CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

GEOLOGICAL SERIES

SHEET 86 B/6

LEGEND

PROTEROZOIC

- 9 — *Gabbro, quartz gabbro; in part diabasic*
- 8 — *Quartz-albite rock*
- 7 7A — **7.** *Granodiorite, quartz diorite, granite;* **7a,** *biotite, biotite – muscovite, and muscovite granite; pegmatite;* **7b,** *pegmatitic granite, pegmatite, minor granite;* **7c,** *mixed granitic rock (with up to 50 per cent inclusions of older rocks);* **7d,** *dioritic rocks*
  7A. *Granite, granodiorite, with porphyritic rhyolite (may be older than 7)*
- 6 — *Mixed rocks: injection gneisses (migmatites), paragneisses, schists (with more than 50 per cent of intruded rocks); derived from and grading into 4, 7, and 7a*
- 5 — *Gabbro, diorite, quartz gabbro, quartz diorite*

ARCHÆAN

- 4 4A — YELLOWKNIFE GROUP (1–4)
  4. *Nodular feldspar-quartz-biotite schist and paragneiss; minor hornfels; derived from 3 (***A,** *andalusite-bearing;* **C,** *cordierite-bearing;* **G,** *garnet-bearing;* **Si,** *sillimanite-bearing);* **4a,** *with much pegmatite and granite masses*
  4A. *Feldspar-quartz-biotite schist and paragneiss, in part nodular (may be post-Yellowknife)*
- 3 — *Greywacke, argillite, phyllite, slate, quartz-mica schist; minor arkose, quartzite, and graphite schist*
- 2 — *Porphyritic (quartz and/or feldspar) rhyolite; in part intrusive; minor rhyolite, dacite, tuff, and breccia;* **2a,** *rhyolite, rhyolite breccia, tuff, agglomerate; minor porphyritic rhyolite;* **2b,** *carbonatized rhyolite, porphyritic rhyolite, and rhyolite breccia*
- 1 — *Basalt, andesite, dacite; minor rhyolite, tuff, agglomerate, volcanic breccia, and spherulitic, amygdaloidal, and porphyritic andesite; undifferentiated basic intrusions;* **1a,** *carbonatized basalt, andesite, dacite; chlorite – carbonate rock; minor rhyolite, tuff, and porphyritic rhyolite;* **1b,** *hornblende schists, quartz-hornblende-feldspar gneisses, amphibolite; derived from 1; undifferentiated basic intrusions;* **1c,** *andesite breccia, agglomerate*

NOTE: The age relations of 7 and 8 to each other, of 8 to 7A, of 5 and 8 to 4A, and of 5 to 3 and 4 are uncertain.

Isograd line of metamorphism
Bedding (inclined, vertical, overturned)
Bedding (direction of dip known, upper side of bed unknown)
Bedding (upper side of bed faces as indicated, direction of dip unknown)
Schistosity, foliation (inclined, vertical, dip unknown)
Minor fold (probably drag-fold indicating direction and angle of plunge) 80
Fault
Anticline
Syncline
Glacial striae
Esker
Prospect trench, diamond drill-hole
Shaft, adit

MINERAL OCCURRENCES

Mineral occurrences known to carry gold are indicated by the symbol **Au.** *Those for which definite information is not available or in which values are known to be negligible are indicated by symbols for the dominant minerals present.* **Q** *indicates an explored quartz vein or lens in which little or no metallic minerals were seen.*

Gold	Au	Galena	Pb
Pyrite	Py	Sphalerite	Zn
Pyrrhotite	Pr	Chalcopyrite	Cu
Arsenopyrite	As	Quartz	Q

Geology by M.S. Stanton, 1946; L.P. Tremblay and D.H. Yardley, 1947
Descriptive notes by L.P. Tremblay

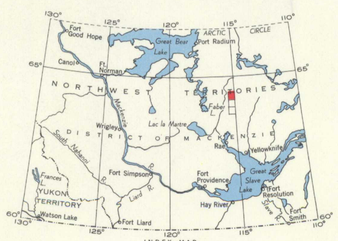
Cartography by the Geological Cartography Division, 1953

Building
Portage
Intermittent stream
Rapid
Marsh
Non-perennial lake
Reef or small island
Height in feet above mean sea-level (approximate) 886

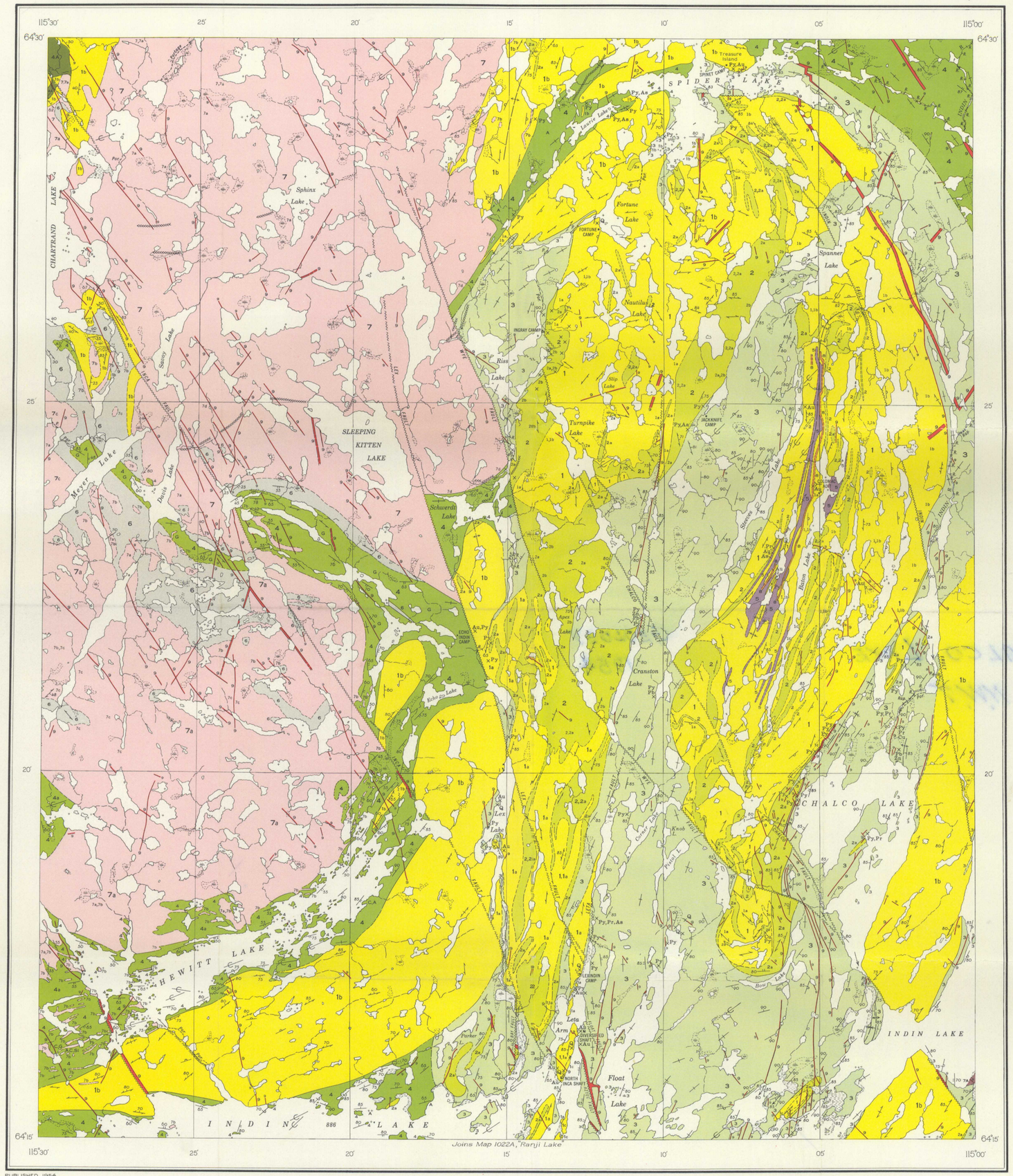
Base-map surveyed by the Topographical Survey, in 1946. Compiled by the Topographical Survey, in 1947, from air photographs taken in 1945 by the Royal Canadian Air Force

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

Approximate magnetic declination, 37°55' East



INDEX MAP



PUBLISHED, 1954

MAP 1023A

CHALCO LAKE

DISTRICT OF MACKENZIE
NORTHWEST TERRITORIES

Scale: One Inch to One Mile = $\frac{1}{63,360}$

Miles

1 ¾ ½ ¼ 0 1 2 3

DESCRIPTIVE NOTES

Chalco Lake map-area has an elevation of about 1,000 feet above sea-level, but local relief can reach as much as 400 feet. Areas of volcanic rocks, and particularly those of hornblende schist and gneiss, are very rugged and stand much higher than adjoining sedimentary terrains, or the area underlain by the Indin Lake granitic mass (7, 7a). The northern limit of forest lies a short distance north of the map-area and, consequently, trees are sparse toward the northern boundary, particularly in the part underlain by granite, which has recently been burnt over. The map-area is not traversed by any good canoe route, but some of the larger lakes provide access to large parts of it.

The map-area has been glaciated and glacial drift is widespread; in some places, as around the northern end of Baton Lake, it covers as much as 95 per cent of the area. Areas southeast of the south end of Riss Lake and east of Schwerdt Lake are occupied by extensive accumulations of big boulders.

Basic to intermediate volcanic rocks (1) of the Yellowknife group are the oldest known rocks of the map-area. They occur as wide, lenticular belts trending about north-northeast, and include basalt, andesite, dacite, and their metamorphic equivalents. Such belts as those southeast of Hewitt Lake, east of Chalco Lake, and west of Spider Lake are composed mainly of hornblende schist and hornblende-feldspar gneiss (1b), and commonly weather dark to light green. In other places, such as east of Lex and Riss Lakes, they are in part much altered to chlorite-carbonate rocks (1a) and weather pale brown to greenish grey. Pillows are common east of Baton Lake, but in general are rare or are deformed or metamorphosed beyond recognition. Light green weathering rocks are especially abundant about a mile southeast of the north end of Riss Lake.

Porphyritic rhyolite (2) and rhyolite with some breccia (2a) are interbedded in abundance in the belts of basic to intermediate volcanic rocks of the Yellowknife group west of Chalco Lake, south of Spider Lake, and east of Riss, Schwerdt, Lex, and Baton Lakes. They appear to be lacking in the other belts of basic volcanic rocks, but were mapped in a few places where they are enclosed in sedimentary rocks, as southwest of Leta Arm of Indin Lake. These rocks are probably mainly flows, as they conform in general with the regional trend of the formations, but some of them may be intrusive, as suggested by the occurrence of dykes of apparently similar rocks. Weathered surfaces are commonly white to buff and yellow, and the rocks are generally massive, but locally may be altered to a sericitic schist. In places it is impossible to differentiate the porphyritic rhyolite (2) from the rhyolite (2a), as they grade into each other. Good rhyolite breccia was noted about a mile west of Chalco and Spanner Lakes.

Sedimentary rocks (3) of the Yellowknife group are dominantly greywacke, argillite, and slate. They are all closely interbedded, and beds vary in thickness from ½ inch to more than 3 feet. The argillite is generally more finely bedded than the greywacke, and rocks of both types are known to be composed of the same minerals, biotite and (or) chlorite, quartz, and feldspar, but in different proportions. Tops of bed were determined in many places by grain gradation from sandy at the bottom to argillaceous at the top, and, rarely, by crossbedding. Quartz-graphite schist occurs locally, particularly near the contact zones of sedimentary with volcanic rocks, and in a few places within the main belts of sedimentary rocks.

Near the contacts of the Indin Lake granitic mass, the sedimentary rocks have been altered to nodular schist and gneiss (4), the width of the nodular zone varying from place to place. The contact of the nodular rocks with those without nodules is gradational within a zone a few hundred feet wide. Nodules are most apparent on weathered surfaces, being relatively inconspicuous in the fresh rock. They are metacrysts that, locally, may be idioblastic, such as those of garnet and chiastolite. Under the microscope, however, they are seen to be porphyroblasts of cordierite, andalusite, and, or, staurolite, replete with quartz and biotite inclusions and resting in a base of quartz, biotite, and feldspar.

Sill-like bodies of diorite and gabbro (5) intrude basic volcanic rocks west of Baton Lake. They were not observed in the sedimentary rocks, but may occur in some of the other volcanic belts. They are commonly massive and composed mainly of hornblende and plagioclase. In places they may carry small blue 'eyes' of quartz.

The westerly trending belt of nodular rocks (4) that divides the Indin Lake granitic mass (7, 7a) into distinctive northern and southern parts, displays, in most places along its contacts with the granitic rocks, an irregular zone of mixed rocks (6) characterized by much granitic material in the form of dykes, sills, and *lit-par-lit* injections. These commonly form less than 50 per cent of the rocks of the mixed zone.

The Indin Lake granitic mass (7, 7a) covers most of the western half of the map-area and extends from Hewitt Lake north to the northern boundary. The rocks of this mass are generally massive and of medium to coarse grain. Two main types were recognized, one on either side of the westerly trending belt of nodular rocks. South of this belt, the granitic mass (7a) carries biotite and muscovite as characteristic varietal minerals, has a pegmatitic facies at its margins, is porphyritic in places, and contains many pegmatite bodies. It has an average mineral composition of about 40 per cent microline, 15 per cent oligoclase, 30 per cent quartz, 8 per cent muscovite, and 4 per cent biotite. Tourmaline was found in some of the pegmatites. North of the sedimentary belt, the granitic mass (7) carries biotite and hornblende as characteristic varietal minerals. Its constituent rocks weather pink to grey, include no pegmatitic facies or pegmatite bodies, and show great variation in the content of potash and plagioclase feldspars.

A pink to grey, medium-grained granite (7a), associated with porphyritic (oligoclase) rhyolite, occurs in the southeast corner of the map-area. It is a biotite-oligoclase granite, and the sedimentary rocks at its contacts are not nodular.

A medium-grained, grey to white, pink weathering rock (8) occurs as a sill in volcanic rocks west of Baton Lake. The rock is composed essentially of albite and quartz, with a little chlorite, biotite, hornblende, and pyrrhotite. Small blue quartz 'eyes' occur in it locally.

Gabbro (9) dykes are numerous in the map-area. They range in width from less than a foot to about 400 feet. Their dip is commonly near vertical, but may be as low as 64 degrees. The largest and most prominent dykes trend northwesterly; others strike northeasterly and northerly. Some of them are composed mainly of secondary minerals, and may be older than the others, which are composed mainly of basic plagioclase feldspar and pyroxene. A few of the dykes have indurated the adjoining rocks across appreciable widths.

Many faults of large displacement are known in the map-area. These strike northwesterly, and all indicate a left-hand offset. Many of them appear to be characterized mainly by horizontal movement, but some also suggest appreciable vertical displacement. Dips appear to be vertical or nearly vertical. Shearing is not everywhere a feature of these faults nor is it an indication of the intensity of movement. The occurrence, however, of numerous quartz veins and stringers in and along a silicified zone is commonly a good indication of the position of these faults. Some faults trend northerly, and appear to have formed earlier than the northwesterly faults, as they are displaced along them. They are commonly characterized by strong shear zones, and the displacement along them is probably also left-hand.

The sedimentary formations are deformed into close, steeply dipping, isoclinal folds, with drag-folds commonly superimposed on the limbs of the main folds. The axial planes dip steeply to vertically, and the folds plunge almost vertically. The structure of the volcanic rocks is not as well known, but the folds in which they are involved appear broader than those affecting the sedimentary rocks.

Gold is the only mineral of economic interest within the map-area. It has been reported from several places. From 1945 to early 1948 much exploratory work was done on several prospects, the most active having been those of the following companies: Diversified Mining Interests (Canada) Limited, North Inca Gold Mines Limited (Trans-American Mining Corporation), Lexindin Gold Mines Limited, Colomac Yellowknife Mines Limited and Indian Lake Gold Mines Limited (Central Mining Services), Goldcrest Gold Mines Limited, Conwest Exploration Company Limited, Spinet Gold Mines Limited, Felix Gold Mines Limited, Frobisher Exploration Company Limited, Bidd Consolidated Mines Limited, Echo-Indin Mines Limited, and Ingray Yellowknife Mines Limited. The gold deposits and occurrences fall broadly into four main types: (1) zones of quartz lenses occupying shears in Yellowknife sedimentary rocks, as at Diversified, Lexindin, and North Inca; (2) zones of quartz lenses in, or occupying small shears in, altered basic to intermediate volcanic rocks, as at Ingray; (3) small, high-grade quartz veins cutting altered intermediate volcanic rocks, as at North Inca; and (4) quartz stock-works or systems of intersecting veins within silicified quartz-albite dykes, as on the Colomac, Indian Lake, and Goldcrest properties, or within amphibolitized basic volcanic rocks, as at Echo-Indin Mines Limited. Three companies, North Inca, Diversified, and Colomac Yellowknife Mines Limited, have done some underground exploratory work on their properties.

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1023A

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