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MEMORANDUM

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Dr. H. Sargent,
Chief Mining Engineer,
Buildings

January 2, 1946

Re: Geological Work on Toad Mountain

The only geological work on Toad Mountain is that of Leroy in 1911, who spent a few weeks in preparing a 1-mile map of an area of about 100 square miles and gathering notes on current mining activity. This map shows with reasonable accuracy on an inferior base granite-greenstone contacts, but is of no real value to present day exploration or development.

The rocks of Toad Mountain, between Cottonwood and 49 creeks, are greenstones intruded by diorite and feldspar porphyry. The diorite is a roof or marginal phase of the Nelson granite and the porphyry is closely associated with, but probably younger than it. Lamprophyre dykes are common on the northern slopes. Argillites presumably lie west of 49 Creek and along Cottonwood Creek. The greenstones are flow rocks for the most part but are in a few places banded and supposedly tuffaceous. The structure is not known.

176

Production has come chiefly from the Silver King and Granite Poorman. The former is a large silver-copper ore zone and the latter a number of gold-quartz veins. Other veins such as Athabaska, California, Venus, Juno, etc., are all narrow quartz veins. There are many prospects throughout the area, many of which have had no work done on them for 30 years or more.

The Silver King produced about four million dollars from ore carrying about 20 oz. silver and 3% copper, and the Granite Poorman produced 47,000 ounces of gold. There has been no other silver-copper production, but numerous veins have produced small tonnages of relatively high grade gold ore. The copper content of all veins and deposits is marked, even though in most instances it is of little or no commercial value.

82FSW176 Silver King

The Granite Poorman and nearby ground contains a series of subparallel veins in diorite which, though small, contain local high values and some have contained important ore shoots. This ground is being actively developed by Kenville Mines Ltd. (a Quebec Gold subsidiary) and work to date strongly indicates a flat southerly rake to ore shoots. The ore shoots seem to lie in each vein at a comparable elevation, so the structural picture is one of a zone of flat southerly dip crossed by a system of veins with easterly dips. Current development is directed towards exploring known ore shoots beyond former limits of mining and also to investigating the possiblity of the existence of the same system of ore shoots in veins which have been opened up at unfavourable horizons. More advanced exploration will be directed towards finding a possible repetition of ore shoots at some different horizon.

This development should be followed by the Department, with a proper study and analysis of the implications. The results may have direct application to other parts of the camp.

The Silver King ore bodies occur in a broad band of schist. The schist is derived from greenstone and is more or less strongly carbonatized (calcium carbonate), so much so that most of the schist over a large area will fizz with acid. The orebodies themselves are replacements following the schist for the most part but spreading out on vaguely defined fractures. The gangue is a dense rock presumably high in iron-bearing carbonate. The ore bodies are surrounded by an envelope of an alteration somewhat different in type from the regional carbonatization and the intense ore-body alteration. The mine is supposedly worked out and is almost entirely inaccessible. Drilling by C.M. & S. in 1919 disclosed additional marginal ore but the drilling was done from the main adit drift and explored close lateral possibilities only.

Work of mapping on 200 feet to the inch was started in 1945 and progressed only to the point of partly delimiting the problems and the collection of a suite of rocks for study. Alteration is so intense as to make study difficult, but there are recognizable several types of rocks in the schists and detailed work may throw light on the structure and the factors of localization of mineralization.

In the intervening ground between the Silver King and Granite Poorman there is a swing in strike of apparent structure and of mineralization of about 30 degrees, also the amount of shearing decreases to the north. There are several interesting small properties about which little is known, and much evidence of mineralization even though a great deal of it does not contain gold or silver values.

The problems in the area are these:

(1) The "granite"-greenstone distribution.
(2) The relation of the dioritic variant of the granite to the main mass.
(3) The major structure of the greenstone series and the relation of intrusion to this structure, which may be important.
(4) The distribution and origin of the feldspar porphyry dykes.
(5) The distribution of sheared greenstone (schist) and its relation to original rock types and earlier structures.
(6) The distribution of carbonatization of both lime and iron-bearing varieties.
(7) The factors which have served to localize ore in the various types of deposits in the various parts of the area.

Outcrops are very scarce except in the high ground about the Silver King and the Toad-Morning Mountain ridges. Drift cover is thick and the growth of brush and timber is heavy. Most of the surveys are so old that neither lines nor posts can be found, and location is on the whole difficult.

Study of the area is recommended. There are, however, difficulties which make it something different from an ordinary job of geological mapping. First is the scarcity of outcrops. In some parts important areas are devoid of outcrops and in others they are so few that detailed search for them would require a complete combing of the ground. As a consequence no geological map could be drawn which would be considered anything but fragmentary.

Second, much of the ground is under development by one company who, at the present, are bent on a complete investigation of their extensive holdings, and contemplate doing the work of field geology as well as underground mapping. Duplication of work on this property is not called for, so long as the company does it and employs a competent geologist.

Further analysis of the problems is recommended, but under the circumstances a plan of mapping the entire area on some conventional scale is probably not warranted. Further analysis would include examination of all showings and workings in the area and detailed studies of any areas that might throw light on the general problems. Additional work at the Silver King is recommended, but the scale of the mapping might be changed depending on the results of petrographic study at present being carried out.

"M. S. HEDLEY"

M. S. Hedley,
Mining Engineer.

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