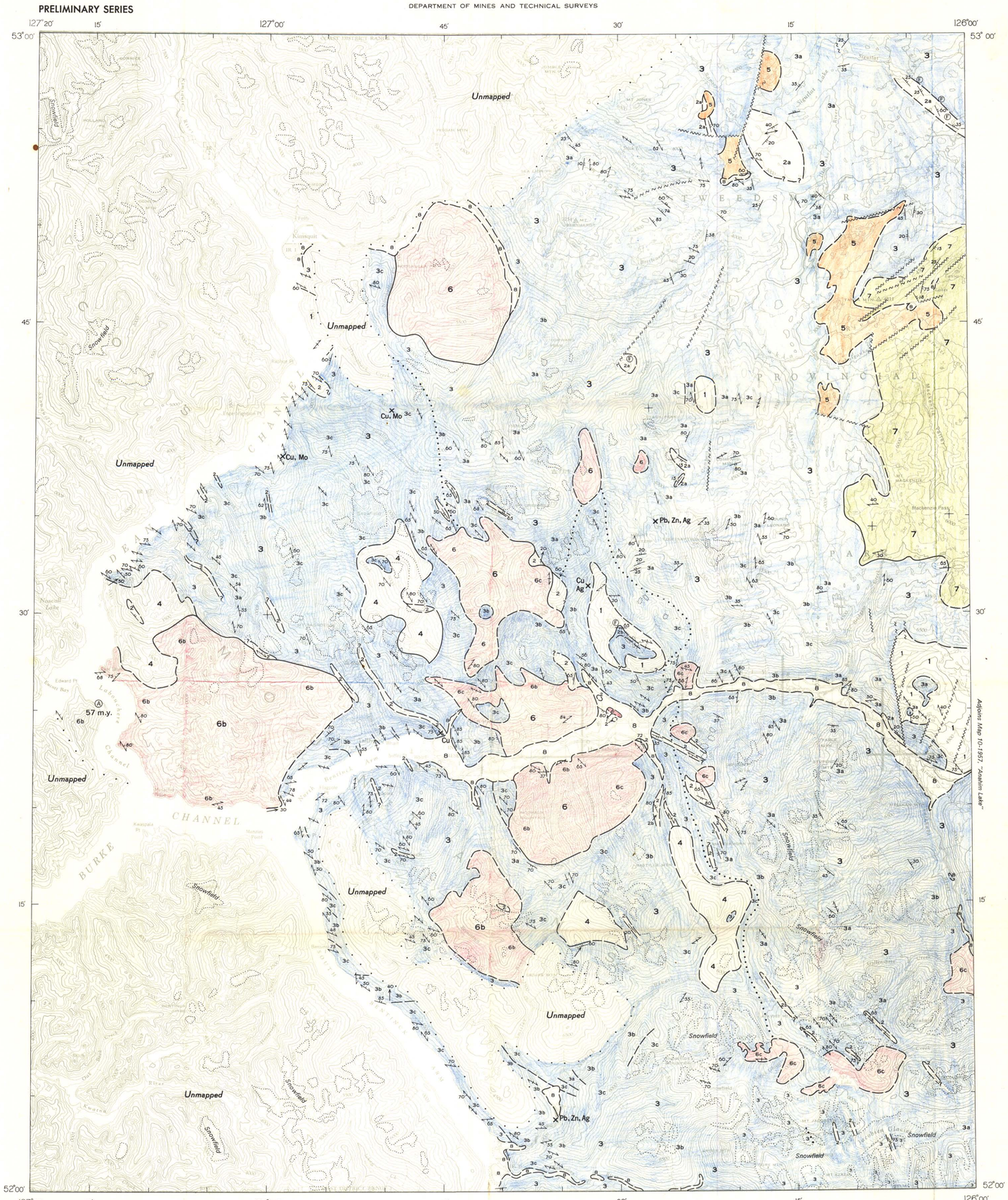
GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES



LEGEND

PLEISTOCENE AND RECENT

8 — Till, gravel sand, clay and silt

TERTIARY — CENOZOIC

MIOCENE AND (?) PLIOCENE

7 — Vesicular and amygdaloidal basalt, olivine basalt and related tuff, subordinate rhyolite

EOCENE AND/OR PALEOCENE

6 — Massive, medium-grained to coarse-grained, light coloured plutonic rocks; 6a, quartz monzonite; 6b, granodiorite

CRETACEOUS OR TERTIARY

EARLY TERTIARY OR OLDER

5 — Pink, medium- to fine-grained quartz monzonite and granodiorite

CRETACEOUS (?)

UPPER CRETACEOUS(?)

4 — White or light grey, foliated, medium-grained granodiorite

JURASSIC AND OLDER — MESOZOIC

MIDDLE JURASSIC AND (?) OLDER

3 — Volcanic rocks and their metamorphosed equivalents, undivided; 3a, mainly green flows, tuff and agglomerate of andesitic composition, interbedded minor slate and greywacke similar to 2, subordinate rhyolite; 3b, greenstone, low-grade chlorite-rich metamorphic equivalents of 3a; 3c, diorite and quartz diorite with veins and stringers of granodiorite, all highly metamorphosed and granitized equivalents of 3a and 3b

MIDDLE AND (?) LOWER JURASSIC

2 — Black slates, argillite and greywacke interbedded with 3; 2a, greywacke; 2b, conglomerate

PRE-MIDDLE JURASSIC

1 — Greenish, foliated granodiorite, cut by andesitic green dykes

Geological boundary (defined, approximate or assumed)
Limit of geological mapping
Approximate eastern and northeastern limit of highly metamorphosed volcanic rocks
Bedding, tops known (horizontal, inclined)
Bedding, layering, tops unknown (inclined, vertical)
Schistosity, gneissosity, foliation (inclined, vertical, dip unknown)
Axes of minor folds (horizontal, inclined)
Fault (defined, approximate, assumed)
Fossil locality (F)
Mineral occurrence ×
K-Ar age determination locality, in million years 57 m.y. (A)

Mineral Symbols

Copper	Cu	Silver	Ag
Lead	Pb	Zinc	Zn
Molybdenum	Mo		

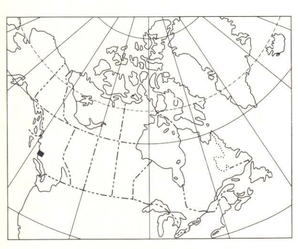
Geology by A. J. Baer, 1962-1964; W. W. Hutchison, 1963, 1964; J. G. Souther, 1963

Geological cartography by the Geological Survey of Canada, 1965

Road, all weather
Trail
Seaplane base, anchorage (I)
Lighthouse
District boundary
Township boundary
Provincial Park boundary
Indian Reserve boundary
Section line
Intermittent stream
Falls (F, R)
Marsh
Contours (interval 500 feet) 500
Glacier, snowfield
Height in feet above mean sea-level 3067

Approximate magnetic declination 25°21' East, decreasing 3.2' annually

Base-map compiled and drawn by the Surveys and Mapping Branch, 1960



INDEX MAP

Published, 1966
Copies of this map may be obtained from the Director, Geological Survey of Canada, Ottawa

Printed by the Surveys and Mapping Branch

MAP 7-1965

GEOLOGY

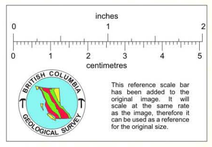
BELLA COOLA

BRITISH COLUMBIA

Scale 1:253,440
1 inch to 4 miles

Miles 4 0 4 8 12 Miles
Kilometres 6 0 6 12 18 Kilometres

CYPRUS MINES CORPORATION



DESCRIPTIVE NOTES

The map-area is crossed by a good motor road that connects Bella Coola with Williams Lake, 200 miles to the east. Good logging roads reach into the lower part of most valleys tributary to Bella Coola valley. Logging has also been carried out on Noeick, Smitley, and Taleomey Rivers, at the head of South Bentinck Arm, and good roads make this area fairly accessible. Another logging road is presently being built along the lower part of Dean River from Kimsquit on Dean Channel. Fixed-wing aircraft can land on numerous small lakes in the northeast part of the area, but heavy bush and deep canyons hinder travel there. Trails are scarce, old, and so little used that most are nearly impassable. Most of the area is accessible only by helicopter, and even that to a limited extent as, particularly around Ape Lake, the jagged ridges are inaccessible to all but the most expert mountain climber.

Bedrock is commonly well exposed, except in creek and valley bottoms and the northeast part of the area where glacial drift is widespread. Shoreline exposures are excellent and practically continuous, except at the head of the fiords and at a few pebbly beaches south of Tallheo Point, on South Bentinck Arm. Timber-line in the map-area is at about 4,500 feet.

A greenish granodiorite (1) is the oldest plutonic rock in the area. The green colour is due to intense chloritization of mafic constituents, and to epidote along numerous small fractures. Contacts with adjacent rocks are commonly sharp but appear to be gradational on upper Salloomt River.

Black argillites and slates (2) form discontinuous rusty-weathering bands interlayered with rocks of unit 3. Their stratigraphic position within that unit has not been determined. A 50-foot conglomerate bed (2b) was found 4 miles northwest of Salloomt Peak, where it lies nonconformably on the greenish granodiorite (1). Pebbles in the conglomerate are exclusively of granodioritic composition. Some poorly preserved brachiopods have been found in the greywacke that overlies the conglomerate. J. A. Jeletzky of the Geological Survey has tentatively attributed a Middle or Lower Jurassic age to these fossils. Another conglomerate containing granodiorite pebbles was found, interlayered with unit 3 on the west side of Nusatsum River, 6 miles from its mouth.

Middle Bajocian (Middle Jurassic) fossils (cephalopods, pelecypods, brachiopods), determined by H. Frebold of the Geological Survey, have been found in a band of greywacke (2a) interbedded with volcanic rocks, east of Sigutlat Lake. Its relationship with other outcrops of similar rocks in the area is unknown. The greywacke (2a) is essentially confined to a northwest-trending band near Sigutlat Lake, and the argillites occupy another zone farther to the southwest. This distribution may have a stratigraphic significance.

Most of unit 3 is slightly metamorphosed and consists of light green or greyish volcanic rocks (3a). Red or brown lava flows are uncommon (at Iltasyuko River south of Sigulat Lake, and Gyllenspetz Creek). The thickness of the flows is generally greater than 10 feet. Agglomerates are common, with fragments varying from a fraction of an inch to 10 inches or more across. Except for a narrow bed, two miles long, none of these agglomerates could be followed far. The lack of distinctive, continuous horizons and the scarcity of planar structures such as bedding, schistosity in the flows and greenstone (3a, 3b) restrict the study of their deformation. Waterlain tuffs contain non-diagnostic molds of brachiopods on the shore of a lake six miles south of Sigutlat Lake. Rhyolite is rare, but the best outcrops appear on the ridge south of Nusatsum Mountain. All fossils found to date in unit 2 are of Middle or Lower Jurassic age. Unit 2 is everywhere interlayered with volcanic rocks of unit 3, except northwest of Salloomt Peak, where unit 2 underlies unit 3. It could therefore be tentatively suggested that units 2 and 3 are approximately the same age. In map-areas to the north and to the east (Whitesail Lake, Nechako River, and Anahim Lake map-areas) andesitic rocks like those of Bella Coola area have been assigned to two different stratigraphic units, the Hazelton Group (Middle and Upper Jurassic) and the Takla Group (Upper Triassic and Jurassic)[1]. Owing to the scarcity of fossils, the lack of stratigraphic control, and the metamorphism of the volcanic and associated rocks, such a subdivision is not possible in Bella Coola map-area. In fact, unit 3a may include older metamorphosed rocks. Other occurrences of greenish granodiorite have been correlated with the one north of Salloomt Peak because of lithological similarities, but 12 miles south of Mount Mackenzie one such pluton is cut by green andesitic dykes that were feeders to lava flows of unit 3.

Plutonic rocks of pre-Middle Jurassic age have been mapped in Taseko Lakes area[2], on the eastern margin of the Coast Mountains. It is not known whether these occurrences belong to the same belt as those in Bella Coola area.

Metamorphism generally increases to the southwest, but is extremely variable locally. Volcanic rocks (3a) grade into greenstone (3b) and into poorly recrystallized diorites, amphibolites, or quartz diorites (3c). On the map, appropriate symbols have been placed where the nature of the rocks has been determined. Large masses of streaky quartz diorite containing subordinate bands of sediments (2) occupy the sides of North Bentinck Arm, west of Bella Coola. Though their mobilization has been more intense than that of other rocks of unit 3c, they have not been differentiated on the map. North and northwest of Bella Coola, granodiorite veins are particularly common in 3c. They are considered to be products of the metamorphism of 3a and 3b, but some may be intrusive.

It is significant that highly metamorphosed volcanic rocks are found mainly in the area where younger intrusive plutons (4 and 6) are most abundant. The metamorphism, however, is of a regional rather than a contact type. No metamorphic aureoles have been found around plutons of units 4 and 6.

Deformation of the sedimentary (2) and volcanic rocks (3) increases to the southwest and is particularly intense around plutons of 4 and 6, where the older rocks appear to have been pushed aside and upward during intrusion.

Plutonic rocks of units 4, 5 and 6 have sharp contacts with other rocks and are clearly intrusive. They appear to represent different stages of intrusion in the Coast Mountains but little is known of their relative ages. East of Labouchere Channel, the foliated granodiorite (4) is cut by the massive granodiorite (6b). West of Ramsey Creek, near Sigutlat Lake, the pink quartz monzonite (5) cuts rocks of probable Middle Jurassic age, and at Tanya Mountain, it is overlain by Miocene lavas (7). The age of a sample from unit 6b as determined by the K-Ar method on biotite, is 57 million years (Paleocene).

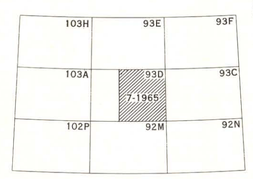
Plateau-type lava flows (7) occur along the eastern margin of the map-area. They are thought to be Miocene because of their similarity with those in Anahim Lake map-area to the east and in Taseko Lakes map-area to the southeast. No fossiliferous beds have been found in them in Bella Coola map-area. Faulting has affected them north of Mount Mackenzie, producing a graben zone now occupied by Tanya Lakes. The age of the numerous north-south faults in Tweedsmuir Provincial Park is not known.

Although small moraines surround present glaciers, most deposits of an earlier glaciation have been washed away or have lost their morphological characteristics. Striae indicate that glaciers covered the country to an approximate elevation of 7,500 feet. In Bella Coola valley, sand, gravel, and silt accumulations (8) indicate former deltas at the mouths of Necleetsconnay River, Thorsen Creek, Salloomt River, Nusatsum River, Noosgulch River and Burnt Bridge Creek. The top of all these accumulations is around 500 feet, which might indicate the level of the ocean in early post-glacial times.

Though prospecting has been intermittent and unrewarding, mineral occurrences have been known for many years in the area. Reports on most of these properties may be found in the Annual Reports of the Minister of Mines of British Columbia for the last sixty years.

[1] Tipper, H. W.: Revision of the Hazelton and Takla Groups of Central British Columbia; Geol. Surv. Can., Bull. 47 (1959).

[2] Tipper, H. W.: Taseko Lakes, British Columbia; Geol. Surv. Can., Map 29-1963 (1963).



N. T. S. REFERENCE
BELLA COOLA
BRITISH COLUMBIA