STUDY OF PURCELL SUPERGROUP ROCKS
SOUTHEASTERN BRITISH COLUMBIA
(82G)

By Trygve Höy

Mapping of rocks of the Purcell Supergroup was continued northward from the Estella-Kootenay King area (Høy, 1978) to the southern boundary of the Canal Flats map sheet (Leech, 1958). M. McMechan, a graduate student at Queen’s University supported by the Ministry of Mines and Petroleum Resources, completed mapping of Purcell rocks southward to Elko. The results of these studies will be published in the spring of 1978 in the form of two preliminary map sheets at scales of 1:50 000.

Reconnaissance mapping of Purcell rocks in the Moyie Lake area, on the west side of the Rocky Mountain Trench, commenced late in the field season and will continue during the 1979 season. The project is intended to focus attention on the structural and stratigraphic controls of lead/zinc mineralization in the Aldridge Formation in southeastern British Columbia. It involves both detailed and regional mapping of areas underlain by Purcell rocks in the vicinity of these deposits.

REFERENCES


CEDAR CLAIMS, GALLOWAY
(82G/12E)

By David Grieve and Trygve Höy

The Cedar claims, staked by Mr. R. H. Stanfield of Galloway, are located 40 kilometres east of Cranbrook and 45 kilometres north of the United States border. They are accessible using well-maintained exploration roads which branch off the main haulage road, 2 kilometres north of Galloway. The authors visited the property in late August 1978 when an adit was being driven and had reached a length of 150 metres. A number of raises had been driven from the adit to intersect the mineralization.

Mineralization consists of a few pods of massive galena in a fault zone in dark grey, laminated argillites of the upper Aldridge Formation, Purcell Supergroup. The fault zone trends east/west and dips steeply northward, crosscutting the regional trend of the sedimentary rocks. This zone contains heavy, grey, fine-grained material deeply encrusted with limonite, and rare similarly encrusted pods of massive galena. Original gangue and sulphide minerals are for the most part oxidized and leached, leaving a residue of rusty weathering argillaceous material.
Mineralization within the country rock is generally lacking although wallrock within the adit contains laminations of fine-grained, well-crystallized pyrite. Logs of diamond drill holes from this and adjacent properties reveal only minor amounts of galena, sphalerite, or chalcopyrite (Assessment Reports 5900, 5901, 5902, 5942, 6031, 6244).

The Cedar showing is similar to numerous other vein-type deposits in Purcell rocks in southeastern British Columbia. Like many other lead-bearing vein deposits in Purcell rocks, the tonnage potential for the Cedar showing appears to be limited. However, deposits of this type have exploration potential for small, relatively high-grade deposits.
Figure 4. Regional geology of the Cottonbelt area.
COTTONBELT LEAD/ZINC DEPOSIT
(82M/7)

By Trygve Höy

INTRODUCTION

A study of the structure, stratigraphy, and mineralization of the Cottonbelt area along the western and northwestern margin of the Frenchman Cap gneiss dome was initiated in July 1978. The project will continue in 1979, extending the mapping around the north end of Frenchman Cap dome and southeastward to Fortynine Creek. This mapping will largely complete detailed stratigraphic and structural study of the southern (Fyles, 1970), western (McMillan, 1970), and northern periphery of Frenchman Cap dome.

Cottonbelt is one of a number of stratiform lead/zinc deposits in the Shuswap Complex. Ruddock Creek (Fyles, 1970), located approximately 30 kilometres north of the Cottonbelt area, is currently being drilled by Cominco Ltd. King Fissure, situated on the southern flank of Frenchman Cap dome, was drilled by Bralorne Pioneer Mines Limited in 1963, 1965, and 1966 (Fyles, 1970). Big Ledge, in the mantling gneisses of the Thor–Odin gneiss dome 60 kilometres south of Revelstoke, has been explored intermittently since the late 1920’s (Höy, 1976).

The Cottonbelt property is located on the northwestern margin of the Frenchman Cap gneiss dome, 60 kilometres northwest of Revelstoke. The property received considerable attention in the 1920’s, including drilling, trenching, and some underground work. Metallgesellschaft Canada Limited optioned the property in 1978 and in July drilled two holes in an attempt to intersect mineralization in the hinge zone of a synformal structure.

This report is based on three week’s field work in the area in July 1978. Discussions with J. Kovacik and F. Wellmer of Metallgesellschaft and with W. J. McMillan of the Ministry of Mines and Petroleum Resources were most helpful. David Johnson provided cheerful and able field assistance.

STRUCTURE

The structure of the Cottonbelt area is dominated by a tight, early syncline that is draped around the northwestern margin of Frenchman Cap gneiss dome (Figs. 4 and 5). Mineralization in the Cottonbelt area occurs on both limbs of the syncline. The structure, informally named the Grace Mountain syncline, is the nose of a westerly closing fold that extends from just west of the Columbia River opposite Goldstream River, through the Cottonbelt area to south of Ratchford Creek (see following paper by Höy and McMillan). Minor structures related to this early (phase 1?) fold are uncommon. Tight to isoclinal, commonly rootless phase 1 fold hinges swing from southeasterly trends southeast of Blais Creek to southwesterly trends to the north.
Figure 5. Composite vertical section through the Cottonbelt area (for location, see Figure 4).

Figure 6. Detailed section through the upper mineralized limb of the Grace Mountain syncline (for location, see Figure 4).
The only phase 2 structure that is large enough to appear on Figure 4 is an S-shaped fold outlined by quartzite north of Blais Creek. It's axis plunges 20 to 30 degrees to the west. However, phase 2 mineral lineations and minor folds are abundant throughout the area. They plunge 30 to 40 degrees toward the west and southwest, south of Grace Mountain and swing to northwesterly plunges north of Blais Creek.

STRATIGRAPHY

Rock units comprise a sequence of quartzites, calcareous schists, marbles, and pelitic schists repeated on both limbs of the Grace Mountain syncline. A number of occurrences of crossbedded and graded quartzites in both the upper and lower limb provide reliable top determinations and allow a stratigraphic succession to be established.

The oldest rocks (unit 1) comprise a well-layered sequence of hornblende gneisses, minor amphibolites, and rare calc-silicate gneisses. A leucocratic, rusty weathering and more massive biotite-quartz feldspar layer several tens of metres thick within unit 1 contains disseminated molybdenite. It forms a prominent band structurally above the folded quartzite in the northwest corner of the map-area.

Quartzites of unit 2 stratigraphically overlie the banded gneisses. A well-exposed section on a cliff south of the north fork of Blais Creek shows that the quartzite grades upward from a coarser grained feldspathic grit unit, cemented by carbonate or silica, through thinner bedded, fine-grained quartzite to thinly interbedded quartzite and micaeous schist at the top. Crossbedded quartzites of unit 2 in the northernmost part of the map-area indicate that these northwestward-dipping beds are inverted. To the southwest, unit 2 is substantially thickened in the core of a phase 2 fold. East of Grace Mountain, crossbedded feldspathic quartzite is overlain to the west by a thick sequence of interlayered quartzite and micaeous schist. This sequence may result from complex interfolds of units 2, 3, and 4, or alternatively may reflect variations in the original sedimentary character of unit 2. To the south in the Perry River area, the same unit changes in character as it is traced northward. Near Bews Creek it is a relatively thin, pure quartzite. Northward it thickens considerably and further north, near Myoff Creek it forms a thicker sequence of interbedded quartzite, schist, and calc-silicate gneiss (McMillan, 1970).

Calc-silicate gneiss, impure marble, and micaeous schist of unit 3 are well exposed on both limbs of the Grace Mountain syncline along the north fork of Blais Creek. They are structurally thickened by northwesterly trending phase 3 folds in the south limb of the syncline.

Quartz feldspathic gneiss and micaeous schist of unit 4 overlie unit 3. They are in turn overlain by the ‘Cottonbelt sequence,’ unit 5, a heterogeneous package of dominantly calcareous rocks that hosts the Cottonbelt mineralization (Fig. 6). A buff-weathering carbonatite layer, lithologically similar to the ‘type 2’ carbonatite of McMillan (1974) is at the base or close to the base of the Cottonbelt sequence. It occurs on both limbs of the Grace Mountain syncline over a strike length of at least 16 kilometres. In the Perry River area, 15 kilometres to the southeast, it occurs at approximately the same stratigraphic level and there has also been traced intermittently along strike length of 15 kilometres westward (McMillan, 1970). In the Grace Mountain area, the carbonatite is stratigraphically overlain by calcareous schists and a calcareous to relatively pure white quartzite (5c). A grey-weathering, white limestone (5d) overlies the quartzite.
Limestone is one of the more distinctive and persistent marker units in the map-area. Interlayered micaceous and calcareous schists (5e), and an impure grey-weathering crumbly limestone (5f) overlie 5d. The sulphide layer (5g), enveloped by a thin layer of very siliceous calcareous schist and a garnet-sillimanite schist, defines the top of the Cottonbelt sequence. Elsewhere, calcareous and quartz-rich schists occur at the top of unit 5.

Unit 6, the youngest rocks in the map-area, comprise the core of the Grace Mountain syncline. They consist dominantly of kyanite and sillimanite schist, quartz feldspathic gneiss, and occasional thin quartzite layers.

MINERALIZATION

Mineralization in the Grace Mountain area comprises an oxide-sulphide layer that can be traced intermittently through a strike length of approximately 5 kilometres in the western (upper) limb of the Grace Mountain syncline and 2 kilometres in the lower limb. The succession of calcareous rocks that hosts the mineralization has been traced a further 5 kilometres northeastward from Blais Creek. There, mineralization is erratic, consisting mainly of disseminated magnetite and chalcopyrite in either an impure, very siliceous calc-silicate gneiss or in a rusty weathering white crystalline marble. Elsewhere, the 'mineralized layer' is represented by a zone of rusty weathering calcareous schist.

The sulphide layer in the Grace Mountain area has been trenched along virtually its entire length. It varies in thickness from a few tens of centimetres to approximately 2 metres. Mineralization generally consists of fairly coarse-grained sphalerite, magnetite, galena, and minor pyrrhotite in a dark green, pyroxene-amphibole-quartz-garnet 'skarn' rock or, as layers within a lighter coloured, more siliceous calcareous gneiss or as disseminated grains in a siliceous granular marble. Assay values of a grab sample and chip samples across the mineralized layer are listed below.

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<tr>
<th>Sample No.</th>
<th>Sample Type</th>
<th>Ag (ppm)</th>
<th>Cu (per cent)</th>
<th>Fe (per cent)</th>
<th>Pb (per cent)</th>
<th>Zn (per cent)</th>
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<td>0.006</td>
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REFERENCES


Figure 7. Regional compilation of the geology of the flanks of Frenchman Cap gneiss dome (from Fyles, 1969; Høy, 1979; Høy, 1978; McMillan, 1973; and Wheeler, 1963).