CANADA
DEPARTMENT OF MINES AND RESOURCES
MINES AND GEOLOGY BRANCH
BUREAU OF GEOLOGY AND TOPOGRAPHY

GEOLOGICAL SURVEY

LEGEND

ARCHAEAN OR PROTEROZOIC

13 — Medium to coarse biotite granite; minor pegmatite; much granitized greenstone, and possibly some quartz-eye granite (11); 13a, garnetiferous granite; 13b, dioritic border phase of 13; 13c, quartz-feldspar porphyry

12 — Basic complex: 12a, rusty red, fine-grained serpentine rocks; 12b, rather coarse-grained hornblendite, locally serpentinized; 12c, speckled weathering gabbro and diorite, some hornblende porphyry; 12d, dark amphibolites and diorite; minor amounts of diabasic rocks; 12e, garnetiferous quartz gabbro

11 — Quartz-eye granite, much of it garnetiferous, and partly chloritic; some granitized rocks. May be older than 4

10 — Garnetiferous amphibolite and gabbro. May be older than 4 and genetically related to 1 and 3

9 — Sparsely garnetiferous gneisses derived from arkose and minor greywacke; some undifferentiated basic intrusions and lavas

8 — Fine-grained, dark greenstones; minor pyroclastic and pillowed members; undifferentiated intrusions of diorite; 8a, banded, or foliated, hornblende gneisses of Kisseynew type

7 — Mainly coarse tuffs, breccias, and agglomerates; some undifferentiated intrusions; 7a, hornblendite, gabbro, diorite, and feldspar porphyry

6 — Acidic lavas and pyroclastic rocks interbedded with large amounts of feldspathic sedimentary rocks; minor acidic intrusions; 6a, rhyolite and related intrusions

4, 5 — 4. Garnet gneisses of Kisseynew type that grade into 5; minor hornblende gneiss; some granitized rocks
5. Staurolite gneiss interbedded with garnet gneiss; minor argillite; 5a, coarse garnet gneiss grading into 5; 5b, fresh argillite grading to rather coarse arkose and greywacke; minor rhyolite

ARCHAEAN

3 — Basic pyroclastic rocks -- tuffs, breccias, and agglomerates; some greenstone flows and undifferentiated basic intrusions; minor sedimentary and metamorphic rocks (2,A)

2 — Argillite, greywacke, arkose, minor staurolite schist; 2a, fine-grained, sheared rhyolite

1 — Altered, basic, massive and pillowed flows and flow breccias (greenstone); some pyroclastic rocks and undifferentiated basic intrusions; minor sediments and metamorphic rocks (2,A); 1a, feldspar-hornblende gneiss, in part derived from 3

A — Feldspathized, silicified, and garnetized greenstones (1, 3); minor sedimentary relics (2); some quartz-eye granite (11). May include some of B

B — Granitized equivalents of sediments and greenstones. Probably includes some of A

Bedding (inclined, vertical, overturned) ....

Bedding (inclined, vertical) upper side of bed unknown ......

Bedding (inclined) upper side of bed determined from pillow lavas ....

Foliation (inclined, vertical, horizontal, dip unknown) ....

Schistosity and gneissosity (inclined, vertical, dip unknown) ...

Fault, shear zone (arrow indicates direction of dip) ....

Direction and amount of plunge determined from linear elements 40

Anticlinal axis ....

Synclinal axis ....

Prospect trench (Au, gold; W, scheelite; S, sulphide) X

NOTE: Subdivisions of formations 7 and 8 appear on the accompanying more detailed map of the Nor-Acme Mine area (46-9A)

Geology by J. M. Harrison, 1944, 1945.

Portage ....

Marsh ....

DESCRIPTIVE NOTES

Information obtained in 1945 has resulted in some changes in Preliminary map 45-7A of the Snow Lake area. It is now known that quartz porphyry between Anderson and Threehouse Lakes, which was mapped as lava, is actually a folded, sill-like intrusion of quartz-eye granite (11). Rocks mapped as granitic and syenitic gneisses are largely hybrid rocks derived from greenstones by action of the quartz-eye granite (11). Some rocks south of Snow Lake that were mapped in 1944 as altered basic intrusions are altered greenstones that have been amphibolitized near faults. In 1945 greenstones south of Snow Lake were separated into predominant lavas (1) and mainly pyroclastic rocks (3); basic intrusions (12) were more finely subdivided; some altered greenstones near Chisel Lake were separated from basic intrusions; and other, minor corrections were made. In addition, a detailed map of the Nor-Acme Mine area accompanies this map, and on it the rock types are indicated in greater detail.

Hybrid rocks (A) are feldspathic and commonly garnetiferous, and the more completely altered types weather to a peculiar bleached appearance. They occur in all gradations from feldspathic volcanic rocks (1, 3), through nearly white rock speckled with hornblende, to quartz-eye granite (11). Some sediments (2) have been altered to garnet-feldspar rocks. In places contacts are sharp, but mostly they are gradational. Granitized rocks (B) are greenstones and sediments that have been metamorphosed by younger granite (13). In a few places both types of hybrid rock (A, B) occur together, and their separation is arbitrary.

A possible unconformity at the base of staurolite schist and garnet gneiss (4, 5) is masked by faulting, and by sparse, poor exposures. Metamorphic characteristics suggest that older greenstones (1, 3), sediments (2), older diorite (10), quartz-eye granite (11), and hybrid rocks (A) are pre-Missi in age, and that others are Missi sedimentary and volcanic rocks and younger intrusions. Older formations (1, 2, 3) are predominantly volcanic in origin, whereas the younger strata (4, 5, 6, 7, 8, 9) are mainly sedimentary. It is suggested that the older assemblage is Amisk, and the younger Missi, in age. The rocks north and northwest of Squall Lake are Kisseynew gneisses.

The predominant folds of Snow Lake map-area are synclines. Older greenstones and sediments (1, 2, 3), quartz-eye granite (11), and hybrid rocks (A) are folded into a large, broad syncline whose axis trends southwest and south from Snow Lake, and plunges northwards. Minor folds occur near the axis between Threehouse and Chisel Lakes. The northward plunge of the syncline steepens from about 40 degrees near Snow Lake to nearly vertical in the south part of the area. Trends of rocks a mile or two east of Morgan Lake suggest a subsidiary anticline. An anticlinal axis that plunges steeply south may pass southeastwards through Morgan Lake. North of Snow Lake the rocks form a basin, or very broad syncline, that centres in Herblet Lake. An overturned, north plunging, isoclinal anticline has been folded in the basin immediately north and east of Snow Lake. The Nor-Acme ore zone occurs at the crest of this anticline. A synclinal axis trends northeast between McLeod and Cleaver Lakes; it begins to curve northwards near the east edge of the map-area, and swings around to northwest to cross the northeast corner. A granite boss north of Squall Lake marks the crest of an elongated dome, during whose formation the McLeod Lake syncline was folded. An anticline, with a very gentle plunge to the north, is inferred south of Varnson Creek. Kisseynew gneisses (4, 5a, 8a, 9) north and northwest of the west bay of Squall Lake have been folded into a number of small synclines and anticlines. Sedimentary rocks (9) around Herblet Lake are probably intricately folded.

Faults are common and have a complex pattern. The most prominent fault, or fault zone, roughly follows Berry Creek Valley in the southeast part of the area. It faults younger granite (13) and extends for some miles to the south. The trace of a large normal fault follows roughly the south and west shores of Snow Lake, and extends north from the west arm of the lake. Slickensides indicate that the north side moved down and to the northeast. Subsidiary faults and shear zones extend southwesterly from Snow Lake. A well defined fault runs through Cleaver Lake; to the southwest it swings southeast at a right angle to follow the upper contact of staurolite schist (5), and cuts out most of the west limb of the Nor-Acme anticline. Northeast of Cleaver Lake, in Wekusko map-area, the northern branch of this fault swings north, and may have been folded by the Squall Lake dome. Another fault, part of which runs through Birch Lake, follows roughly the trend of the Cleaver Lake right-angled fault. Rocks between these two faults are much faulted and sheared. Strong shearing probably marks a fault along the west shore of Anderson Lake. Faults may follow the east and west shores of Morgan Lake, but their extensions north and south are masked by drift. A fault zone that extends northward from the east side of Cook Lake for a mile or two beyond Varnson Lake is cut off by granite in the north and by a basic intrusion in the south. A small fault extends southeast from Tent Lake, and another from the northwest part of Woosey Lake. Elsewhere in the area shearing is common locally, but no regular trend was indicated.

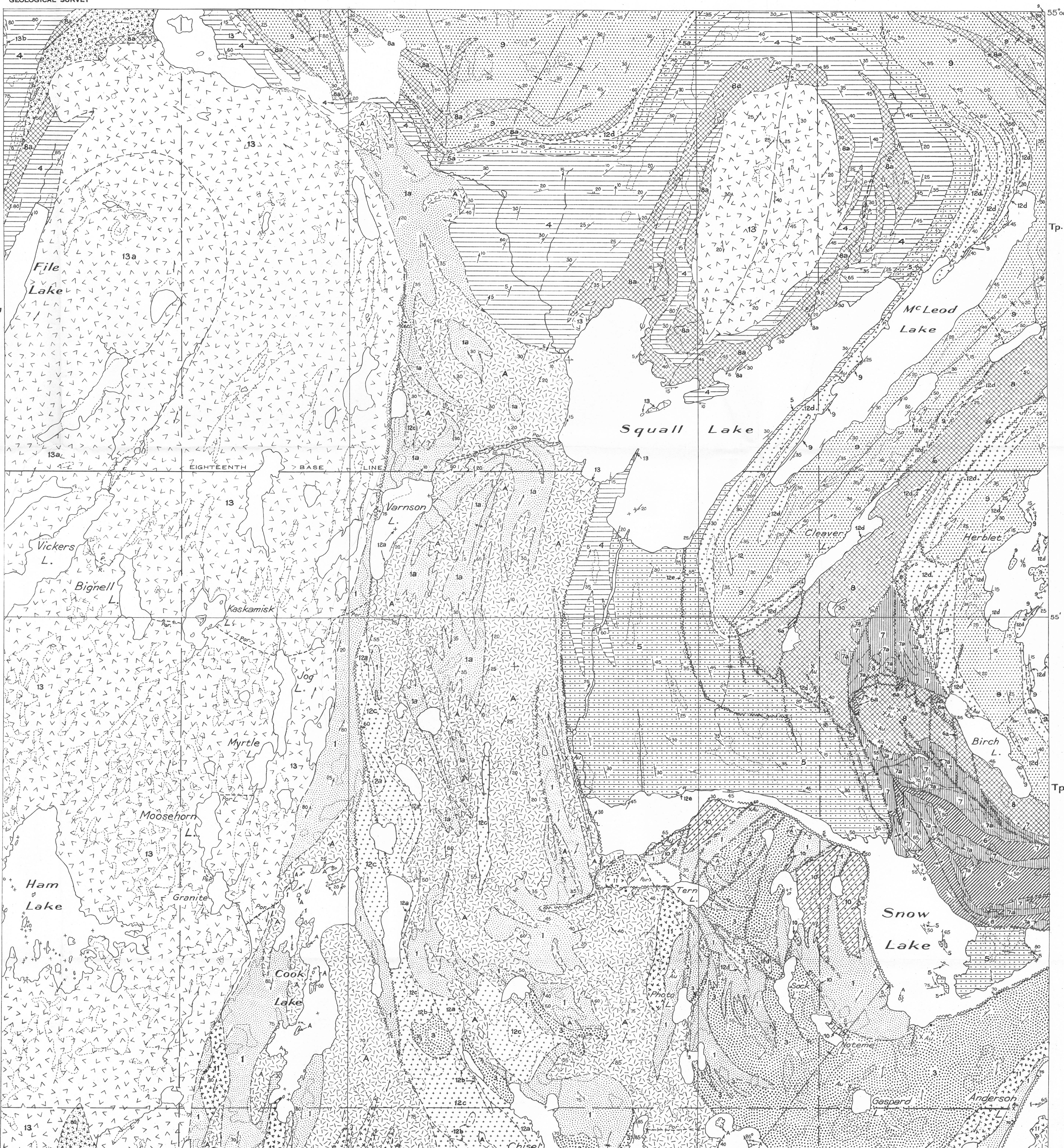
Nor-Acme gold mine is the only known deposit of commercial size in the Snow Lake area. Diamond drilling has indicated two zones totalling nearly 5,000,000 tons of ore that averages $5.25 a ton in gold. The main, or Dick, ore zone occurs at the crest of the northerly plunging, easterly dipping, isoclinal anticline. A minor syncline and anticline occur on the west limb of the main anticline, and the Toots ore zone is on the crest of the subsidiary anticline. Both orebodies occur at and near the contact between hanging-wall basic rocks (7) and foot-wall acidic rocks (6), where these are much brecciated and silicified. Fine, felted needles of arsenopyrite are the best indicator of ore; they occur in silicified rocks, but not in stringers of quartz. The anticline is cut off by faults both north and south of the ore zones, being confined almost entirely to the Howe Sound lease. A feature of the hanging-wall rocks is the presence of tourmaline, and irregular, small sheets of pegmatitic material that consists almost entirely of zoisite. This type of alteration is unusual in the area and may be significant.

Several gold showings are known north of Nor-Acme, and some have shown spectacular surface values. However, of those drilled, none persists in depth. Gold has been found in diorite (12d) between McLeod and Squall Lakes, and in its continuation around the Squall Lake granite dome (13). These finds are being drilled. Gold showings on Threehouse and Morgan Lakes have been drilled, but results were disappointing. No arsenopyrite was found in the Morgan Lake showing, but chalcopyrite and sphalerite are common.

Exploratory drilling has been undertaken in the western narrows of Snow Lake, where interesting mineralization has been discovered in faults branching from the main Snow Lake fault. Test pits on certain shear zones near the southwest corner of the lake have given some encouragement. Prospect trenching and drillings have been undertaken near the east end of the Howe Sound lease, just west of Squall Creek, and south of Anderson Lake. Results reported are inconclusive. Old test pits, some of which have been drilled, are numerous throughout the area, but assays on samples from these were low.

Grey copper (tetrahedrite) occurs in a small quartz vein on the south shore of Snow Lake narrows. Galena and sphalerite are common in some localities south of Snow Lake. One trench, west of Edwards, discloses a little scheelite in a quartz vein.

In general, mineralization is associated structurally with folds and faults. Where carbonatization is not extreme values appear to be more encouraging, but most shear zones have much carbonate. Amphibolitized rocks near faults appear to be more brittle, and hence more favourable hosts for mineralization. Fine needles of arsenopyrite are the best indicator of gold among the metallic minerals, and zones where tourmaline or zoisite occur should be examined carefully. Rusty red gossan, rather than yellow-ochre gossan, indicates the possibility of finding gold in underlying, fresh rock. In numerous places coarse particles of gold, some of it crystallized, occur along and near the margins of quartz veins, but drilling and trenching have so far failed to disclose similar conditions more than a few feet below the surface. This disappointing feature may be the result of secondarily enriched deposits that were not removed by glaciation, and high surface assays should hence be viewed with caution. Sedimentary rocks in Snow Lake area do not appear to be favourable hosts for mineral deposits, as they are, in the main, structurally incompetent. However, geological contacts, whether between sedimentary and igneous rocks or two types of igneous rock, may be worth examination, if suitable structures are present.



Surveyed and compiled by the Topographical Survey.
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PRELIMINARY MAP 46-9B

SNOW LAKE

WEST OF PRINCIPAL MERIDIAN

MANITOBA

Scale:- 2 inches to 1 mile

1 ½ 0 1 2