CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

CROWDUCK BAY

WEST OF PRINCIPAL MERIDIAN
MANITOBA

MAP 987A

Scale: One Inch to One Mile = 1/63,360

Miles 1 ¾ ½ ¼ 0 1 2 3

PUBLISHED, 1950.

LEGEND

PALÆOZOIC

ORDOVICIAN

15 — *Dolomite*

ARCHÆAN OR PROTEROZOIC

POST-MISSI

13, 14 — **13.** *Aplite*; **14.** *Pegmatite*

12A-12D — **12A,** *biotite granite, granite-gneiss*; **12B,** *granodiorite*; **12C,** *diorite, quartz diorite*; **12D,** *granite porphyry*

11A, 11B — **11A,** *medium-to coarse-grained quartz diorite*; **11B,** *fine-to medium-grained diorite; quartz gabbro, gabbro*

10 — *'Quartz-eye' porphyry*

9 — *'Quartz-eye' granite, granodiorite*

8 — *Quartz-feldspar porphyry*

7 — *Biotite dacite, dacite breccia*

MISSI (?)

6A-6C — **6A,** *andesitic and basaltic flows*; **6B,** *laminated feldspathic chert and greywacke*; **6C,** *rhyolite*

5 — *Conglomerate, minor greywacke*

4 — *Greywacke, arkose, and conglomerate;* **4a,** *greywacke, derived schists and gneisses;* **4b,** *greywacke, arkose, pebble beds*

3A-3C — **3A,** *biotite schist*; **3B,** *coarse garnet and staurolite schist*; **3C,** *interbedded conglomerate and staurolite schist*

ARCHÆAN

AMISK GROUP (?) (1, 2)

2 — *Predominantly basic flows; minor breccia, tuff, and greywacke; derived amphibole schist and gneiss*

1 — *Garnetiferous biotite schist; minor staurolite-sillimanite schist*

A — *Garnetiferous biotite gneisses and schists of sedimentary origin; minor hornblende-plagioclase gneiss of volcanic origin*

B — *Sedimentary biotite gneisses, altered by granitic intrusions; probably derived from 4*

Heavily drift-covered area
Bedding (inclined, vertical, overturned, dip unknown)
Bedding (direction of dip known, upper side of bed unknown)
Bedding (upper side of bed faces as indicated, direction of dip unknown)
Schistosity, gneissosity, (inclined, vertical, direction of dip unknown)
Lineation
Anticlinal axis
Synclinal axis
Shear zone, fault
Glacial striæ
Mineral occurrence — x

MINERAL SYMBOLS

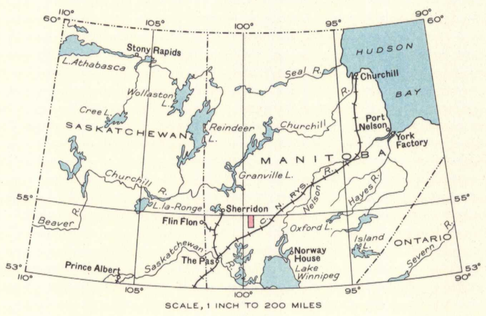
Arsenopyrite	As
Chalcopyrite	Cu
Galena	Pb
Gold	Au
Pyrite	Py
Pyrrhotite	Pr
Sphalerite	Zn
Spodumene	Li
Sulphide	S

Geology by M. J. Frarey 1946, 1947, 1948.

Building
Portage, trail or winter road
Township boundary (surveyed)
Township boundary (unsurveyed)
Survey monument — M130
Telephone line along trail
Stream (position approximate)
Marsh
Rapid
Reef or small island
Height in feet above mean sea-level — 842

Base-map compiled by the Topographical Survey in 1946 and 1947. Cartography by the Geological Mapping Division, 1946, 1947 and 1949.

Approximate magnetic declination, 13°00' East.



SCALE, 1 INCH TO 200 MILES

Adjoins Map 665A, "Wekusko"

DESCRIPTIVE NOTES

The map-area is easily accessible by the Hudson Bay Railway to Wekusko, by motor road from there to Hales Landing on Wekusko Lake, and from points on this lake. The nearest settlement is Herb Lake, about 3 miles northwest by trail from the south end of Stuart Lake.

The area was previously mapped by Alcock[1] in 1917 and 1918 on a scale of 1 inch to 2 miles, and in 1936 the southwestern corner was included by Stockwell[2] in detailed mapping on a scale of 1 inch to 1,000 feet.

A wide zone of gneisses and schists (A) is exposed in the northwestern part of the map-area. Within it are included normal, grey, bedded, quartz-biotite gneiss, derived from greywacke (4); fine-grained, grey, microcline-quartz-biotite gneiss and gneissic quartzite, with intercalated bands of hornblende-plagioclase and hornblende-pyroxene-plagioclase gneiss, and hornblende schist. All are commonly garnetiferous. Pillow remnants were observed locally in the basic gneiss, which is evidently of volcanic origin; but elsewhere bedding structures and mineral composition are indicative of sedimentary accumulation.

The biotite gneisses (B) north and south of Hat Lake are commonly buff coloured on the weathered surface, and in places contain coarsely crystalline pink feldspar. They vary irregularly from fairly typical sedimentary gneiss to altered equivalents lacking original sedimentary structures, and are probably all derived from sedimentary rocks (4) by metamorphism, including addition of granitic material. Many, small, aplite, granite, and pegmatite dykes intrude the gneisses; *lit-par-lit* injections and lenses and stringers of quartz are also numerous.

Subordinate sedimentary rocks (1) and associated intermediate to basic flows (2) of the Amisk type comprise what is evidently the oldest group in the map-area. West of Roberts Lake and northwest of Niblock Lake, the sedimentary beds evidently underlie the volcanic rocks. The latter grade from fine- to medium-grained, pillowed, andesitic and basaltic flows into coarse-grained, structureless, dioritic bodies of irregular outline. Acidic facies are almost entirely lacking. Elongated and otherwise deformed pillows were observed in many places north of Roberts Lake, and the lavas are intercalated with minor sedimentary beds.

The succeeding group of rocks (3-6) is predominantly sedimentary, and overlies the older lavas unconformably. Arkosic strata of the group commonly lack good bedding, but greywacke and its metamorphic equivalents are well bedded in most localities, and in several places exhibit excellent crossbedding. The several conglomerate bands, with interbedded greywacke, vary in thickness up to about 4,000 feet, and carry a variety of pebbles and boulders, including granite and porphyry, greenstone, greywacke, chert, and quartz, of which the last is most abundant. The boulders lie at or near the base of the conglomerate strata, and range up to 2½ feet in diameter. The conglomerate beds grade upwards into pebble-bearing greywacke. The volcanic members (6A, 6C) differ from Amisk types (2) in that they are rarely pillowed, contain definite rhyolite bands, are locally characterized by large phenocrysts of plagioclase feldspar, and include a distinct belt of interbanded andesite, basic sills, and thinly laminated chert and greywacke (6B). Armstrong[3] included this group in his 'Laguna series' in the adjoining Wekusko map-area. The lithology of the sedimentary members and their unconformable relation with the older volcanic rocks (2) strongly suggest that they are of Missi age, and probably correlative with the Snow group of the File Lake map-area[4].

Biotite dacite (7) forms irregularly shaped bodies, with local intrusive relations to other rocks. West and south of Puella Bay, dacitic, vesicular, and amygdaloidal flows and flow breccia are exposed. Small, stock-like bodies of fine-grained, banded, grey or pink weathering quartz-feldspar porphyry (8) are intrusive. 'Quartz-eye' granite (9) is a distinctive, grey to pink rock, characterized by abundant ovoid eyes of glassy quartz, up to ¼ inch long, and by parallel biotite streaks and clusters in a fine-grained groundmass of feldspar and quartz. The rock resembles the quartz-feldspar porphyry (8) in composition and texture, and the two are probably of related origin. Similar 'eyes' of quartz exist in the 'quartz-eye' porphyry (10), which occurs as sills east and west of Dion Creek. The texture is relatively coarse, as compared with the quartz-feldspar porphyry (8), and the biotite content is higher, but these rocks may also be related.

The various types of basic (11) and acidic (12) intrusive rocks grade into one another, and the positions of their respective boundaries are necessarily approximate. Gneissic structure is in most places only moderately developed. Pegmatite masses (14) vary in size from small dykes to sizable stocks; the former appear to grade into simple quartz veins. Other than common rock-forming minerals are scarce in the pegmatite; a few dykes carry abundant spodumene. Numerous dykes of lamprophyre, too small to be mapped, were observed, and are probably the youngest Precambrian rocks in the area. At one place east of Dion Creek, such a dyke was seen to cut pegmatite (14), which, in turn, intrudes 'quartz-eye' porphyry (10).

Flat-lying Ordovician dolomite (15) outcrops in the extreme southwest corner of the map-area, and several outliers were also mapped south of Burns Lake. The dolomite is a fine-grained, buff-coloured, bedded rock; its contact with Precambrian rocks was not observed.

The pre-batholithic rocks of the map-area have been severely folded, and the structure is obscure in many places, but large, well-defined folds lie south and west of Roberts Lake, and smaller, steeper folds are exposed north of Niblock Lake. Axes of folds generally strike 10 to 45 degrees east of north, and beds are commonly overturned. The Hackett Lake-Roberts Lake syncline is a large structure that continues southwest into the adjoining map-area. The folded sedimentary rocks along it are particularly well crossbedded, and are well exposed from Stuart Lake north as a result of forest fires.

The opposing directions of tops of beds in nearby strata between Stuart and Lostfrog Lakes and on either side of Stuart Lake are attributed to close folding rather than to unconformity. This view is supported by lack of angular discordance, and by the almost identical nature of conglomerate and greywacke beds on either side of Stuart Lake and to the northeast.

The major fault and shear zones, and many small, scattered, discontinuous shears, trend northeast, and commonly are hidden under muskeg. The amount and direction of displacement along them are uncertain. The fault that extends southerly from near the west end of Roberts Lake, although not well defined for much of its length, proved important in explaining the age relations of the sedimentary (4) and volcanic members (6A) of the Missi (?) group. Younger faults, with relatively small displacement, strike northwest in the area south of the sharp bend of Grass River, and north of east to the north of Hackett Lake. Most faults have a curving strike.

No mineral deposits of commercial size are known in the map-area. However, considerable development work at the Ferro property indicated the presence of several possible ore shoots of gold-bearing quartz. The quartz veins lie in a shear zone, in andesite flows, along the axis of a broad syncline. Detailed descriptions of this and other occurrences nearby are given by Stockwell[2]. Further operations have been deferred, as the deposits are considered marginal under existing economic conditions. For similar reasons, development of spodumene deposits west of the narrows at the south end of Crowduck Bay was discontinued. Spodumene occurs as a constituent of pegmatite dykes, in crystals up to 1½ feet long.

Many relatively small mineral occurrences have been discovered during an extended period of prospecting. Gold-bearing quartz veins occur in a wide variety of rocks, but are small and irregular or discontinuous, and have usually yielded low assay returns. The veins occur typically in or near shear zones, and are mineralized together with the adjoining wall-rocks. Arsenopyrite is the most prevalent metallic mineral, occurring commonly in crystals up to ½ inch in length or, more rarely, in disseminated form. Pyrite, chalcopyrite, bornite, pyrrhotite, galena, sphalerite, molybdenite, iron oxide, and gold are other metallic minerals noted. Gangue minerals, in addition to quartz, include feldspar, tourmaline, white mica, and carbonate. Some veins appear to be pegmatitic, as though genetically related to granite (12); this origin is also suggested by the presence of mineralized quartz veins in these granitic rocks.

Occurrences of nickeliferous pyrrhotite at the small lake north of the northeast end of Osborne Lake, and silver-bearing galena, with sphalerite, southeast of Osborne Lake, were reported many years ago; the latter, together with some other mineral occurrences in the map-area, has been described in detail by Wright[5].

Small, scattered occurrences of chalcopyrite with pyrite, with little or no quartz, were noted chiefly in basic intrusive rocks.

[1] Alcock, F. J.: The Reed-Wekusko Map-area, Northern Manitoba; Geol. Surv., Canada, Mem. 119 (1920).

[2] Stockwell, C. H.: Gold Deposits of Herb Lake Area, Northern Manitoba; Geol. Surv., Canada, Mem. 208 (1937).

[3] Armstrong, J. E.: Geol. Surv., Canada, Map 665A, Wekusko, Manitoba (1941).

[4] Harrison, J. M.: Geol. Surv., Canada, Map 929A, File Lake, Manitoba (1948).

[5] Wright, J. F.: Geology and Mineral Deposits of Northwest Manitoba; Geol. Surv., Canada, Sum. Rept. 1930, pt. C (1931).