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DEPARTMENT OF THE INTERIOR

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SUGGESTED EXPLORATION TARGET IN WEST-CENTRAL MAINE

by

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Introduction

Reconnaissance geochemical drainage surveys have located a stream in the southern part of the Long Pond quadrangle in Somerset County, Maine, where the active stream sediment contains as much as 2,500 parts per million (ppm) lead and 7,000 ppm zinc. Although this anomaly has been known for some time, its apparent significance has recently increased. Reappraisal of the anomalous pattern in the light of a large quantity of geochemical data obtained by a regional geochemical mapping program during the past two years has shown that this lead anomaly is by far the strongest one yet found by the Geological Survey in Maine. Galena- and pyrite-bearing quartz veins are present in the drainage basin of this stream, but the exposed veins are not believed to contain enough lead to be the principal cause of the geochemical anomaly. Accordingly, the drainage basin of this stream is believed to be above average in mineral potential.

The anomalous stream, here named Pyrite Creek for convenience, is the northeastern branch of a major tributary to Bean Brook.

Figure 1 presents the data of the detailed geochemical survey along Pyrite Creek, reconnaissance geochemical data in the surrounding area, and the approximate distribution of the major rock types.

Geology

The rocks in the general vicinity of Pyrite Creek (fig. 1) are on the southeastern limb of the Boundary Mountain anticlinorium (Albee, 1961, p. C51-C54) and comprise quartz monzonite of probable Cambrian or Ordovician age, and metasedimentary rocks and diabase of Early Devonian age. The metasedimentary rocks are not exposed in the immediate vicinity of Pyrite Creek but elsewhere in the area of figure 1 they include slate, metasiltstone, and fine-grained argillaceous sandstone of the Seboomook and Tarratine Formations (Boucot, 1961). These rocks are, in part, overlain comformably by a sheet-like body of altered diabase. The metasedimentary rocks rest unconformably on the quartz monzonite, and dip easterly at a moderate angle.

The quartz monzonite in this area is typically coarse grained, pinkish green, and consists of quartz, pink euhedral to subhedral phenocrysts of microcline, plagioclase, and a small amount of chloritized mafic minerals. In thin section, the plagioclase is moderately sericitized, the mafic minerals (probably principally biotite) are completely altered to chlorite, quartz is strained, and the rock is crisscrossed by an anastomosing network of tiny fractures healed with fine-grained granular quartz and sericite.

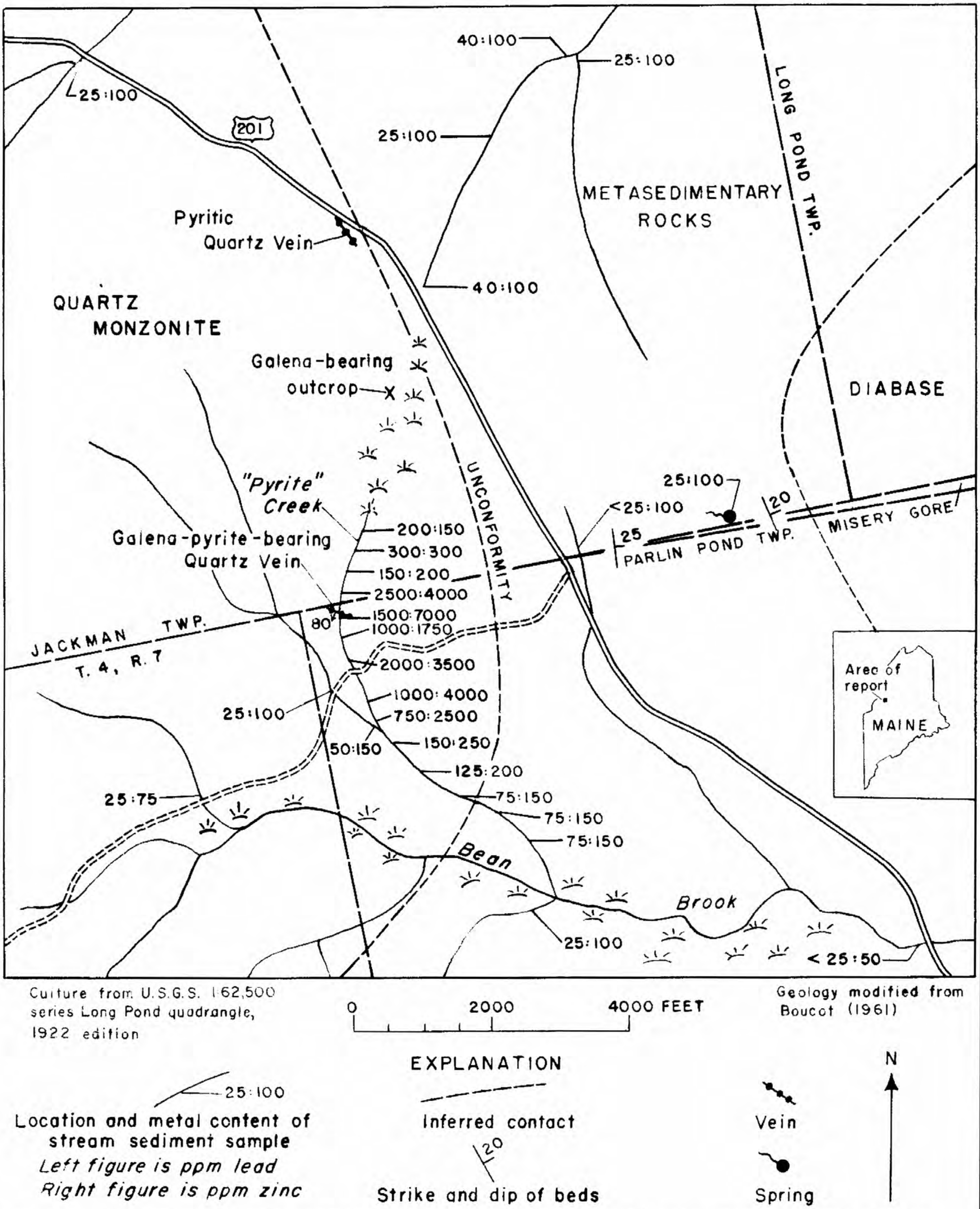

Figure 1.— Geochemical and geologic map of the "Pyrite Creek" area, southern part of the Long Pond quadrangle, Somerset County, Maine.

The quartz monzonite at several places in the area of figure 1 is extensively silicified so that in hand specimen it resembles a dense pinkish-green felsite. Remnant outlines of the original crystals of the coarse-grained quartz monzonite can be seen in thin section within a groundmass of fine-grained granular quartz and sericite. Available geologic mapping does not permit us to outline the areas of silicified rock in figure 1.

A waterfall 20- to 25-feet high is present on Pyrite Creek about 700 feet upstream from the unpaved road in Parlin Pond Township. A 10- to 12-inch quartz vein, which strikes N. 70° W., and dips about 80° to the southwest is well exposed in a narrow gorge at the foot of the falls. On strike and about 150 feet to the southeast, a quartz vein bordered by silicified and pyritized rock is exposed on a steep hillside. Presumably this is the same vein. The vein in the gorge at the foot of the falls is mostly barren quartz, but when broken open, it was found to contain small pockets of galena, pyrite, and very sparse chalcopyrite. The country rock adjacent to the vein is highly silicified and pyritized. This vein apparently does not extend far to the northwest, for a short, angle diamond drill hole collared near the edge of the stream at the top of the falls did not intersect the vein at its projected position.

The galena from the vein is rich in silver and bismuth. One sample containing selected pieces of galena-bearing quartz assayed 1.6 percent lead and 5.4 oz of silver per ton; no gold was detected. A semiquantitative spectrographic analysis of a sample of relatively pure galena showed the bismuth and silver contents to be about 2 percent and 0.7 percent respectively.

Approximately 3,300 feet north northeast of the waterfall zone an outcrop of silicified quartz monzonite is cut by narrow stringers of galena-bearing quartz. A highly pyritic quartz vein is also present on the southwest side of Route 201 (fig. 1). It trends N. 37° W., and is surrounded by iron-stained and silicified quartz monzonite. No galena was seen but its presence has been reported.

The quartz monzonite locally contains stringers and clots of specular hematite where the rock is extensively silicified and altered. Although the hematite is not known to be related to the sulfide minerals in the quartz veins, it does characteristically accompany extreme alteration of the quartz monzonite in this area.

Geochemistry

The geochemical data were obtained by analyzing the fine-grained fraction (minus 250 micron) of samples of stream sediments collected from the active channels. Field methods of chemical analysis described by Ward and others (1963) were used.

The most striking feature of the geochemical pattern is the exceedingly high contents of lead and zinc in Pyrite Creek from a point just north of the Parlin Pond Town line to the junction of Pyrite Creek with the western branch of the tributary. Although the heavy-metal content of the stream sediment is anomalous along the entire length of Pyrite Creek (lead background in this part of Maine is about 10-30 ppm and zinc background about 50-125 ppm), a marked dilution of the anomalous values occurs at its confluence with the western branch of the tributary. This is due to the much greater load of fine sediment carried by the western branch.

The stream sediments of Pyrite Creek also have extremely high contents of manganese with numerous samples containing between 1 and 15 percent manganese. Visible manganese in the form of black coatings on boulders in stream courses, and often as discrete nodules, is not uncommon in streams in Maine, especially in streams draining swampy areas. Pyrite Creek does drain a northeasterly trending swamp; nevertheless, the manganese contents of the Pyrite Creek sediments appear to be unusually high when compared with the manganese content of sediments from other streams draining similar environments, and therefore these high manganese values are in themselves suggestive of a mineralized area.

Interpretation of the data of geochemical drainage surveys in Maine is complicated by the scavenging action of manganese coatings and nodules. Zinc, cobalt, molybdenum, and barium are among the elements we know to be concentrated by this material. Accordingly, the variability in the zinc pattern along Pyrite Creek is controlled partially by the varying manganese content of the stream sediment. Nevertheless, the ratio of zinc-to-manganese is considerably above average. This suggests that the zinc is derived from a mineral deposit, rather than being merely the product of manganese oxide scavenging. The significance of the lead anomaly is also increased by the fact that much of our data on the lead and manganese content of stream sediments suggest that lead is not scavenged by manganese to any significant extent.

Appraisal of the possible economic significance of this anomaly is difficult. The known exposures of mineralized rock appear to be inadequate to produce this very intense anomaly. The galena-bearing vein exposed in the gorge at the foot of the waterfall appears to have little effect on the anomaly, for the highest lead content (2,500 ppm) was measured about 300 feet upstream from the vein. It is conceivable that a swarm of similar weakly mineralized zones are concealed beneath the extensive glacial cover and swamp upstream and that sufficient lead and zinc is being leached by circulating ground water to account for this anomaly. On the other hand, the possible presence of larger and richer zones cannot be ruled out on the basis of present knowledge. It is our opinion that the intensity of this anomaly justifies a more detailed exploration program of the upper Pyrite Creek area by geological, geophysical and geochemical surveys.

References

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