GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

PRELIMINARY SERIES

105A

LEGEND

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT
15 — Unconsolidated glacial, fluvioglacial, and alluvial deposits; volcanic ash

TERTIARY (?) AND QUATERNARY
14 — Vesicular olivine basalt

PALEOCENE OR EOCENE
13 — Siltstone, shale, coal

MESOZOIC

CRETACEOUS
12 — Biotite–hornblende granodiorite and quartz diorite; 12a, granite porphyry

CRETACEOUS OR OLDER
11 — Highly sheared and altered granitic rocks, granitic gneiss; may include 1c locally

PALAEOZOIC

MISSISSIPPIAN
10 — Steatitized peridotite; serpentinite, gabbro, pyroxenite

9 — 9a, light grey, massive, crinoidal limestone; limestone and polymictic conglomerate; sandy limestone, cherty limestone; 9b, green, grey, and maroon chert, argillite, slate, tuff (?), chert breccia and pebble conglomerate, green and maroon volcanics, limestone, phyllite, and greywacke; 9c, pebble and cobble conglomerate, phyllitic argillite

8 — Greenstone, chert, phyllite, argillite, chert-pebble conglomerate

DEVONIAN AND/OR MISSISSIPPIAN
7 — Chert-pebble conglomerate, carbonaceous black slate, impure siltstone and sandstone, quartzite, greywacke; may locally include older strata

SILURIAN (?) AND DEVONIAN
6 — Dolomite, sandy dolomite, dolomitic sandstone, dolomite breccia; in part correlative with 5

5 — Buff, brown, and grey, laminated, platy, calcareous siltstone; grey orthoquartzite; black, argillaceous limestone

CAMBRIAN AND ORDOVICIAN
4 — Dark grey and black, non-calcareous argillite, slate, and phyllite; locally includes rocks older than 3 northwest of Tom Lake; buff and grey calcareous, phyllitic limestone, phyllite, and slate; minor wavy-banded silty limestone

CAMBRIAN
LOWER CAMBRIAN
3 — Thick-bedded limestone

2 — Quartzite, slate, siltstone

PROTEROZOIC

HADRYNIAN
1 — Black and dark green shale and slate; feldspar-quartz-pebble conglomerate and grit; quartzite; maroon shale and slate; green argillite; 1a, limestone, dolomite, dolomite breccia; 1b, greenish grey phyllitic slate, may be in part or entirely of Cambrian age; 1c, highly sheared equivalents of 1; 1d, hornfels, schist, gneiss

Geological boundary (defined, approximate or assumed) . . .
Bedding (inclined, vertical, overturned) . . . . . .
Foliation (inclined) . . . . . .
Fault (defined, approximate or assumed) . . . . . .
Anticline (defined or approximate) . . . . . .
Syncline (defined or approximate) . . . . . .
Drumlinoid ridge . . . . . .
Fossil locality . . . . . .
Mineral occurrence or prospect . . . . . .XPb

MINERAL SYMBOLS

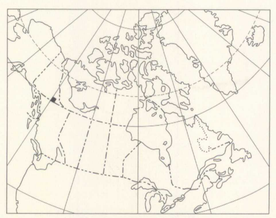
Lead . . . . . Pb
Silver . . . . . Ag
Tungsten . . . . . W
Zinc . . . . . Zn

Geology by H. Gabrielse, 1965, 1966

Base-map produced by the Army Survey Establishment, RCE, 1948–50 with revisions by the Geological Survey of Canada, 1966

Magnetic declination 1967 varies from 32° 03' easterly at centre of west edge to 32° 12' easterly at centre of east edge. Mean annual change 5.1' westerly

All elevations in feet above mean sea-level



INDEX MAP

Published 1967, the Centennial of Canadian Confederation
1867 1967

MAP 19-1966
GEOLOGY
WATSON LAKE
YUKON TERRITORY

Scale 1:253,440
1 inch to 4 miles

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

Printed by the Surveys and Mapping Branch
Copies of this map may be obtained from the Director, Geological Survey of Canada, Ottawa

DESCRIPTIVE NOTES

Fixed-wing aircraft equipped with floats are available for charter at Watson Lake, a community serviced by scheduled airline flights. Rotary-wing aircraft can be chartered at Watson Lake Wye, on Alaska Highway, a supply and communications centre for the region. Good gravel roads run northerly from Watson Lake to Ross River on Canol Road and to the Canada Tungsten Mine near the headwaters of Flat River. Rapids in Liard Canyon present the only obstacle to navigation on Liard River. Frances and Hyland Rivers have long stretches of easily navigable water but these are interrupted by several dangerous rapids.

A thick sequence of Proterozoic rocks (1) (possibly including Lower Cambrian strata in the upper part) is composed of three units, from oldest to youngest as follows: interbedded slates and feldspathic gritty rocks of apparently great, but unknown thickness; limestone and limestone breccia of variable thickness but locally between 500 and 600 feet thick; and fine-grained phyllitic and slaty rocks possibly more than 1,000 feet thick. The clastic rocks in Simpson Range (1c, 1d) are highly sheared and northwest of Hasselberg Lake are strongly metamorphosed.

Lower Cambrian clastic and carbonate rocks (2, 3) in the southwest part of the map-area are characteristic of the Atan Group to the south in McDame map-area. Lower Cambrian limestone (3) containing archaeocyathids in the central part of the map-area appears to range from zero to as much as 200 feet thick. The limestone overlies crinkled, non-calcareous, finely laminated, phyllitic argillite and is overlain by calcareous phyllitic slate and wavy banded limestone.

Cambrian and Ordovician strata (4), probably more than 1,000 feet thick, are typically buff weathering in the southwest part of the map-area and in Liard Canyon but are grey weathering elsewhere. The rocks are highly incompetent and commonly display well developed cleavage.

Silurian and Devonian strata (6), containing Middle Devonian fossils in an uppermost unit of black, fetid limestone, are possibly as much as 1,000 feet thick along the Canada Tungsten road west of Hyland River and appear similar in lithology and thickness to correlative rocks in McDame map-area. Middle Devonian fossils were also collected from platy argillaceous limestone (included in 5) 3½ miles southwest of the unnamed peak, elevation 5,165 feet, in the central part of the map-area. There, however, the sequence includes very little carbonate.

The basal non-volcanic clastic rocks of the Devono-Mississippian assemblage (7) are characterized by chert pebble conglomerates that locally form resistant members several hundred feet thick.

Several belts of volcanic rocks and associated sedimentary strata, probably of Mississippian age, (8), locally include bodies of ultramafic rocks (10). The distribution of volcanic and ultramafic rocks is well defined by aeromagnetic anomalies (See G. S. C. Map 7000 G). A limestone member (9a) southeast of Sambo and Marten Lakes may be as much as 500 feet thick. In Middle Canyon on Frances River well bedded limestones contain interbeds of sheared limestone and polymictic conglomerate generally less than 10 feet thick. Massive and, in places, highly sheared conglomerate on the east side of Simpson Lake (9c) contains well rounded to sub-angular pebbles and cobbles of greenstone, vein quartz, quartz-muscovite gneiss, serpentinite, phyllitic slate, and limestone.

Granitic bodies in the northeast part of the map-area (12) have a fairly uniform composition. An isolated granitic plug (12a) east of Oscar Lake contains crystals of quartz, feldspar and biotite in a fine-grained, buff weathering matrix. Granitic rocks north of Tuchitua River and in Simpson Range (11) have been highly metamorphosed and those in Simpson Range include much granitic gneiss.

Steeply dipping Paleocene or Eocene sediments (13) containing lignitic coal outcrop along Liard River near the mouth of Rancheria River. The best exposed coal seam is about 4 feet thick.

Small exposures of flat-lying vesicular olivine basalt (14) occur in the southwest part of the map-area. Aeromagnetic anomalies suggest that these rocks underlie a fairly extensive area along and near Little Rancheria River. An outcrop of basalt along the Ross River road north of Tuchitua River contains some medium-grained gabbro.

The entire map-area was covered by one or more advances of ice. The last major advances were southeasterly along Liard River, westerly from Cassiar Mountains, southerly down the upper Frances River valley and northerly and northeasterly up the valleys of Hyland and Green Rivers. Glacial lake silts underlie a large area from north of Simpson Lake southerly and easterly beyond Stewart Lake to north of Hyland River.

Poorly consolidated, flat-lying sands and pebbly sands containing logs and fragments of wood are exposed in a cut bank on the east side of Liard River about 4 miles southeast of the mouth of Allan Creek. The sediments may be of intra- or pre-Pleistocene age as they underlie boulder till. Radiocarbon dating of the wood indicates an age of greater than 40,800 years B. P.

A layer of white weathering volcanic ash, about ½ inch thick, occurs beneath the humus layer along Liard River south of the mouth of Allan Creek and also near Simpson Lake.

Structural information is fragmentary and no coherent picture of structural style of the bedrock formations has been obtained. Proterozoic (?) rocks on Hyland River above the mouth of Green River and southeast of the mouth of Green River are strongly cleaved and tightly folded with axial planes dipping moderately to the east. The overlying incompetent Cambro-Ordovician strata appear to be much less deformed and form relatively open folds. Similarly, the strongly sheared Proterozoic rocks and associated granitic rocks in Simpson Range are more intensely sheared than those of the adjacent Devono-Mississippian sequence to the northeast.

The distribution of map-units in the mountain range northwest of Tom Lake suggests a domal structure. In this area thin-bedded strata of map-units 4 and 5 are cut by a well developed, northerly trending strain-slip cleavage which is in turn folded.

The major structure in southeastern Simpson Range appears to be a syncline with a gently dipping southwestern limb and a steeply dipping to slightly overturned northeastern limb. Farther northwest in Simpson Range gneissic structures in granitic and metasedimentary rocks generally dip at low angles.

An important fault separates the gneissic terrain from considerably less deformed Devono-Mississippian strata northwest of Sambo Lake. Northerly and northwesterly trending faults such as those exposed along Little Rancheria River are probably abundant in the southwest part of the map-area, where, combined with tight folds, they cause considerable repetition of strata.

Folding of Paleocene or Eocene strata along Liard River demonstrates deformation during the interval between deposition of these beds and the extrusion of flat-lying basalt.

A relatively high-grade lead-zinc showing containing minor silver has been discovered about one mile southeast of the unnamed peak, elevation 5,165 feet, sixteen miles northwest of Tom Lake. There, several trenches reveal coarse-grained galena and sphalerite associated with a spectacular garnet-diopside-hedenbergite (?) skarn in Lower Cambrian limestone. Trenching has also been carried out on a similar occurrence near the crest of a ridge two miles farther north.

A prospector has reported the presence of scheelite along the east contact of the granitic batholith four miles northwest of the north end of Oscar Lake.

MAP 19-1966
WATSON LAKE
YUKON TERRITORY
105 A