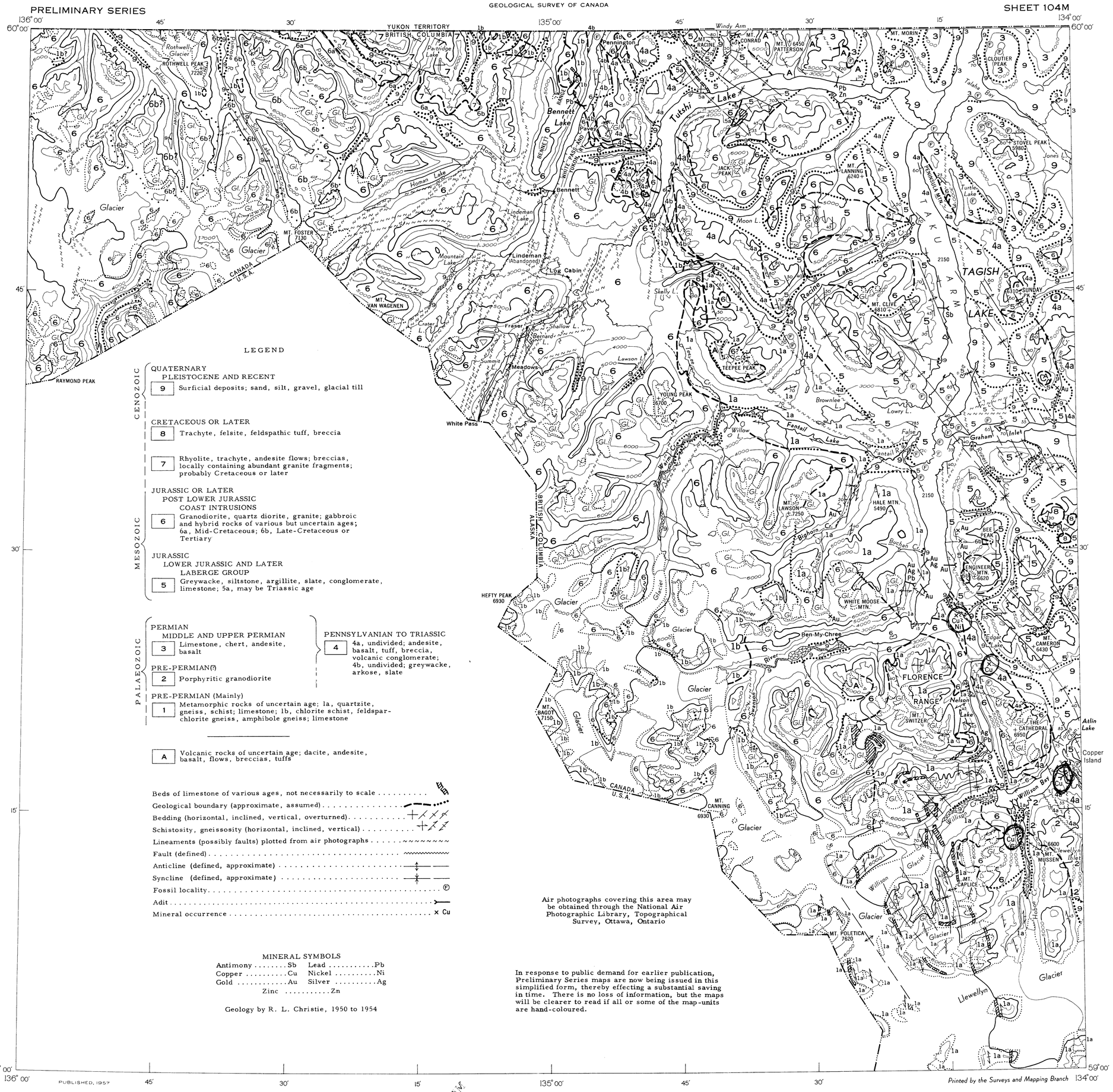
CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

PRELIMINARY SERIES

SHEET 104M



LEGEND

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT

9	Surficial deposits; sand, silt, gravel, glacial till

CRETACEOUS OR LATER

8	Trachyte, felsite, feldspathic tuff, breccia
7	Rhyolite, trachyte, andesite flows; breccias, locally containing abundant granite fragments; probably Cretaceous or later

MESOZOIC

JURASSIC OR LATER
POST LOWER JURASSIC
COAST INTRUSIONS

6	Granodiorite, quartz diorite, granite; gabbroic and hybrid rocks of various but uncertain ages; 6a, Mid-Cretaceous; 6b, Late-Cretaceous or Tertiary

JURASSIC
LOWER JURASSIC AND LATER
LABERGE GROUP

5	Greywacke, siltstone, argillite, slate, conglomerate, limestone; 5a, may be Triassic age

PALAEOZOIC

PERMIAN
MIDDLE AND UPPER PERMIAN

3	Limestone, chert, andesite, basalt

PRE-PERMIAN(?)

2	Porphyritic granodiorite

PRE-PERMIAN (Mainly)

1	Metamorphic rocks of uncertain age; 1a, quartzite, gneiss, schist; limestone; 1b, chlorite schist, feldspar-chlorite gneiss, amphibole gneiss; limestone

PENNSYLVANIAN TO TRIASSIC

4	4a, undivided; andesite, basalt, tuff, breccia, volcanic conglomerate; 4b, undivided; greywacke, arkose, slate

A	Volcanic rocks of uncertain age; dacite, andesite, basalt, flows, breccias, tuffs

Beds of limestone of various ages, not necessarily to scale
Geological boundary (approximate, assumed)
Bedding (horizontal, inclined, vertical, overturned)
Schistosity, gneissosity (horizontal, inclined, vertical)
Lineaments (possibly faults) plotted from air photographs
Fault (defined)
Anticline (defined, approximate)
Syncline (defined, approximate)
Fossil locality
Adit
Mineral occurrence × Cu

MINERAL SYMBOLS

Antimony	Sb	Lead	Pb
Copper	Cu	Nickel	Ni
Gold	Au	Silver	Ag
Zinc	Zn		

Geology by R. L. Christie, 1950 to 1954

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.

PUBLISHED, 1957

Printed by the Surveys and Mapping Branch

DESCRIPTIVE NOTES

In the northeastern part of the map-area, Bennett Lake, Windy Arm, and Tagish Lake are accessible by boat from Carcross and Tagish, in Yukon Territory to the north. The White Pass and Yukon Railway, traversing the northern part of the map-area, connects the ocean port of Skagway, Alaska, with Whitehorse in Yukon Territory.

Travel in the area is principally by boat or sled on the lakes and rivers. Sudden, strong, variable winds are a common hazard on the lakes. Trails shown on the map have been cut out and are well used.

The map-area covers the Coast Intrusions (6) and their eastern border. Metamorphic rocks (1) lie in and along a belt on the northeast flank of the main intrusions, separating them from late Palaeozoic and Mesozoic volcanic and sedimentary rocks to the northeast.

Rocks of unit 1 consist of two principal lithological facies. The bulk of them, 1a, are characteristically micaceous quartzite and hornblende-quartz-feldspar gneiss. Amphibolite and mica schist are present. Most of the rest of unit 1, 1b, lies mainly in large and small bodies within the Coast Intrusions. Its rocks are generally chlorite bearing and finer grained than those in areas of 1a. Both facies, 1a and 1b, contain beds and lenses of crystalline limestone and marble.

The relationships of unit 1 to other non-granitic rocks in the map-area are not known. Most of the rocks are presumably pre-Permian although some, particularly those of unit 1b, resemble Mesozoic volcanic rocks. Whereas most are regarded as Palaeozoic, some of the rocks are similar to those of Yukon group to the north and may be Precambrian.

Porphyritic granodiorite (2) occurs east of Hoboe Creek. As boulders of similar rock occur in a nearby conglomerate under a bed of limestone of Permian age, just east of Llewellyn Inlet, this body is perhaps of pre-Permian age.

The limestone of unit 3 in the northeastern part of the map-area is massive, though much fractured. The unit also contains chert and minor amounts of andesite and basalt, and limestone breccia. Fossils of Guadalupian (Middle and Upper Permian) age were found in it.

Unit 4 consists of a great, indivisible assemblage of volcanic and sedimentary rocks that may have a total thickness of 8,000 feet or more. The lower part contains late Palaeozoic fossils, younger than Upper Mississippian in age, and the upper part, lying between Bennett and Tutshi Lakes, may be equivalent to Triassic rocks that occur a few miles to the north in Whitehorse map-area. The unit also underlies, with structural conformity, greywacke of the Laberge group (5) of Lower Jurassic age at Willison Bay.

In the Laberge group (5) the strata lie in open folds though some close folding occurs locally, particularly in the vicinity of Graham Creek and Engineer Mine. Conglomerate of the Laberge group contains boulders of granitic rocks similar to rocks of the Coast Intrusions (6) and the pre-Permian (?) porphyritic granodiorite (2). It is intruded by stocks of granitic rocks (6). Neither the base nor the top of the group is known in Bennett area. The sequence from bottom to top appears to be as follows: at the base is 2,000 feet of dark, well-bedded slate, followed by 2,000 to 5,000 feet of massive greywacke, conglomeratic greywacke, and thick conglomerate beds, with about 5,000 feet of fine-grained greywacke and argillite at the top. Fossils collected indicate a Lower Jurassic age for at least part of the group.

The Coast Intrusions (6) occur in large, generally distinct bodies. In places one body can be seen to have intruded another of slightly different composition. The most abundant rock types are medium- to coarse-grained biotite granodiorite, slightly foliated biotite-hornblende granodiorite, and quartz diorite. The foliated bodies appear to be older. The youngest type is a leucocratic, vuggy, brown-weathering granite (6b).

Unit A includes altered volcanic rocks. They are lacking in structure and are similar in some respects to those of unit 5 to which they may belong in part.

Unit 7 contains two widely separated areas of volcanic rocks. In the northwest at the head of Partridge Lake these rocks lie unconformably upon the eroded surface of the Coast Intrusions (6). There the lower 2,000 feet is an unusual volcanic breccia containing a very large proportion of angular granitic fragments. There also dykes of similar rock intrude the granitic rocks. In the southeast, on Engineer Mountain, similar rocks unconformably overlie the folded Laberge group (5) and are intruded by a body believed to be a part of the Coast Intrusions (6).

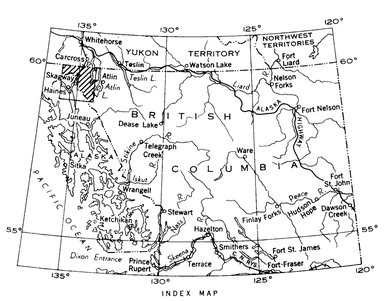
Volcanic rocks (8) cap some hills south of Graham Inlet and consist of rhyolite and trachyte flows and breccias, and feldspathic tuffs, with felsite sills and dykes. These rocks are flat-lying and overlie the Laberge group (5) with angular unconformity.

Surficial deposits (9) are as thick as 500 feet in parts of some of the major valleys. In scattered localities abandoned beach terraces and deltas occur up to about 300 feet above the present level of Tagish Lake. Within about 50 feet of the lake, beaches of earlier levels of the lake itself are widespread.

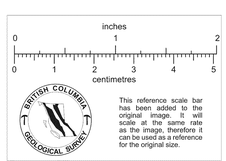
The rocks, as a whole, occur in rude belts with a northwest trend, conforming with that of the folds and to the regional, structural trend. Although folds in the Late Palaeozoic and Mesozoic volcanic and sedimentary formations (5) generally follow this main direction, easterly trends occur in the thick limestone formation (3) and north-northwesterly trends are present in the pre-Permian rocks (1).

Numerous lineaments, probably fractures accentuated by glacial and stream erosion, are evident in the air photographs. They are most conspicuous in the gently sloped granitic terrain around White Pass. The directions of the long, straight major valleys appear to be guided by zones of such fractures.

Very little sign of mineralization has been found within the granitic rocks but minor quartz vein and replacement deposits occur near and at the contacts of the Coast Intrusions. In the quartz veins two associations of metallic minerals are common: gold-pyrite, occasionally with some arsenopyrite and chalcopyrite; and gold-pyrite-chalcopyrite-galena-sphalerite, with some tetrahedrite occasionally present. Veins, particularly those with the second type of mineralization, tend to be in northwest trending fractures, and these structures are therefore regarded as most favourable for prospecting. Other mineral occurrences include antimony minerals, in a prospect on the west shore of Taku Arm, below Mount Clive, and native copper on Copper Island and on Edgar Lake. A small amount of placer gold was recovered from the upper part of Graham Creek.



INDEX MAP



MAP 19-1957

BENNETT

CASSIAR DISTRICT

BRITISH COLUMBIA

Scale: One Inch to Four Miles = $\frac{1}{253,440}$
Miles

LEGEND

Trail	
International boundary	
Provincial boundary	
Glacier	Gl.
Contours (interval 1,000 feet)	8000
Height in feet above mean sea-level	7200

Cartography by the Geological Cartography Unit, 1957

Approximate magnetic declination, 30° 51' East

MAP 19-1957
BENNETT
BRITISH COLUMBIA

SHEET 104 M