CANADA

DEPARTMENT OF MINES AND RESOURCES

GEOLOGICAL SURVEY OF CANADA

MINES, FORESTS, AND SCIENTIFIC SERVICES BRANCH

CROWDUCK BAY
MANITOBA

Scale: 2 inches to 1 mile
or 1 inch to 2640 FT.

1 0 1 2

PRELIMINARY MAP 48-22

BASE MAP SURVEYED BY THE TOPOGRAPHIC SURVEY.
CARTOGRAPHY BY THE GEOLOGICAL MAPPING DIVISION, 1948.

LEGEND

ARCHAEAN OR PROTEROZOIC

- Pegmatite
- Biotite granite, granite-gneiss; 12a, granodiorite; 12b, diorite, quartz diorite; 12c, granite porphyry; 12d, aplite
- 11a, medium- to coarse-grained quartz diorite; 11b, fine- to medium-grained diorite; quartz gabbro, gabbro
- "Quartz-eye" porphyry
- "Quartz-eye" granite, granodiorite
- Quartz-feldspar porphyry
- Biotite dacite, dacite breccia
- 6a, andesitic and basaltic flows; 6b, laminated feldspathic chert and greywacke; 6c, rhyolite
- Conglomerate, minor greywacke
- Greywacke, arkose, and conglomerate; 4a, greywacke, derived schists and gneisses; 4b, greywacke, arkose, pebble beds
- 3a, biotite schist; 3b, coarse garnet and staurolite schist; 3c, interbedded conglomerate and staurolite schist

ARCHAEAN

- Predominantly basic flows, minor breccia and greywacke; derived amphibole schist and gneiss
- Garnetiferous biotite schist, minor staurolite-sillimanite schist

- Garnetiferous biotite gneisses and schists of sedimentary origin; minor hornblende-plagioclase gneiss of volcanic origin
- Sedimentary biotite gneisses, altered by granitic intrusions; probably derived from 4

- Heavily drift-covered area
- 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, gneissosity, (inclined, vertical, dip unknown)
- Lineation
- Anticlinal axis
- Synclinal axis
- Shear zone, fault
- Glacial striae
- Mineral occurrence
- Trail, portage

MINERAL SYMBOLS

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

Geology by M. J. Frarey, 1946, 1947

DESCRIPTIVE NOTES

The oldest rocks, consisting of basic flows and subordinate sediments (1, 2) resemble those of the Amisk group of the Flin Flon and Amisk Lake regions. Metamorphism has resulted in the formation of secondary amphibole and quartz, and carbonate, in the flows, and of biotite, garnet, staurolite, and sillimanite in the sedimentary rocks, but original structures, such as pillows and cross-bedding, have not been obliterated. The flows grade from fine- to medium-grained, pillowed, andesitic and basaltic bands into coarse-grained, massive, dioritic facies of irregular outline. Acidic facies are almost entirely lacking. The succeeding group of predominantly sedimentary rocks (3-6) overlies the older basic lavas (2) unconformably. The arkosic strata commonly lack good bedding, but the greywackes and their metamorphic equivalents are extremely well cross-bedded in several localities, and are visibly laminated in nearly all outcrops. The series includes several conglomerate bands, all with a wide variety of pebbles. The sedimentary members are commonly metamorphosed to biotite gneisses and schists; secondary amphiboles appear locally, where the beds are relatively high in lime content. A coarse biotite schist, with numerous large metacrysts of staurolite and garnet (3b) is the most distinctive rock type in the area. All the sedimentary gneisses and schists in the series are garnetiferous. The volcanic rocks (6) differ from the older lavas (2) in that they are only rarely pillowed; contain definite bands of rhyolite; include dacitic flows; are locally characterized by large plagioclase feldspar phenocrysts; and include a distinct belt of interbanded andesite, basic sills, and thinly laminated chert and greywacke. This younger group (3-6) was mapped and described by Stockwell [1], and the results of his work are incorporated in the geology of the southwest corner of this map-area. These younger formations were later included by Armstrong [2] in his Laguna series. The present interpretation suggests that they are of Missi age.

A wide zone of gneisses and schists (A) is exposed in the northwestern part of the map-area. Most of these rocks are of sedimentary origin, as indicated by recognizable bedding structures and typical metamorphism to garnetiferous biotite gneisses and schists. The remainder is of volcanic origin, as indicated by the presence of hornblende schist and hornblende-plagioclase gneiss, which locally contain pillow remnants. Due to the lack of structural evidence, and their isolation by intrusive bodies, the relation of these rocks (A) to other sedimentary and volcanic rocks of the area is not known.

The biotite gneisses (B) vary in appearance from fairly typical sedimentary gneiss to granitoid gneiss with no remaining sedimentary structures. The boundaries of the unit are drawn arbitrarily. Lit-par-lit granitic material is commonly in evidence, and aplite, granite, and pegmatite dykes, and lenses and stringers of quartz are numerous.

Biotite dacite (7) forms irregularly shaped bodies, with intrusive relations to other rocks. Stock-like bodies of quartz-feldspar porphyry (8) are also definitely intrusive. The various types of basic intrusive rocks (11) grade into one another as do those of the more acidic intrusions (12), and the positions of their respective boundaries are necessarily approximate. Pegmatitic masses (13) 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.

Folding in the map-area is severe, and is obscure in many places, but large, well-defined folds lie south and west of Roberts Lake, and smaller folds were observed north of Niblock Lake. Axes of folds generally strike 10 to 45 degrees east of north. The canoe-shaped syncline between Hackett and Roberts Lakes is the largest structure in the map-area. It is well exposed, and is outlined readily from top determinations provided by excellent crossbedding. Overturned beds are common on the limbs and crests of folds.

The main fault and shear zones and many, small, scattered, discontinuous shears trend northeast, and commonly are buried under muskeg. The amount and direction of movement along them are uncertain. Smaller faults, of relatively little displacement, strike northwest, in the area south of the sharp bend of Grass River, and southwest, to the north of Hackett Lake. Others curve, such as that along and beyond the south shore of Roberts Lake.

No mineral deposits of commercial size are known in the area. However, development work on the Ferro property of Wekusko Consolidated, Limited, has indicated several possible ore shoots of gold-bearing quartz, and in some of these high-grade pockets were encountered. The quartz veins lie in a shear zone, in andesitic lava flows, along the axis of a broad syncline. Under existing economic conditions, the deposits are of marginal value, and mining has been deferred.

Spodumene deposits, in pegmatite dykes west of the narrows at the north end of Wekusko Lake, have been investigated by Sherritt Gordon Mines, Limited, and at present are controlled by that company. Drilling was done in 1942, and indicated interesting possibilities, but further operations were postponed for economic considerations.

Many, relatively small mineral deposits have been found during a period of prospecting that dates from 1914. Gold-bearing quartz veins occur in a wide variety of rocks, but are small and irregular, and have yielded low assay returns. The most prevalent metallic mineral in these veins is arsenopyrite, commonly in crystals up to one-half inch in length and, more rarely, in disseminated form. It is found in both vein material and wall-rock, and is particularly abundant in the showings west and south of Niblock Lake. Other metallic minerals in these veins are: pyrite, chalcopyrite, bornite, pyrrhotite, galena, sphalerite, molybdenite, iron oxide, and free gold. Gangue minerals include red feldspar, black tourmaline, muscovite, and carbonate.

The silver-lead-zinc deposit southeast of Osborne Lake consists of quartz veins carrying galena, sphalerite, pyrite, pyrrhotite, chalcopyrite, and arsenopyrite, in quartz-biotite gneiss. The galena is reported to carry silver. Wright has described the deposit as flat-lying [3]. Strong shearing is evident from the occurrence of soft sericite and actinolite schists.

At Little Pine Lake, a deposit of chalcopyrite, pyrite, bornite, and pyrrhotite, is exposed by trenching. The sulphides are in quartz lenses and irregular veins, and also in the wall-rock, which is biotite gneiss. The pyrrhotite is said to be nickeliferous.

Small, scattered occurrences of chalcopyrite, with pyrite, were noted, chiefly in basic intrusive rocks.

REFERENCES

1 Stockwell, C. H.: Gold Deposits of Herb Lake Area, Northern Manitoba; Geol. Surv., Canada, Mem 208, pp. 4-7 (1937).

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

3 Wright, J. F.: Geology and Mineral Deposits of Northwest Manitoba; Geol. Surv., Canada, Sum. Rept., 1930, pt. C, pp. 110-111 (1931).