REGIONAL SETTING OF GIANT MASCOT MINE
(92H/5W, 6E)

By Mark R. Vining
(Graduate Student, University of British Columbia)

Field mapping was carried out between American and Emory Creeks (Fig. 9) in an attempt to determine the relationship between the Spuzzum batholith and the Giant Mascot ultrabasic complex. The study will be completed as a Master of Science degree at the University of British Columbia and field costs were supported, in part, by the British Columbia Department of Mines and Petroleum Resources.

Work began in mid-June at American Creek and had been extended northward to Emory Creek by mid-September. Heavy forest cover extends to elevations of 1 430 metres, above which open areas are thickly overgrown with brush. Age relationships between the ultrabasic rocks and surrounding dioritic rocks in the Giant Mascot mine area have been the subject of study by a number of previous workers. Ultrabasic rocks and the surrounding diorites and norites in the mine area were described by Aho (1956) as being roughly contemporaneous, although they exhibit ambiguous contact relationships.

GENERAL GEOLOGY

Schist

The oldest rocks in the area are schists, which occur as xenoliths in tonalite and diorite. They are mainly pelitic schists with interbeds of calc-silicate rock and quartzite, numerous synkinematic dykes and sills of aplite, and rare ultrabasic pods. The schists contain sillimanite in contact aureoles and abundant staurolite, garnet, and kyanite away from igneous contacts. Ultrabasic pods contain directionless talc and radiating clots of acicular anthophyllite or tremolite. These rocks are tentatively correlated with the Hozameen Group by McTaggart and Thompson (1967).

Ultramafites

Aho (1956) described a suite of ultrabasic rocks on the Giant Mascot property ranging from pyroxenite at the periphery to several cores of dunite in a crudely concentrically zoned complex. All phases of the complex have varying amounts of sievy hornblende. Angular xenoliths of peridotite and pyroxenite, with sharp contacts are found in diorite, and dykes of diorite cut peridotite and pyroxenite at the perimeter of the complex. Small stocks and a sill-like mass of ultrabasic rocks intrude schists, south and east of the mine.

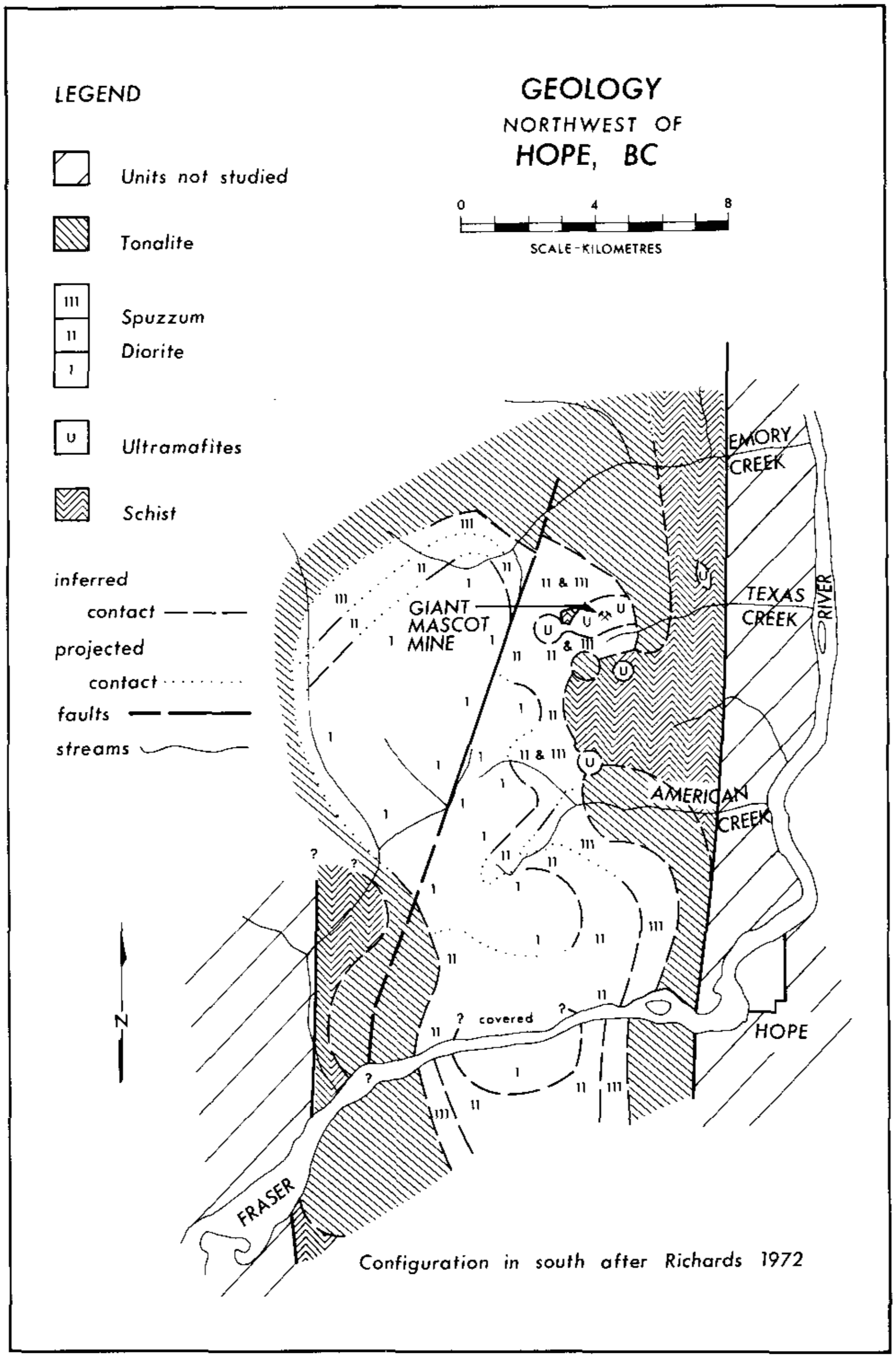

Figure 9. Geology northwest of Hope.

Hornblendite rims the complex and grades to gabbro and diorite with increasing amounts of plagioclase. Fine-grained dykes or veins of hornblendite and hornblende gabbro cut the less hydrous ultrabasic rocks. Hornblende is generally the only mafic mineral, but some dykes contain hypersthene or biotite phenocrysts. McLeod (1975) reported K-Ar ages of 95 to 119 m.y. for various ultramafites from the Giant Mascot property.

Spuzzum Diorite

A zoned suite of diorites intrudes the schists and ultramafites.

Richards (1972) described three types of diorites in the Spuzzum intrusions south of American Creek including: hypersthene-augite diorite, augite-hypersthene-hornblende diorite, and biotite-hypersthene-hornblende diorite. These three types have roughly constant proportions of hypersthene and plagioclase. Other types seen north of American Creek include: hornblende diorite, with or without biotite and with no pyroxene, hornblende diorite, with small to very large (several centimetres) euhedral crystals of hornblende in a finer grained matrix of white plagioclase which grades to a gabbro or to plagioclase-bearing hornblendite, and 'noritic' diorite in which the most common mafic mineral is hypersthene.

Foliation and lineation are common in these rocks, imparted by the alignment of plagioclase and hornblende crystals and locally by the alignment of elongate pyroxenes or biotite flakes. The structural continuity is broken near the North Fork of American Creek, and is perhaps due to a large reentrant of schist from the east.

Hornblendite Inclusions

Richards (1972) described two tpyes of ultramafic bodies, pyroxenite and hornblendite, found only in diorite. The form of these bodies is most commonly lenticular, but some hornblendite 'dykes' up to 5 feet across have sharp to gradational contacts w th diorite. The origin of both types of ultramafic bodies is attributed by Richards (1972) to metasomatic removal of SiO_2, Na_2O, and CaO by hydrothermal fluid.

Field observation during the present study suggests that their mechanism of formation is not simple. Pyroxenite bodies are of small size and occur only locally. Hornblendites in diorite are seen as irregular rounded bodies ranging in size from several centimetres to somewhat under 1 metre, in what appears to be an interconnected three dimensional net within hornblende diorite. The foliation of the diorite at a contact with hornblendite body is either truncated, somewhat contorted, or concordant, but generally rather obscure. Contacts are generally very sharp. This type of relationship may grade to another in which the hornblendite veins consist of very coarse hornblende crystals, usually with skeletal plagioclase cores, and with or without minor interstitial plagioclase. These could be termed pegmatitic hornblendite dykes or veins and are suggestive of a very volatile-rich environment. Hornblendite occurs also as narrow veins, usually under 5 centimetres, commonly associated with nearly pure plagioclase 'veins' or 'segregations.'

Tonalite

Tonalite intrudes diorite, truncating the zoning pattern in many places, and also the foliation of the diorite visibly in at least one locality (Richards, 1972). Xenoliths of granofels and hornfelsed schist occur in the tonalite. Granofels is thoroughly recrystallized, but appears more mafic than tonalite with lesser or no quartz. It is thought, therefore, to be Spuzzum diorite.

The composition of the tonalite is fairly constant and averages plagioclase, 55 to 60 per cent; quartz, 15 to 20 per cent; and hornblende plus biotite, 25 to 30 per cent. The greatest visible variation is in the ratio of hornblende to biotite, which ranges from 0.5 to 2. These rocks are quite strongly foliated and in places lineated, as expressed by the alignment of hornblende and biotite. Protoclastic textures are common. The tonalite has yielded K-Ar ages of 79, 81, 83, and 103 m.y. (Richards and White, 1970).

Late Phases

A late differentiate of the tonalite, a plagioclase-quartz-tourmaline-mica-pegmatite, fills joints in older rocks. Possibly contemporaneous with this pegmatite are quartz veins which cut most of the rock units. Lastly, a garnet-bearing, strongly foliated, leucocratic dyke-rock cuts the above-mentioned pegmatite and tonalite.

Breccias containing fragments of virtually all units older than tonalite have a fine-grained matrix of plagioclase and hornblende. The texture of the matrix appears to be metamorphic.

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