

BEDROCK GEOLOGY
SPANISH LAKE
AND ADJOINING AREAS
BRITISH COLUMBIA
Scale 1:50,0000 1 2 3 4 5 6 7 8 9 10
KILOMETRESOPEN FILE
O.F. 920
Geological Survey of Canada
OTTAWA

DESCRIPTIVE NOTES

Bedrock is well exposed above 5500' (1700 m), on steep slopes and along some creeks and rivers. It occurs as scattered exposures along road cuts and through the glacial drift that covers most of the lower areas.

The Kaza Group is only confidently known east of the map-area where it consists of interbedded felspathic coarse grained poorly sorted quartzite and phyllite. It is described by Sutherland Brown (1963) and Campbell et al. (1972). It conformably underlies the Cariboo Group.

The Cariboo Group is restricted to include the Isaac (H₁), Cunningham (H₂), Yankee Belle (H₃), Yanks Peak (H₄), Midas (H₅), and Mural (H₆) Formations east of the Pleasant Valley Fault (Struik, 1962). Different strata west of the fault, formerly included with the Cariboo Group are here assigned to the Snowshoe Group. The Mural and Cariboo formations east of the Pleasant Valley Fault is described first.

The Cariboo Group generally thins to the southeast and west. The Isaac Formation is approximately 1000 m thick near the east edge of the map; its thickness to the west is unknown. The Cunningham Formation thins from 1000 to 200 m, the Yankee Belle Formation from 1200 to 400 m, the Yanks Peak Formation from 300 to 0 m, the Midas Formation from 400 to 75 m, and the Mural Formation from 300 to 200 (17) m. The maximum thickness of the Mural Formation is not known because it is essentially removed below the Black Stuart Group. The Yanks Peak Formation occurs in elongate lenses of 0 to 70 m thick paralleling the trend of the Isaac structures.

It is difficult to distinguish between the Cunningham and Mural Formations or Yankee Belle and Midas Formations. The Cunningham Formation is gradational with both the underlying black shaly laminated pelites of the Isaac Formation and the overlying sandstones of the Yankee Belle Formation. The Mural Formation is in sharp contact with the underlying olive grey pelites of the Midas Formation and the unconformably overlying black pelite, chert or dolomite of the Black Stuart Group. The Yankee Belle Formation is more quartzite rich than the Midas Formation and unlike the Midas has limestone beds. The Mural Formation has folded Lower Cambrian Archeozoic and trilobite rich south of the Cariboo River. The Cariboo Group is laterally continuous into the eastern Cariboo Mountains and is correlated with the upper Mistle Group and McLaughlin Group in the Rocky Mountains.

The Black Stuart Group unconformably overlies the Cariboo and Kaza Groups. Its oldest known unit is a Middle and/or Upper Ordovician dark shale (O₁), as much as 50 m thick where preserved. The next younger unit is of Silurian Devonian chert and carbonate (S₁) up to 800 m thick. The shale may represent a basal sequence interrupted by a possible Lower Silurian unconformity or hiatus. The chert-carbonate unit has characteristic thought to be indicative of shallow-water deposition. The basal shale contains Upper Ordovician graptolites and the chert-carbonate unit contains Upper Silurian brachiopods (Lind, 1977) and Lower Devonian conodonts and corals. Up to 300 m of black shale with Middle Devonian conodonts overlies the chert-carbonate unit (included in O₁).

The rock previously mapped as Cariboo Group west of the Pleasant Valley Fault, included the Yankee Belle, Yanks Peak, Midas and Snowshoe Formations as defined by Holland (1954). However, the stratigraphy is not the same as that of the Cariboo Group east of the fault and therefore an informal terminology for the western rocks is introduced. The western "Cariboo Group" is referred to as the Snowshoe Group and its stratigraphy is described in Struik (1982). From oldest to youngest, the subdivisions within the map area, are the Ramo Creek, Keithley, Harvey, Pine Creek, Goose Peak, Shoney and Bralco successions.

The Ramo Creek (R₁) previously considered an upper unit of the Snowshoe Group (Struik, 1982) is now thought to be the lower because of the relations near Keithley Creek. The relationship of Ramo Creek, on which the previous interpretation was based, are now suspected to be due to faulting. The Ramo Creek may be more than 200 m thick. Its felspathic grit resembles those of the Kaza Group and the bed may be time equivalent, hence, its assigned Hadrynian age. The Keithley succession (K₁) incorporates rocks formerly mapped as Yankee Belle and Yanks Peak Formation on Yanks Peak (Holland, 1954, unit of Struik, 1982). It is recognized only in the western part of the Snowshoe Group. The Keithley may correlate with the Yankee Belle and Yanks Peak Formation east of the Pleasant Valley Fault and is therefore considered to be Hadrynian. It is certain mainly by black siltite and phyllite of the Harvey succession (H₁) in the Yanks Peak and Brown Mountain areas. At Yanks Peak these rocks were mapped as Midas Formation by Holland (1954).

Included in the Harvey is dark grey pelitic quartzite with black quartz grains that occurs near Harvey Creek and west of Mount Barker. The Harvey rocks were mapped as H₁ by Struik (1982) and are assigned to the Paleozoic as they may correlate with parts of the Black Stuart Group. The Pine Creek conglomerate (P₁) has a local maximum thickness in the order of 200 m. It contains clasts of quartzite and pelite, including some derived from the Harvey, and is considered Paleozoic. The Goose Peak succession (P₂) consists of coarse grained felspathic light grey quartzite and olive-grey and grey phyllite, laterally equivalent to the Pine Creek conglomerate. The unit is thin in the Snowshoe plateau, but thickens southward. The Downey succession (D₁) directly overlies the Harvey within the map area. It is probably greater than 200 m thick. Like much of the Snowshoe Group the Downey is a quartzite, however it is characterized by locally abundant marble and basic volcanic rocks. From lithological correlations with fossiliferous limestone the Downey sequence may be partly Mississippian (Struik, 1982). The Bralco marble (B₁) lies east of the Downey along the Pleasant Valley Fault. The Harvey, Downey and Bralco units resemble parts of the Eagle Bay Formation, just north of Kamloops.

The Snowshoe Group is increasingly metamorphosed to the southwest. Rocks metamorphosed above the garnet isograd have few recent secondary features and the units outlined above are indistinguishable. The Downey succession, however can be recognized by its marble and amphibolite horizons. It also has a distinct scarnite-silicified-chert bearing schist in part equivalent to a green chlorite phyllite in the lower metamorphic grade areas to the northwest in Cariboo Lake (1934/4) and Wells (1934/4) map area.

The Slide Mountain Group (S₁) is thrust over and preserved along the western margin of the Snowshoe Group. It consists mainly of amphibolite greenstone and less serpentine and altered ultramafic rocks, generally less than 400 m thick. Locally the Slide Mountain is missing and the overlying Triassic clastic rocks are in contact with the Snowshoe. The greenstone and ultramafics are correlated with the Mural Formation that is Mississippian to Lower Permian. Truncation of the Slide Mountain Group from the west was probably during the Triassic and/or Early Jurassic. The Slide Mountain Group is correlated with the Aulvi Group of Yukon, part of the Sylvester Group of northern British Columbia and possibly the Sello Group of southern British Columbia.

The Triassic (T₁) and Jurassic (J₁) clastic and volcanic rocks are suspected to stratigraphically overlie the Slide Mountain Group. The contact may be partly faulted. They are part of striae rocks along much of the western margin of the Intermontane Belt (Tippin et al. 1983).

A recent olive basalt volcano and associated pyroclastic and flow rocks (P₁) occurs near Grate Creek. Another of the same type has been reported close to Mount Stevenson by Giesinger (1982).

The map area includes five intrusive igneous rock suites. The Quenel Lake gneiss (Q₁), foliated granodiorite (P₁) and diorite (D₁) are pre-metamorphic and intrude the Snowshoe Group. The Quenel Lake gneiss is mylonitic where in contact with the Slide Mountain Group, and the diorite occurs mainly as sills and dykes that are folded, but only weakly foliated. The foliated granodiorite forms sill-like tabular bodies in the Mount Stevenson area. The Little River stock (J₁) intrudes folded Cariboo Group. Coarsely crystalline pegmatite (P₁) cuts amphibolite facies metamorphic rocks of the Snowshoe Group, along the North Arm of Quenel Lake.

The structure and metamorphism vary across the east-dipping Pleasant Valley Fault. On both sides of the fault the foliation and metamorphism occurred after the intrusion of the Slide Mountain Group, and are Mesozoic. East of the fault the folds are open to tight on the macroscopic scale and can be isoclinal on the mesoscopic scale. They are predominantly overturned to the west. The map pattern is governed by a series of east-dipping normal trending low and high angle faults. Early thrust faults are partially obscured by later folding and faulting. Late transverse and northerly and north-northerly right-lateral strike-slip faults have been mapped. Movements are associated with quartz veining and gold mineralization. West of the Pleasant Valley Fault the folds are mostly tight to isoclinal on all scales. Small faults of the area have the same characteristics as east of the Pleasant Valley Fault. Regional Barrovian metamorphism attains greenschist facies east of the Pleasant Valley Fault and amphibolite facies to the west. The peak of metamorphism coincides with the macroscopic folding.

Geology by L. C. Struik 1978, 1979, 1981, 1982.

Geological contacts around Macford Lake and Little River Fault by D.W. Klepac 1979, units re-interpreted by Struik.

Location of metamorphic mineral occurrences and some contacts in the Three Ladies Mountains and Mount Stevenson area provided by J.S. Giesinger 1982.

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