GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 105 B

LEGEND

CENOZOIC

QUATERNARY
PLEISTOCENE AND RECENT
18 Glacial till; gravel, sand, and silt; lake clay; volcanic ash

TERTIARY (?) AND QUATERNARY
17 Vesicular olivine basalt

MESOZOIC

CRETACEOUS OR TERTIARY
UPPERMOST CRETACEOUS OR LOWERMOST TERTIARY
16 SEAGULL AND HAKE BATHOLITHS AND STOCKS: mainly biotite leuco-quartz monzonite and alaskite, in places with quartz-tourmaline concentrations and miarolitic cavities

JURASSIC AND/OR CRETACEOUS
15 15a, CASSIAR BATHOLITH: mainly biotite quartz monzonite and granodiorite, in part sheared and altered; 15b, RAM STOCK: saussuritized biotite-hornblende quartz monzonite and granodiorite, in part sheared; 15c, LOGJAM STOCKS: mainly biotite-hornblende quartz monzonite with basic borders; 15d, mainly biotite quartz monzonite and granodiorite; 15e, mainly biotite-muscovite granodiorite

CASSIAR INTRUSIONS

14 Dioritic rocks: diorite, granodiorite, quartz diorite; 14a, includes gneiss, hornblendite

13 Ultramafic rocks: olivine-bearing clinopyroxenite, dunite; serpentinized and metamorphosed equivalents

PERMIAN TO JURASSIC (?)
12 12a, pebble and cobble conglomerate, greywacke, limestone; minor quartzite, chert; 12b, andesitic volcanic breccia and tuff; minor lava(?); 12c, feldspathic quartzite, subgreywacke, greywacke, quartzite, grit, argillite; relatively rich in microcline, may be in part equivalent to 12a and 12b

PALAEOZOIC

MISSISSIPPIAN
LOWER AND MIDDLE MISSISSIPPIAN
11 Upper Division: chert, slate, argillite, hornfels; minor greywacke; 11a, limestone and dolomite, in part with chert nodules, skarn; 11b, sandy and conglomeratic tuff

10 Lower Division: chert and quartzite pebble and cobble conglomerate, chert, quartzite, slate, argillite, hornfels

DEVONIAN AND MISSISSIPPIAN
UPPER DEVONIAN AND LOWER MISSISSIPPIAN
9 Limestone and dolomite, in part with chert nodules, skarn

8 Chert, hornfels, argillite, slate, phyllite, quartzite, limestone, in part with chert nodules; skarn, tremolitic marble, dolomite; 8a, schist and gneiss

7 Greenstone, chlorite schist and quartzite, phyllite, slate, argillite, chert; 7a, greenstone, chlorite schist; 7b, argillite, slate, phyllite, chert, subgreywacke, grit, conglomerate, sericite-biotite schist and quartzite; 7c, limestone and dolomite, in part with chert nodules; 7d, quartz-albite-mica gneiss, albite-actinolite schist

SILURIAN AND DEVONIAN
MIDDLE SILURIAN AND MIDDLE DEVONIAN
6 Upper part: grey and black fetid dolomite and calcitic dolomite;
Lower part: quartzite and dolomitic quartzite

MIDDLE SILURIAN
5 Grey-buff dolomite; underlain by thin-bedded shale and limestone, and buff dolomitic siltstone and quartzite

CAMBRIAN TO SILURIAN
MIDDLE CAMBRIAN TO MIDDLE SILURIAN
4 Thin-bedded buff and grey slate, phyllite, and limestone, dark grey slate and limestone; 4a, thin-bedded buff and grey phyllite and limestone; probably Middle and Upper Cambrian; 4b, black slate, argillite, grey dolomite, and dolomitic limestone; probably Ordovician; 4c, hornfels, limestone, skarn

CAMBRIAN
LOWER CAMBRIAN
3 3a, grey limestone; minor dolomite, slate, and phyllite; 3b, unfossiliferous, probably equivalent to 3a; 3c, limestone minor grey and green argillite and slate, dolomite; may be older than 2; 3d, marble, skarn

PRECAMBRIAN (?) AND PALAEOZOIC

CAMBRIAN AND (?) EARLIER
LOWER CAMBRIAN AND (?) EARLIER
2 Quartzite, minor slate and phyllite, quartz grit and fine pebble conglomerate; 2a, phyllite, minor slate; 2b, hornfels

1 Probably metamorphic equivalents of 2; 1a, biotite schist and quartzite; 1b, marble and skarn; 1c, biotite schist and quartzite with sills, dykes, and irregular bodies of pegmatite; 1d, biotite schist and gneiss

Geological boundary (defined, approximate or assumed)
Bedding (horizontal, inclined, vertical, estimated; g, gentle; m, medium; s, steep)
Schistosity, gneissosity, cleavage (horizontal, inclined, vertical)
Fault (defined, approximate, assumed)
Anticline (position approximate)
Syncline (position approximate)
Drift ridge or rock groove (direction of ice-movement known, unknown)
Fossil locality

MINERAL SYMBOLS

Fluorite... fl	Tin.....Sn
Lead.....Pb	Tungsten..W
Silver.....Ag	Zinc.....Zn

Geology by W.H. Poole, 1951 – 1955
J.A. Roddick and L.H. Green, 1959

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

In response to public demand for earlier publication, Preliminary Series maps are issued in this simplified form and will be clearer to read if all or some of the map-units are hand-coloured

Published, 1960 Reprinted 1980
Copies of this map may be obtained from the Geological Survey of Canada, Ottawa

MAP 10-1960
GEOLOGY
WOLF LAKE
YUKON TERRITORY

Scale: One Inch to Four Miles = 1/253,440
Miles
4 2 0 4 8 12

PRINTED BY THE SURVEYS AND MAPPING BRANCH

LEGEND

Mile post, Alaska Highway	720
Trail	
Cabin	
Provincial boundary	
Intermittent stream	
Marsh	
Contours (interval 1000 feet)	3000
Height in feet above mean sea-level	3260

Cartography by the Geological Survey of Canada, 1960

Approximate magnetic declination, 32° 48' East

DESCRIPTIVE NOTES

The southern part of Wolf Lake map-area is accessible from the Alaska Highway, and the northeastern part from Liard River which is there navigable by small river-boats and canoes. Pack-horses can be used in all parts of the map-area. Suitable aircraft can land on most of the lakes; the Pine Lake airstrip is maintained for emergency use.

Wolf Lake map-area occupies the northern end of the rugged, northwesterly trending Cassiar Mountains. Nisutlin Plateau borders the mountains on the west and north. The northern extensions of Dease Plateau and Liard Plain border the mountains on the east and separate them from the Simpson Range of the Pelly Mountains to the northeast. The divide between Yukon River and Mackenzie River drainage follows an irregular line through the central part of the map-area.

The oldest known, relatively unmetamorphosed rocks in the map-area are thick-bedded, reddish, grey, and white-weathering quartzites (2) containing interbeds of phyllite and slate. The sequence appears to be several thousand feet thick. Unit 2 is conformably overlain by more than 1,000 feet of thick-bedded, light grey limestone (3), which in the southern part of the map-area contains Lower Cambrian archeocyathids. Unit 3c, a dominantly limestone unit, may be older than unit 3 as it appears to be overlain by unit 2 south of the highway near the east edge of the map-area. Metamorphic rocks (1a) in the central part of the map-area seem to grade by decreasing metamorphism into rocks of units 2 and 3. Rocks of unit 4 are generally highly folded and commonly form the loci of major faults. They are chiefly contorted dark grey to brown phyllites and argillites with thin limy interbeds. In places throughout the map-area they have been converted to hornfels (4c). Units 4 and 4c conformably overlie limestone (3). Two or three hundred feet of Middle Silurian graptolitic rocks (5) are overlain by 100 to 200 feet of non-fossiliferous dolomite (also in unit 5), which in turn is overlain by quartzite (6) of probable Middle Silurian age. The quartzite and overlying dolomite (6) are about 2,000 feet thick and are conformably overlain by Devonian and Mississippian rocks (7).

Devonian and Mississippian rocks (7) occupy parts of two faulted major synclines, one on each side of the Cassiar batholith (15a). In the southeast, more than 8,000 feet of these strata are exposed. On Hazel Ridge they are about 9,500 feet thick, the base of the section being exposed west of the map-area. The greenstone (7a), lying above and east of the limestone and dolomite bed (7c) on Hazel Ridge and Englishmans Range, apparently pinches out to the northwest in Teslin map-area. In the fault-slice near Hidden Lake, rocks of map-unit 7 lie conformably on Middle Devonian dolomite (6).

Mississippian rocks (8) in the Dorsey Range are about 14,000 feet thick west of the Pine Lake airstrip and about 25,000 feet thick north of Dorsey Lake. Most of the argillaceous rocks have been metamorphosed to hornfels and hard argillite by the underlying Seagull and Hake batholiths and stocks (16). The Mississippian rocks (8) overlie conformably the greenstone-bearing assemblage (7) along most of the northeast border of Dorsey Range.

Strata of map-units 10 and 11 are about 5,000 feet thick. Rocks of map-unit 12 overlie, apparently unconformably, those of map-units 8 and 11. Conglomerate (12a) near Wolf River is composed of pebbles and cobbles of schist, quartzite, granitic rocks, limestone, and slate, and contains Permian fossils. Tentative lithological correlation with dated formations in nearby parts of Yukon Territory and British Columbia suggests that map-units 12b and 12c are Triassic and/or Jurassic in age.

Massive pink to grey biotite-quartz-monzonite and granodiorite are the characteristic rocks of the Cassiar batholith (15a) and most of the stocks and batholiths to the east (15d). The western margin of the batholith consists of a sheared and foliated zone which, near the highway, is about 4 miles wide. The granitic body around Marker Lake contains conspicuous muscovite, as well as biotite, and areas of gneiss and biotite schist (14). West of the batholith (15a) the stratified rocks are cut and extensively metamorphosed by diorite and granitic intrusions. Evidence from other map-areas indicates that most of the granitic rocks (15, 16) were intruded during the Jurassic and/or Cretaceous periods. The granitic rocks of map-unit 16 appear to be younger than those of map-units 14 and 15, as was substantiated by potassium-argon dating (on biotite) of about 59 million years (uppermost Cretaceous or lowermost Tertiary). Diorite and ultramafic bodies (13, 14) are cut by rocks of units 15b, 15e, and 16, but their ages are not otherwise defined.

As much as 250 feet of flat-lying olivine basalt (17) occurs in the Rancheria River valley. The top of the basalt is marked by a relatively flat bench, but the base is everywhere concealed by drift (18). The lavas were probably erupted in the late Tertiary and/or Pleistocene.

Pleistocene ice probably at one time covered the whole map-area. It appears to have moved easterly through and around the Cassiar Mountains in the eastern two thirds of the map-area, and thence southeast on Liard Plain. Direction of ice-movement near the western border is uncertain, but west and north of the map-area, it seems to be westerly and northwesterly.

The dominant structures in the map-area are two northwest-trending major synclines separated by an anticlinal area occupied by the Cassiar batholith (15a), and two major fault systems in the Rocky Mountain Trench (Liard Plain in map-area) and Tintina Valley, which overlap one another in the northeast corner of the map-area. Another major anticline lies a few miles west of Hazel Ridge, and yet another passes through rocks of units 2 and 3b near the highway and the east border of the map-area. The major folds plunge southeasterly from 0 to 15 degrees and have vertical or steeply dipping axial planes. Map-units 2, 3, and 4(?) in the southeast corner of the map-area appear to form major, nearly-isoclinal folds. The rocks (4, 5, 6, 7) of the interior of a major syncline have apparently been broken by tear faults and down-faulted against older rocks (2, 3, 4). These northerly trending faults probably continue northward, but could not be traced. Along the northeast border of Dorsey Range, Middle Devonian and younger rocks (6, 7, 8) are down-faulted against older rocks (2, 3, 4). Along the southwest border of Dorsey and Englishmans Ranges, Mississippian rocks (8) seem to be down-faulted against older rocks (7). Along the southwest contact of the Cassiar batholith (15a), as far northwest as Ice Lakes Creek, rock units 2 and 3 have been down-faulted against the batholith.

Prospecting in the map-area began in the 1870's with the discovery of placer gold on Liard River and its tributaries, Rainbow, Scurvy, Sayyea, and Cabin creeks. In subsequent years, the map-area was largely neglected, except during the 1930's when bush flying came into practice. With construction of the Alaska Highway in 1942, prospecting was renewed but was generally restricted to the country adjacent to the Highway. Several base-metal properties have been found. Veins of silver-bearing galena cut Lower Cambrian dolomite (3) along the east contact of the Cassiar batholith (15a) near the Alaska Highway and similar veins cut this batholith south of the Highway. Northeast of Boulder Creek, quartz veins containing wolframite, cassiterite, and fluorite cut contorted limy phyllite. Southeast of Crescent Lake, sphalerite and pyrrhotite occur in skarn in hornfels along the borders of diorite bodies (14), and a few miles southwest of these deposits, silver-bearing sphalerite and galena outcrop in the bed of a small creek. West of Logjam Creek, silver-bearing galena-sphalerite-quartz veins cut hornfels along the border of a diorite body (14). Fluorite and boron minerals occur in many places along the borders of the batholith (16) in the Dorsey Range. West of the headwaters of Seagull Creek, a tourmaline-fluorite-quartz vein cutting hornfels contains small cassiterite crystals. East of Wolf Lake were noted two occurrences of fluorite, one a replacement of limestone and the other a quartz-fluorite vein.

MAP 10-1960
WOLF LAKE
YUKON TERRITORY
SHEET 105 B