INTRODUCTION

The request for a review on the Iron Mask batholith stated that the data in the 1929, 1956 and 1967 Annual Reports of the Minister of Mines were already under study. Presumably G.S.C. Memoir 249, "Geology and Mineral Deposits of Nicola Map-Area", is also at hand. In view of this, the present report will be confined to information which, in the writer's opinion, may be of direct use in the exploration of the batholith.

The data in the 1956 and 1967 Annual Reports are first rate and give a reliable picture of the situation at those times.

The Iron Mask batholith outcrops about 3 miles southwest of Kamloops. It trends northwesterly and is less than 3 miles in average width. In length the batholith may be said to extend no farther northwest than the Trans-Canada Highway and, if so, its dimensions, 3 miles x 12 miles, do not qualify it for the name 'batholith'. If, however, one presumes the batholith to continue beyond the Trans-Canada Highway, beneath the Tertiary volcanics and sediments, and resurface in the Kamloops Lake area, its dimensions could be 3 miles x 20 miles and thus it would attain the minimum dimensions required of a batholith.

In the Cordillera one is apt to think of 'batholith' and 'granite' in more or less synonymous terms. Our undersize Iron Mask batholith, however, is a complex of quartz-poor, nondescript intrusive rocks. In spite of the variety of igneous rocks present, the writer is not aware of any granite outcrops within the boundaries of the Iron Mask batholith.

In summary, a great deal of effort has yielded the production noted above and the following 'reserves' are on the books:

Property	Tons	% Cu	Environment
Cominco (Ajax)	8,000,000	0.68[1]	Albitized Sugarloaf microdiorite.
Galaxy Copper (Evening Star)	5,000,000	0.5[2]	Altered andesite, diorite.
Pinnacle	75,000	0.66[2]	Microdiorite, microsonzonite.
Makaoo	311,000	1.12[3]	Picrite basalt - diorite contact.
Afton (Pothook)	600,000	0.63[4]	Altered diorite.

1 Classified information.

2 Prendergast, J.B., Summary Report of Pinnacle Mines Ltd. for Velocity Surveys Limited, Jan. 30, 1969.

3 Geddes Webster, private report, Sept. 22, 1956.

4 Chapman, Wood & Griswold Ltd., Report on Afton Mines Ltd., March 9, 1967.

The foregoing reserves do not include Afton's Lake deposit or others currently being explored.

RELATIONSHIP OF GEOLOGY TO MINERALIZATION

The geology of the area has been particularly well done by Carr, Livingston and Prato; it should be emphasized that this is rolling range country in which, with the exception of Coal Hill, Sugar-loaf Hill and the Cominco ground, sections of more than 5 per cent outcrop are not common. Moreover, it is a "petrographer's batholith" - one in which numerous variations, some unusual, occur. Batholiths are not commonly dominated by micro-varieties and yet fully 50 per cent of the Iron Mask batholith, from Pinnacle northwest to Afton, is composed of such rocks.

If one may be permitted an anecdote, it will serve to illustrate one of the difficulties within the Iron Mask. On September 9, 1971 the writer examined several bags of percussion cuttings, the earliest information on Afton's new orebody, the Lake zone. The writer came to the conclusion that the native copper present occurred in recrystallized Nicola volcanics. On February 1, 1972 Dr. Jim Allen, senior Cominco geologist, examined the core from several Afton drill holes and advised the writer that he considered the core was partly Nicola and partly intrusive. Dr. Carr, the authority on the area, believes the Afton is entirely in intrusive rocks. He is probably right but the point being made is that distinctions within the batholith are not always easy. The same thing happened at Cominco's Ajax deposit near Jacko Lake. After some 15,200 feet of drilling in 1955-57, Cominco thinking was that the Ajax is "a contact type of deposit, and that the

mineralization was deposited in an albitized assemblage of Nicola volcanics." However, the 1967 mapping suggests that such is not the case. It now appears that "the mineralization occurs in altered intrusive rocks which form a part of the Iron Mask igneous complex".

A very fine map of the Afton area was prepared by Noranda geologist Alex Burton in 1958. In addition to 3 post-mineral formations, Burton recognized: 6 distinct Iron Mask intrusions - diorite, gabbro, syenite, hornblende diorite, trachyte, pink feldspar altered diorite; 6 dyke rocks - diorite, felsite, hornblende diorite, leucite-feldspar porphyry, pyroxenite, magnetite; 3 forms of picrite basalt - picrite, augite, serpentine; and 5 distinct Nicola group components - flow, agglomerate, argillite, quartz-feldspar porphyry, carbonate breccia.

It is thus difficult to select one or two particularly favourable host rocks. Picrite basalt is abundant on the Cominco property but is not a host rock there whereas it is on the Makaoo.

There has to be something, however, with the picrite basalt. Even if it is unmineralized at Cominco, it is there, it is at the Makaoo, at the old Iron Mask and at a number of other mineralized sites in small amounts. This is sufficient for the writer to recognize its importance, if not its significance. The picrite occurs generally in relatively narrow, elongate intrusions that strongly suggest to the writer that these bodies were intruded along zones of shearing and fracturing that were reopened at a later date and subsequently mineralized.

The Sugarloaf and Cherry Creek Intrusions are considered for various reasons to be post-Iron Mask. Whether this is a valid

conclusion or not, both formations are mineralized here and there with copper. These formations will be dealt with again in the next section.

A word must be said about magnetite because there are still some geologists who think in terms of a close genetic magnetite-copper association. Too bad this is not true because there is one great deal of magnetite in the Iron Mask batholith. In fact, in the period 1891-1902, 16,773 tons of magnetite was mined from the Glen Mine in the same vicinity as the Copper King (Rolling Hills Cherry Bluff deposit) and in the 1950's magnetite was mined for pipeline ballast from Mineral Leases L899 and L4798 (Pothook area, Afton).

The relationship of geology to mineralization involves at least token consideration of structure as well as petrography. The main structures are northwesterly striking shear zones, parallel to the grain. In one or two significant places, such as Ajax and the Iron Mask, a conjugate set has developed and northeasterly trending shoots of copper mineralization form the orebodies.

POTENTIAL

In attempting to measure the potential of various parts of the batholithic area, the writer depends largely on petrography and the distribution of the known occurrences.

Dealing with petrography, the writer firmly believes in the "favourability" of the areas mapped as Cherry Creek Intrusions and Sugarloaf Intrusions - over the main batholithic rocks.

With the Cherry Creek Intrusions, there is the old Copper King on Rolling Hills northwestern property; there are Cherry

Creek rocks east and west of the new Afton; the Cherry Creek rocks east of Afton contain the promising Comet-Krain showings; the Evening Star (Galaxy) is off the western tip of a lobe of Cherry Creek rock; and finally there is Cherry Creek rock on the Pinnacle ground.

With regard to the Sugarloaf Intrusions, there is the Ajax deposit and the promising Leemac on Sugarloaf Hill.

Another way of looking at the above is to state that the margins of the batholith hold more potential than the interior of the batholith.

Apart from the properties with substantial established reserves (Afton, Cominco, Galaxy) or commitments (Leemac with Western Mines), the writer rates the prospects as follows:

1. Comet-Krain.
2. Rolling Hills (Cherry Creek, NW of Afton).
3. Rolling Hills (E of Leemac and W of United Bata).
4. Makaoo (extensive work done).
5. Pinnacle-Kalamalka.
6. Rolling Hills, W, N, E of Cominco.
7. Minox, S of Cominco.