. The program was directed to trying a number of geochemical and geophysical exploration techniques over areas of known deposits and extending the surveys, where warranted, to unknown areas.

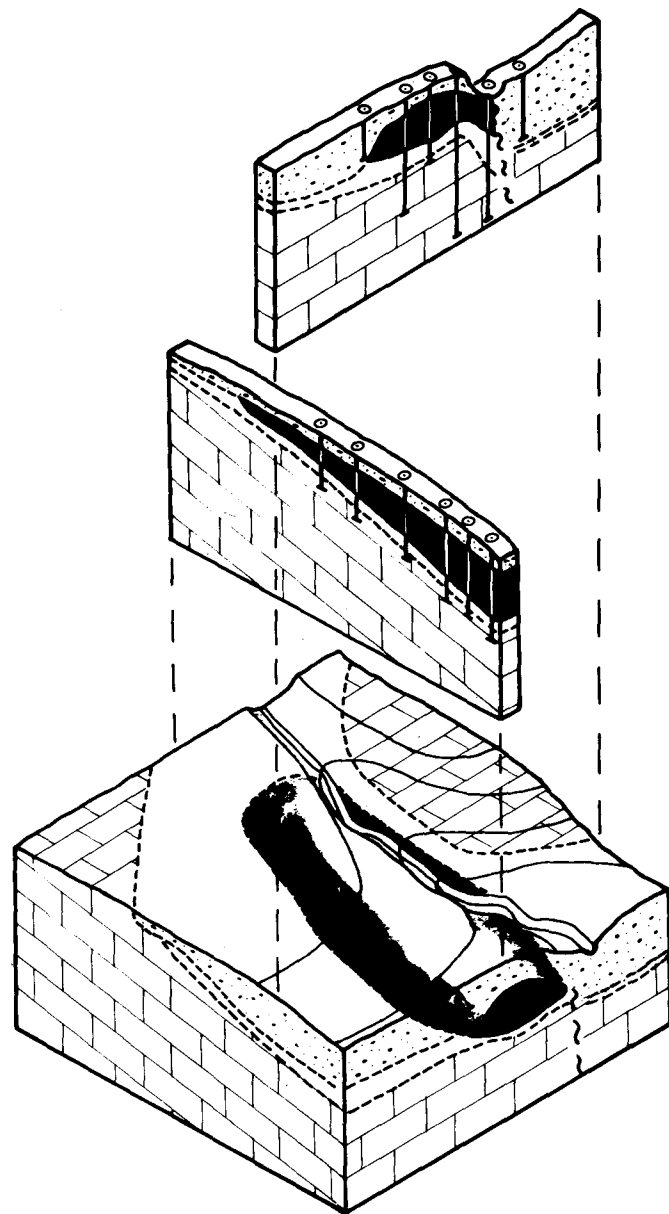
All streams on the Port au Port Peninsula have been silt sampled and prospected. This work has been carried out in co-operation with the Geochemical Project 6-2. The samples are being analysed for Ba, Sr, (-100+200 mesh) Cu, Pb, Zn, Fe, Mn, and organic content (-80 mesh). Limited follow-up work has been carried out in some areas where favourable stream silt analyses have been available. The follow-up consisted of soil sampling and deep overburden sampling by drilling with a Pionjar drill. It has been demonstrated that the deep overburden drilling technique is particularly suited to barite - celestite exploration as the drill has the ability to penetrate and core the barite-celestite bedrock beneath the overburden.

Trial EM-16, resistivity, gravity, and hammer seismic surveys have been tried over the Ronan deposit in an attempt to develop a geophysical exploration tool for these deposits.

Geological mapping of the Carboniferous areas of the Port au Port Peninsula was carried out using the geological map by Besaw and DeGrace (from Project 4-1) as a base.

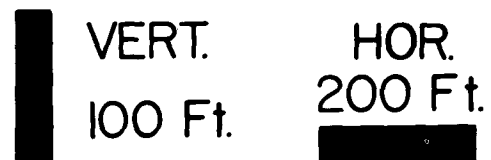
The final report of the results of both seasons work will be published by the Department in 1974.





RONAN DEPOSIT PORT AU PORT PENINSULA

SCALE



LEGEND







-  OVERBURDEN
-  CARBONIFEROUS
-  BARITE - CELESTITE
-  CODROY GROUP
-  ORDOVICIAN
-  TABLE HEAD GP.

FIG. 2