PRELIMINARY SERIES

PART OF SHEET 33

LEGEND

PROTEROZOIC

- 10 — Gabbro dykes, in part with diabasic texture
- 9 — MANITOUNUK GROUP (8, 9) Chiefly andesite; some basalt and/or gabbro sills
- 8 — Limestone, sandstone, quartzite, siltstone, arkose; includes some 9
- 7 — Quartzite; minor pebble conglomerate and conglomerate

ARCHEAN

- 6 — Granite to granodiorite, massive to poorly foliated; includes minor granite gneiss
- 5 — Granite gneiss, porphyritic in part; varies to banded gneiss and paragneiss; includes minor amounts of 2 and 6
- 4 — White to grey granite and pegmatitic granite
- 3 — Gneiss and schist derived primarily from sedimentary material, interlayered with white to grey granite and pegmatitic granite (4)
- 2 — Gneiss and schist derived from sedimentary (S) and volcanic (V) rocks, commonly with minor granitic material; in part derived from 1
- 1 — Andesite, dacite, rhyolite, and pyroclastic rocks, varying to greenstone and amphibolite; minor quartzite, conglomerate, greywacke, and quarts-magnetite iron-formation

Geological boundary (defined, approximate, gradational)

Bedding, tops known (inclined)

Gneissosity, schistosity (inclined, vertical, dip unknown)

Lineation (inclined, plunge known)

Trend lines (from air photographs)

Fault (approximate, assumed)

Anticline (trace of crest plane)

Syncline (trace of trough plane)

Mineral occurrence — x Cu

SYMBOLS FOR METALS OR MINERALS

Copper (stain) . . . . . Cu
Iron oxide (rusty zones) . . . . . Fe
Magnetite-rich sands . . . . . mag
Pyrite . . . . . py
Quartz-magnetite iron-formation . . . . . if

Geology by K.E. Eade, W.W. Heywood, and H.A. Lee, 1957

Trading post

Wireless station

Sand or mud

Marsh

Falls and rapids

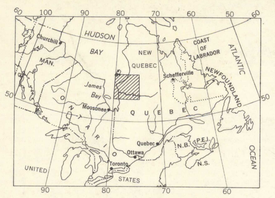
Height in feet above mean sea-level 550

Approximate magnetic declination, 21° 40' West

Cartography by the Geological Cartography Unit, 1957

Air photographs covering this area may be consulted at the Photographic Library, Topographical Survey, Ottawa, Ontario

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.



INDEX MAP

CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS
GEOLOGICAL SURVEY OF CANADA

MAP 23-1957

SAKAMI LAKE AREA

NEW QUEBEC

Scale: One Inch to Eight Miles = 1/506,880

8 4 0 8 16 24 Miles

Note: All islands in Hudson and James Bays lie within the District of Keewatin, N.W.T.

DESCRIPTIVE NOTES

This geological reconnaissance was made by helicopter during the field season of 1957, with some checking in key areas by ground parties. The centre of the map-area is approximately 270 miles northeast of Moosonee, Ontario, 330 miles northwest of Chibougamau, Quebec, and 400 miles west of Knob Lake, Quebec. Bush aircraft are available at all these places. Trading posts within the area are at Great Whale River on Hudson Bay, Fort George on James Bay, and an inland post, operated only during the winter, at Kanaaupscow. Ship transportation for supplies is available from Moosonee to the coastal posts during the summer.

Two main canoe routes traverse the area eastward from the coast; Fort George and Great Whale Rivers and their tributaries. Numerous rapids and falls on all rivers and streams make canoe travel within the area difficult.

Forest cover ranges from semi-barren lands in the northern part of the area to heavy coniferous forest in the southern part. Much of the forested area has been extensively burnt so that bedrock exposures are free of moss and lichen.

The Pleistocene geology of this area will be described in a separate report.

Previous geological studies were confined to coastal areas[1,3,5], certain river routes[2], and aerial reconnaissance[4] with some ground observations in the southwestern part of the area.

The volcanic rocks (1) are generally moderately to highly metamorphosed though in a few places appear to be relatively unchanged. Andesite is most abundant with lesser amounts of dacite and rhyolite. Fragmental types are relatively rare. The andesitic rocks are mainly light to dark green, fine-grained types that weather various shades of brown and green. They may be massive, schistose, or foliated, and some show pillow structures. The moderately metamorphosed types (greenstones) are generally strongly sheared but the amphibolites or highly metamorphosed types are more gneissoid. The associated sedimentary rocks are strongly sheared and include some garnetiferous schist. The iron-formation, interbedded with the volcanic rocks and consisting of fine- to medium-grained quartz and magnetite, was observed near Duncan Lake and 40 miles southeast of Great Whale River post.

Included with the gneiss and schist (2) are amphibolites probably derived from basic sills or dykes. In the gneiss and schist derived from sedimentary material are recognizable bands of quartzite, iron-formation, and rarely conglomerate.

Rocks of map-unit 3 are confined to the southeast quarter of the area. Gneiss and schist derived primarily from sedimentary material are estimated to be 60% to 75% of the whole, the remainder being white granite. The granite, being more resistant to erosion, outcrops prominently. Grey quartz-biotite-plagioclase schist, garnetiferous in part, grades to a gneissic rock of similar composition. The schist weathers brown whereas the gneissic types are grey and brown. In the eastern part of the area underlain by these rocks, gneiss predominates over schist and there is a gradation towards a homogeneous granite gneiss. The granite interlayered with the schist and gneiss ranges from medium- to coarse-grained granite and pegmatitic granite. Both biotite and hornblende may be present but the mafic content is relatively small. In the eastern area of these rocks the granite is normally grey, medium grained, and less abundant.

Two small bodies of granite (4) within the area of unit 3 appear to be segregations of the granite described above. In these the rock is massive and commonly medium grained, varying from white to pink.

The granite gneiss (5), grey to pink, may contain feldspar phenocrysts but this characteristic is so irregularly distributed that no separate map-units could be followed. Considerable variation exists within the unit from well-foliated granite gneiss to well-banded gneiss or paragneiss, granite gneiss being most abundant. It varies in composition from granite to granodiorite. Both hornblende and biotite may be present, with hornblende predominant in the granite gneiss and biotite in the banded gneiss and paragneiss. The latter type may also be garnetiferous. In a few places quartz rich bands are present in the paragneiss and these with some hornblende rich bands are similar to rocks of unit (2) and probably have the same origin. Mafic inclusions of all sizes, consisting of hornblende, plagioclase, and some biotite, are present throughout the granite gneiss, in places being particularly abundant. Minor amounts of massive granite (6) are included with the granite gneiss.

The granite gneiss (5) grades into the massive granite (6) so that the contacts outlined are arbitrary. The pink to grey, massive to poorly foliated granite to granodiorite (6), including minor amounts of related rocks, contain hornblende as the typical mafic mineral. Biotite may also be present and, in places up to 5% magnetite. The granite forms rounded, generally high, outcrops in contrast to the more elongate, blocky surfaced outcrops of granite gneiss (5) that may be high or low. Both granite (6) and granite gneiss (5) are apparently younger and in part derived from the sedimentary volcanic rocks of units 1, 2, and 3.

Within the map-area are one large area and a few small patches of pink to white quartzite (7). This appears to overlie granite gneiss (5) and volcanic rocks (1) unconformably, but for the most part is in small down-faulted blocks. The rock is fine to medium grained, well bedded to massive, and is estimated to be at least 900 feet thick. The beds dip at 35° or less except where disturbed by faulting. Well indurated quartzite predominates throughout the sequence, with a few poorly indurated sandstone beds in the upper part and some pebble conglomerate and conglomerate layers in the lower part. The well-rounded pebbles and boulders, from 1/4 inch to 6 inches in diameter, consist of granite, granite gneiss and white quarts but some boulders of red jasper, quarts-magnetite iron-formation and pebble conglomerate were observed. The matrix of the conglomerate bands is stained red by finely disseminated hematite. This same red staining is present in scattered quartzite beds throughout the sequence and along some joint fractures. The relationship of this unit to the Manitounuk group is unknown.

The Manitounuk group[3,5] occurs as a fringe along the Hudson Bay coast and adjoining islands. The arkose of the lower part (8), which is distinguished with difficulty from granite in hand specimens, occurs principally north of the east-trending fault cutting these rocks. Details of the sequence at several places are given elsewhere[3,5]. The beds dip westward at less than 20°. Primary structures such as crossbedding, ripple-marks, and mud-cracks are present. The rocks have undergone practically no metamorphism.

Fine- to medium-grained basic igneous rocks (9) overlie the sedimentary rocks (8). Near the lower fine-grained, chilled contact, scattered vesicules are present. This dark green rock, weathering brown, is resistant to erosion so that outcrops capped by it form prominent hills. Columnar jointing is a typical feature. Evidence is lacking to indicate whether there are extrusive lavas or intrusive sills. Minor isolated occurrences of 9, too small to show on the map, are included with unit 8.

Gabbro dykes (10) were found intruding all units except 7, 8 and 9. They are irregularly distributed, as few are present in the north half of the map-area. These dark green rocks with a brown weathered surface, vary from fine to medium grained, and some cases have a diabasic texture. They are all fresh as compared with the possible remnants of dykes in the granite (6) and granite gneiss (5). In width they vary from mere dykelets of a foot or less to dykes 170 feet across. They vary in trend but a pronounced majority trend north-northwesterly. Only small segments of dykes are indicated on the map but some at least appear to be continuous over 40 miles or more.

Folding is recognized in the granite gneiss of the central part of the map-area and the traces of crestal and trough planes of some major folds are shown. In addition to these major folds, numerous small folds are superimposed on the large folds. Though there is a general easterly trend to the folds there is a definite change in direction as indicated. Folding is in general open and, on a large scale, shows no evidence of overturning. There is some suggestion that the massive granite (6) is present most commonly along crests of major folds with granite gneiss (5) in the troughs. A distinctly different, northeast-trend of folding occurs in the southeast quarter of the map-area. To the south, in the area underlain by unit 3, the folding is more complex, with closed or isoclinal folds overturned southward. Crests or troughs of these folds could not be determined with the available information.

Faulting is prominent in one section of the southeastern part of the map-area where a number of faults are indicated and probably still more exist. Strong shearing and brecciation of the adjacent rocks characterize the faults. The relative movement on them is unknown but a vertical movement seems to predominate with a small horizontal shift. In the northern part of the area underlain by rocks of the Manitounuk group, at least one east-trending cross fault is present. Shearing and brecciation in some of the sedimentary rocks also indicates bedding plane faults.

Strong jointing, with resultant prominent lineaments, is present in the granite (6) and granite gneiss (5), particularly in the north half of the area. Field observations suggest little or no movement along such lineaments.

Quarts-magnetite iron-formation, occurring with volcanic rocks (1) near Duncan Lake and southeast of Great Whale River, is extensive and has some economic interest. The occurrences of iron-formation near Lac Grande-Pointe are smaller but due to higher grade metamorphism are commonly coarser grained. Iron-formation also occurs as inclusions from a few inches to a few tens of feet long in the gneiss (5).

On Fort George River, in the southeast quarter of the map-area, several localities are marked where considerable concentrations of magnetite sand are present. Thin beds of almost pure magnetite sand are concentrated along the present river shore but the extent and thickness of these beds were not determined. Further investigation might show other areas of concentration in some of the glacio-fluvial and marine sands.

Within the granite gneiss (5) area several small rusty weathering zones are marked where limonite is developed, usually along small sheara. Pyrite is present in some but commonly the rust is derived from magnetite or biotite. Just northeast of Duncan Lake, in the belt of volcanic rocks, is a prominent rusty weathered shear zone with pyrite and, in a few places, copper stain. In one other band of volcanic rocks, pyrite occurs along a small shear zone. Quarts veins are very small or lacking. The greenstone bands are potentially of most interest for further prospecting.

[1] Kranck, E. H.: On the Geology of the East Coast of Hudson Bay and James Bay; Acta Geographica, Helsinki, 11, No. 2, 1951.

[2] Low, A. P.: Report on Explorations in James Bay and Country East of Hudson Bay: Geol. Surv., Canada, Ann. Rept., vol. 3, pt. J, 1887.

[3] Low, A. P.: Exploration of the East Coast of Hudson Bay from Cape Wolstenholm to the South End of James Bay; Geol. Surv., Canada, Ann. Rept., n.s., vol. 13, Rept. D., 1900.

[4] Shaw, G.: Preliminary Map, Eastmain, Quebec; Geol. Surv., Canada, Paper 42-10.

[5] Young, G. A.: Iron Bearing Rocks of Belcher Islands, Hudson Bay; Geol. Surv., Canada, Sum. Rept. 1921, pt. E., p. 16E.

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MAP 23-1957
SAKAMI LAKE AREA
NEW QUEBEC