GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

GEOLOGICAL SERIES

SHEET 63 N/13

LEGEND

ARCHÆAN OR PROTEROZOIC

16 — *Pink biotite granodiorite*

15 — *Gneissic diorite and syenodiorite, in part porphyritic (occurs on Map 1071A, "Heming Lake" only)*

14 — *Gneissic biotite granodiorite;* **14a**, *foliated, very gneissic granodiorite (14a occurs on Map 1071A, "Heming Lake" only)*

13 — *Gneissic hornblende-biotite quartz diorite to granodiorite*

12 — *Grey gneissic hornblende diorite (occurs on Map 1071A, "Heming Lake" only)*

11 — *'Quartz-eye' granite;* **11a**, *grey gneissic rocks derived mainly by granitization of basic volcanic rocks (1); age uncertain, possibly older than Kisseynew complex (5-8)*

10 — *Meta-gabbro and meta-diorite;* **10a**, *meta-pyroxenite, younger than 3, older than 10; relation to Kisseynew complex (5-8) unknown*

9 — *Porphyritic rhyolite and rhyolite, in part younger than 13; relations to Kisseynew complex (5-8) unknown*

KISSEYNEW COMPLEX (5-8)

8 — *Granodiorite;* **8a**, *pegmatite (8 occurs on Map 1071A, "Heming Lake" only)*

7 — *Granitized gneiss derived from both biotite gneiss (5) and hornblende-plagioclase gneiss (6)*

6 — *Hornblende-plagioclase gneiss, in part banded*

5 — *Biotite gneiss, in part garnetiferous*

4 — *Interbedded argillite and greywacke;* **4a**, *hornblende-biotite schists and gneiss; relation to Kisseynew complex (5-8) unknown*

ARCHÆAN

AMISK GROUP (1-3)

3 — *Hornblende-plagioclase gneiss, probably altered volcanic rocks*

2 — *Garnetiferous biotite schist and gneiss, garnetiferous staurolite gneiss, probably altered sediments; minor quartzite*

1 — *Basic volcanic rocks, pillow lavas, minor acidic volcanic rocks, minor pyroclastic rocks, cherts, iron-formation; undifferentiated basic intrusions;* **1a**, *basic volcanic rocks with thin bands of garnetiferous hornblende-plagioclase gneiss;* **1b**, *banded hornblende-plagioclase gneiss derived from 1;* **1c**, *coarse-grained amphibolite derived from 1*

A — *Grey gneisses and migmatites derived from basic volcanic rocks (1, 3) and sedimentary rocks (2) by biotite granodiorite (14)*

B — *Grey to buff gneisses and migmatites derived from basic volcanic rocks (1) and sedimentary rocks (4a) by hornblende-biotite granodiorite (13)*

Bedding (inclined, vertical, overturned)
Bedding (upper side of bed unknown)
Schistosity, gneissosity (inclined, vertical, dip unknown)
Foliation (inclined, vertical, dip unknown)
Lineation (direction and amount of plunge determined from linear elements)
Drag-fold (form and direction of plunge)
Fault or shear zone
Anticline
Syncline
Glacial striæ
Mineral property ×

INDEX TO MINERAL PROPERTIES

1. Parres property
2. Webb property
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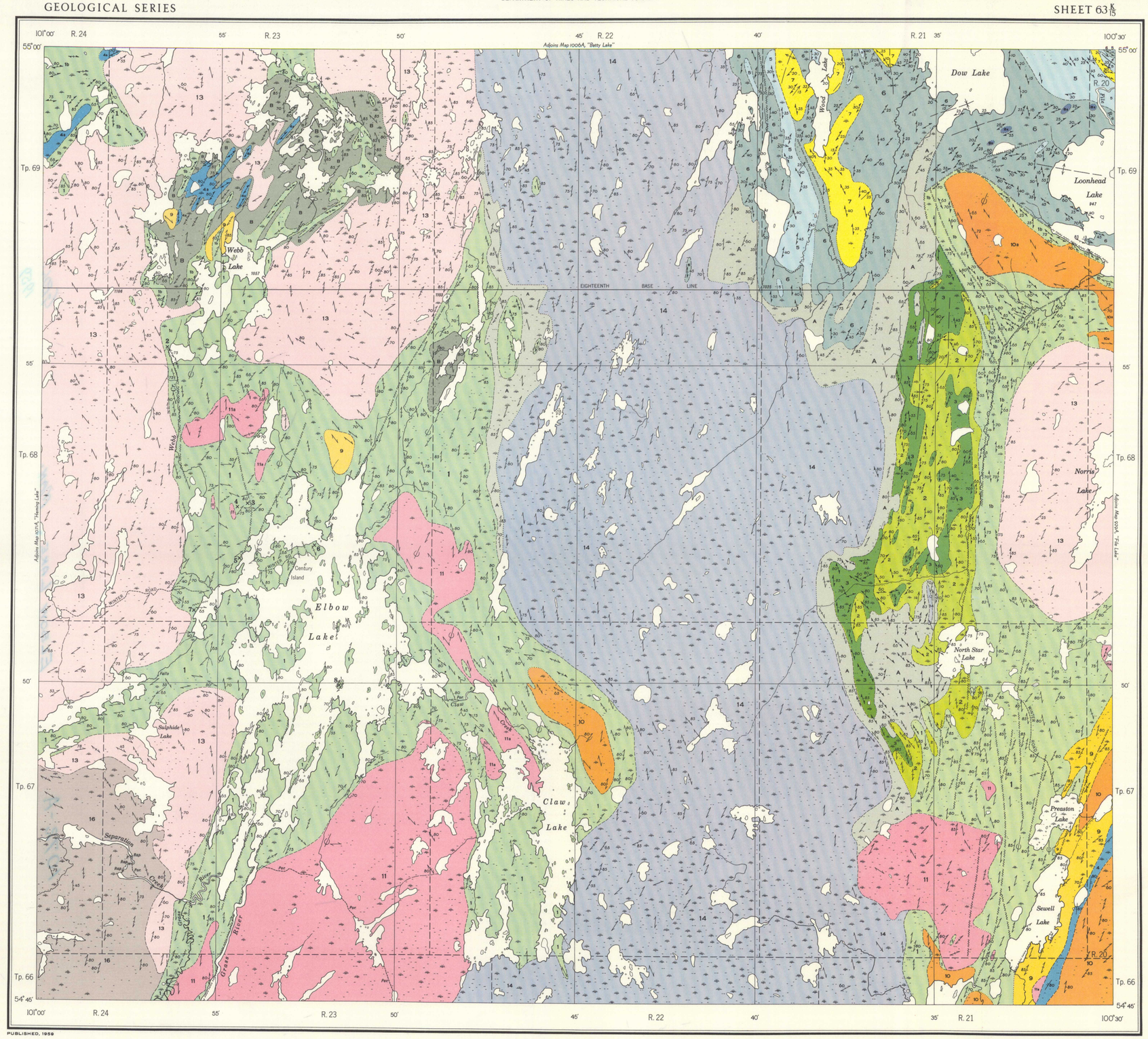
5. Vanderberg group
6. Century mine
7. Elbow Lake property
8. Ding How property

Geology by J. C. McGlynn, 1949-1952

Approximate magnetic declination, 14°06' East



PUBLISHED, 1959

MAP 1072A

ELBOW LAKE

WEST OF PRINCIPAL MERIDIAN

MANITOBA

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

Miles 1 ½ 0 1 2 3

COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA

REFERENCE

Portage, trail or winter road
Building
Township boundary (surveyed)
Township boundary (unsurveyed)
Intermittent stream
Marsh
Reef or small island
Height in feet above mean sea-level 947

Base-map compiled by the Topographical Survey, 1945.
Cartography by the Geological Cartography Unit, 1958

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

DESCRIPTIVE NOTES

The oldest part of the Amisk group (1) consists of basic volcanic rocks and their metamorphic equivalents. Near Elbow Lake pillow lavas are found, and bands of basic pyroclastic rocks and a little acidic volcanic rock occur. The last is most common northwest of Elbow Lake. The basic lavas are dark greyish green, fine grained, and commonly schistose. Near Elbow Lake, the volcanic rock assemblage is highly sheared and chlorite-carbonate or chlorite-epidote schists are widespread. North of North Star and Elbow Lakes, the volcanic rocks are gneissic due to alternating bands of hornblende and plagioclase (1b). Locally these gneisses contain garnet and south of Loonhead Lake include bands of garnetiferous hornblende-plagioclase gneiss (1a). Near Webb Lake the basic volcanic rocks are converted to coarse-grained amphibolites (1c) containing large porphyroblasts of hornblende in a groundmass of hornblende and plagioclase. Numerous intrusions of meta-diorite or gabbro have been mapped with the volcanic rocks, and are probably roughly equivalent in age.

A band of meta-sediments (2) overlies the volcanic rocks (1) conformably west of North Star Lake. These strata consist mainly of biotite schist and gneiss, commonly garnetiferous, and garnetiferous staurolite gneiss. These rocks are overlain conformably by hornblende gneisses (3), lithologically similar to the lavas (1).

The meta-sediments east of Sewell Lake (4) and north of Webb Lake (4a) consist of interbedded metamorphosed greywacke and argillite and highly metamorphosed hornblende-biotite gneisses, respectively. All are younger than the Amisk rocks (1-3) but their relation to the Kisseynew complex (5-8) is unknown. The sediments north of Webb Lake may be the same age as the Kisseynew but the evidence for such a relationship is weak.

The Kisseynew complex (5-8) occurs only in the north. The biotite gneiss (5) is a fine-grained, light grey to brownish grey, thin-banded rock containing quartz, plagioclase and biotite; commonly it is garnetiferous. The hornblende-plagioclase gneiss (6) is a fine-grained, dark grey, commonly well banded rock consisting of alternating bands of hornblende and plagioclase with minor quartz. In both rock types, banding is contorted in schist zones that occur along faults. The granitized gneisses (7) vary in composition and texture and grade into both granodiorite and biotite gneiss or hornblende-plagioclase gneiss. The granodiorite (8) is a pink, fine-grained, faintly gneissic rock with plagioclase, microcline, quartz, and minor biotite. Kisseynew rocks are in fault contact with Amisk rocks (1-3) around Loonhead Lake.

Rhyolite and quartz-feldspar porphyry dykes and stocks (9) are common in Amisk rocks (1-3) throughout the area; many of these dykes are too small to show on the map. Near Sewell Lake the porphyry is cut by meta-gabbro (10) and, therefore, is older than the 'quartz-eye' granite (11). Probably most of the dykes in this map-area are thus related. However, near Webb Lake, porphyry dykes cut hornblende-biotite quartz diorite (13) and, therefore, are younger than the granitic rocks. No attempt is made to map the porphyries on the basis of age because they are all of similar composition and appearance. The porphyries are light-grey-weathering rocks with medium-grey fresh surfaces and consist of quartz and feldspar phenocrysts up to ¼ inch diameter in a fine-grained matrix of quartz, feldspar, and minor biotite.

Basic intrusions (10), commonly meta-gabbro, occur as sill-like bodies. These rocks intrude Amisk rocks (1-3) but are older than 'quartz-eye' granite (11) for this granite alters the gabbro where the two are in contact. The basic rocks are dark grey, medium grained, massive to slightly schistose and consist of plagioclase and hornblende and minor amounts of apatite, magnetite and ilmenite. The meta-pyroxenite (10a) consists of tremolite with small amounts of feldspar, pyroxene, and magnetite.

'Quartz-eye' granite (11) is the oldest granite recognized in the area. It is a grey weathering gneissic rock consisting essentially of plagioclase, quartz and biotite. The rock is characterized in the field by bluish 'quartz-eyes' and greenish grey laths of plagioclase. Grey gneissic rocks (11a) of varying composition occur in some places in contact areas of 'quartz-eye' granite and basic volcanic rocks (1). These gneisses are the result of granitization of the volcanic rocks.

Hornblende-biotite quartz diorite (13) and biotite granodiorite (14) form the largest masses of granitic rock in the map-area. These granites cut the 'quartz-eye' granite and are themselves of slightly different ages—the biotite granodiorite being the younger. The hornblende-biotite quartz diorite is gneissic and grey on the weathered surface, with characteristic lavender-coloured quartz. The rock is a fine-grained aggregate of biotite and green hornblende, pink to reddish plagioclase, quartz and minor amounts of chlorite and epidote. The biotite granodiorite is a gneissic, fine- to medium-grained rock consisting of flesh-coloured plagioclase, pink microcline, quartz and biotite with epidote and magnetite as minor constituents.

Granitized rocks and migmatite zones (A, B) occur along the contacts of quartz diorite (13) and granodiorite (14). The rocks are strongly gneissic, grey weathering and fine to medium grained. Their composition is variable but quartz and plagioclase are always present, as well as some biotite, hornblende and microcline. Such rocks grade imperceptibly into either quartz diorite or biotite granodiorite. Where formed from sediments the granitized rocks are rich in biotite, whereas near the contact with basic volcanic rocks they contain hornblende and many inclusions of unreplaced volcanic rocks.

Dykes of pink weathering biotite granodiorite are numerous near large bodies of the granodiorite (16). The rock is slightly gneissic to massive, pink, fine grained, and consists essentially of plagioclase, microcline, quartz and about 2 per cent biotite.

Amisk and Kisseynew strata are intensely folded. The general trend of the folds in the central and southern parts of the area is north or slightly east of north. In the north the folds trend northeast and plunge northeast. The folds in Amisk rocks in the east-central part of the area plunge north; the plunge of folds in the vicinity of Elbow Lake cannot be determined definitely. Scattered top determinations on pillows in the lavas around Elbow Lake suggest that the basin of the lake may be a syncline; this structure is complicated by smaller folds and faults. Flexures in the volcanic rocks west of Elbow Lake and again in the northwest corner probably represent anticlinal folds but lack of top determinations and steep dips make this interpretation uncertain.

The faults are marked by zones of intense shearing. Commonly in volcanic rocks, chlorite and epidote are developed, whereas in biotite gneiss and granite, white mica occurs in the sheared rock. Crenulation and drag-folding of shear planes are common. Crushed quartz and feldspar occur along fault zones in granite and to a lesser extent in volcanic rock. Near Loonhead Lake, Kisseynew (5-8) and Amisk (1-3) strata are in fault contact; evidence of movement is conflicting in that minor structures indicate both thrusting from the south and horizontal movement.

A study of the gold deposits and sulphide zones suggests that the most favourable areas for prospecting are those underlain by basic volcanic rocks. Particular attention should be given to sheared zones in these rocks and in sedimentary rocks, especially those in which chlorite is present in noticeable quantities.

1072A