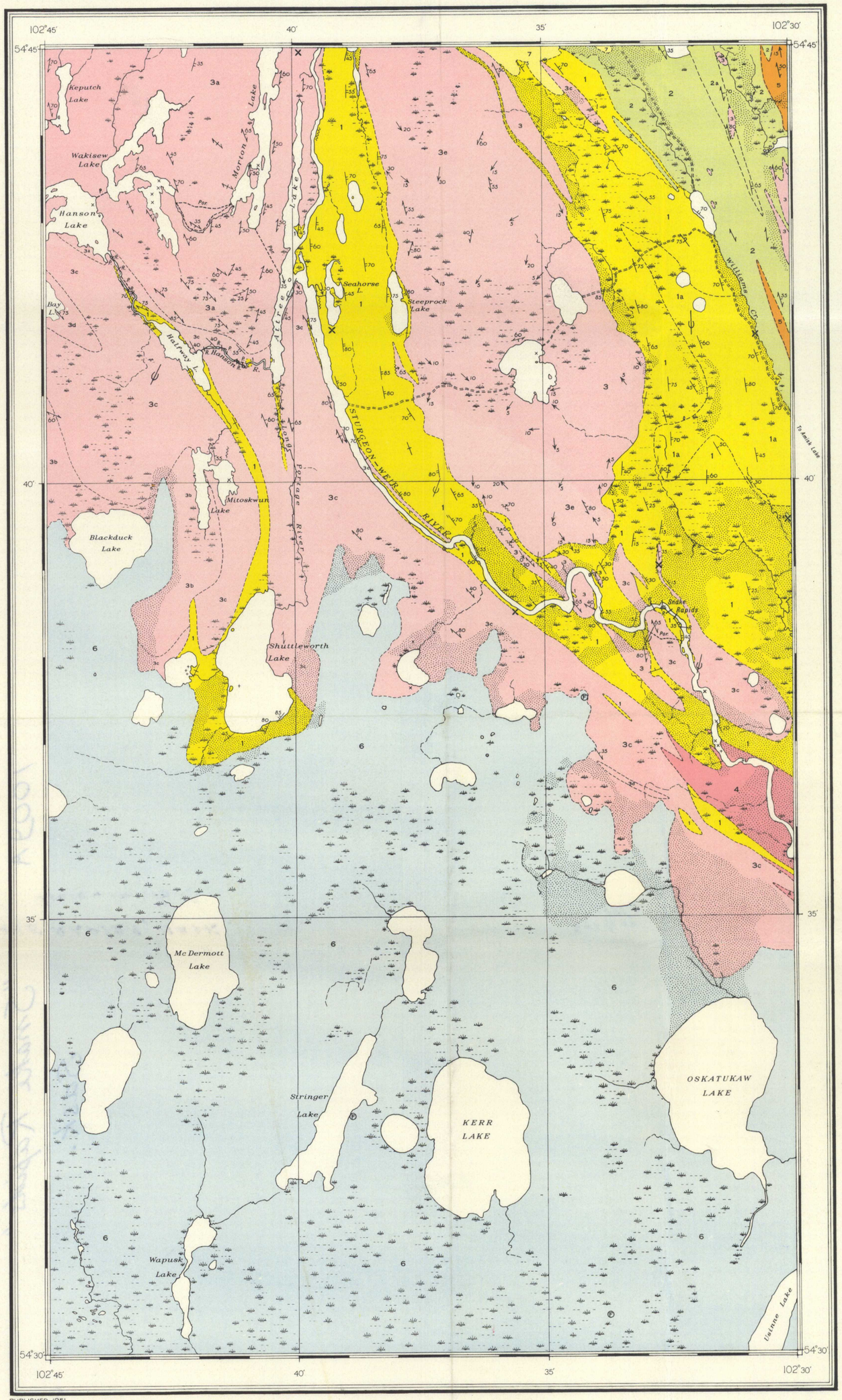
CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

GEOLOGICAL SERIES

SHEET 63 $\frac{L}{10}$ (East Half)



LEGEND

CENOZOIC (?)

QUATERNARY (?)

7 — *Sand*

PALÆOZOIC

6 — *Limestone; minor dolomite and sandstone*

ARCHÆAN OR PROTEROZOIC

5 — *Diorite, gabbro, hornblendite. Some bodies may be as old or older than 3*

4 — *Pegmatite and aplite*

3 — *Undifferentiated batholithic rocks, mainly massive granodiorite and quartz monzonite;* **3a**, *gneissic granite;* **3b**, *massive, pink granite;* **3c**, *mainly porphyritic and gneissic granodiorite and quartz monzonite;* **3d**, *diorite;* **3e**, *altered diorite and syenodiorite*

ARCHÆAN

AMISK GROUP (1,2)

2 — *Andesite and basalt; hornblende schist; related diorite dykes;* **2a**, *dacite, rhyolite*

1 — *Greywacke, slate, impure quartzite; biotite and garnet schist;* **1a**, *staurolite schist*

Thickly drift-covered area
Rock outcrop (in drift-covered or swampy area)
Bedding (inclined, vertical, overturned)
Bedding (direction of dip known, upper side of bed unknown)
Drag-fold (arrow indicates direction of plunge)
Schistosity, gneissosity, foliation (inclined, vertical, dip unknown)
Crystal lineation
Shear zone (dip known, dip unknown)
Glacial striæ
Fossil locality
Mineral prospect or occurrence
Rocky islet

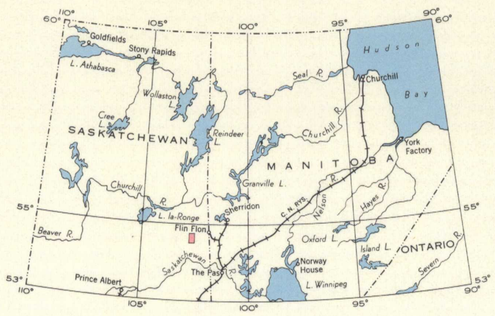
Geology by G.E.P. Eastwood, 1947, 1948

Cartography by the Geological Mapping Division, 1950

Winter road
Portage
Survey monument
Stream (intermittent)
Rapid
Marsh or swamp
Sand bar

Base-map compiled and drawn by the Surveys and Mapping Branch

Approximate magnetic declination, 17° 00' East



PUBLISHED, 1951

MAP 1009A

SNAKE RAPIDS

SASKATCHEWAN

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

Miles

1 ¾ ½ ¼ 0 1 2 3

DESCRIPTIVE NOTES

The map-area lies west of Flin Flon, across Amisk Lake. The central and northern parts may be reached by canoe from Denare Beach on this lake, and a canoe route also leads from Amisk Lake to the lake in the extreme southeast corner of the map-area. The remainder of the southwestern half of the area can be reached only on foot from Sturgeon-weir River or Stringer Lake, which is suitable for Norseman aircraft landings.

The continuous succession of Precambrian layered rocks encountered within the area is assigned to the Amisk group, a term proposed by Bruce for the volcanic rocks between Amisk Lake and Flin Flon, which he considered the oldest rocks in the region.

The older, predominantly sedimentary, part of the group (1) underlies a large part of the area east of Sturgeon-weir River, and narrow bands of these strata are included in the batholithic rocks between the river and the west border. The exposed thickness is at least 10,000 feet.

The sedimentary rocks consist mainly of greywacke, with some slate facies near Snake Rapids and some impure quartzite to the north and northeast. Biotite occurs everywhere in these rocks, with garnet along most intrusive contacts and scattered irregularly through the sedimentary beds. Staurolite-bearing strata(1a) are confined to the northeast part of the area, and may be a result of different original composition rather than of special metamorphic conditions. The rocks are mostly thick bedded to massive, but thin beds appear near Seahorse Lake. Crossbedding is sparsely developed in the upper part of the sedimentary unit. The contact with the overlying volcanic rocks is gradational, and transitional types are probably metamorphosed tuffs.

The predominantly volcanic assemblage (2) overlies the sedimentary unit in the northeast part of the area. It consists principally of flows, with a few small lenses of intercalated tuff and sediment, and several small, unmapped, diorite dykes. The flows consist chiefly of metamorphosed andesite, but include a rhyolite-dacite band (2a). Pillows, flow contacts, and primary flow structures are rarely recognizable. Schistosity is commonly well developed, and locally the rock passes to a hornblende schist.

The dominant structural feature of the map-area is believed to be an anticline, the axis of which extended northerly across Hanson River, about half a mile above its mouth, through an area now occupied mainly by granitic rocks. The east limb flattens slightly east of Snake Rapids, but the concomitant synclinal axis lies somewhere east of the area. Any minor folds of the west limb have been obliterated by igneous invasion.

The igneous complex (3, 4) that resulted from the principal epoch of intrusion comprises several bodies, ranging in size from the large batholith west of the Sturgeon-weir, which extends for unknown distances north and south of the area, to stringers a fraction of an inch wide injected along bedding planes in the Amisk sedimentary rocks. In addition to the main batholith, several smaller intrusive bodies were mapped that appear to be parts of this complex. The largest of these (3e) extends from near Snake Rapids to beyond Scoop Rapids, north of the area.

That part of the main batholith exposed within the map-area includes four intergrading structural-lithological facies. The northern part is gneissic granite (3a), light pink in colour, medium grained, and containing many concordant sedimentary inclusions and aplite-pegmatite injections. Massive, coarse-grained, pink granite (3b) is exposed around Blackduck Lake; it contains neither inclusions nor injections. Porphyritic to sub-porphyritic, gneissic granodiorite and quartz monzonite (3c) constitute the eastern part of the batholith south and southeast of Hanson River, but grade to equigranular, massive granodiorite along the west border of the area. This westward decrease in foliation is accompanied by a gradual disappearance of sedimentary inclusions and aplite-pegmatite injections, and decrease in percentage of biotite together with a corresponding increase in percentage of hornblende. Quartz and orthoclase are lacking in some small patches of the batholith, which are, therefore, mapped as diorite (3d).

The plutonic mass (3e) that extends from near Snake Rapids northward beyond the map-area differs from other intrusive bodies of the region in several respects, and appears to be peculiar to the Snake Rapids area. The exposed part is pyroxene diorite and syenodiorite, hydrothermally altered in small, irregular patches. The rock is medium to coarse grained and porphyritic, mostly massive, but locally gneissic in the north. Sedimentary inclusions are rare. Small dykes of aplite and pegmatite are abundant, but do not appear to be directly associated with alteration patches. In these patches biotite is replaced by chlorite, and plagioclase by sericite and allophane. The altered feldspar is commonly reddish from minute, disseminated flakes of iron oxide, giving a distinctive colour to the rock. The plagioclase in many of the aplite and pegmatite bodies is similarly altered.

The smaller intrusions of the batholithic complex that were mapped are, with one exception (4), quartz monzonite and granodiorite in composition, and range from sub-porphyritic and gneissic to equigranular and massive. They contain few inclusions or injections.

Dykes of pink to reddish aplite and pegmatite are abundant in the plutonic body (3e) north of Snake Rapids, but do not invade the rocks farther east. Dykes of aplite and concordant sheets of pegmatite are likewise abundant in the gneissic granite (3a), in the gneissic granodiorite (3c) up to 2 miles west and southwest of Sturgeon-weir River, and in the belt of sedimentary rocks immediately east of the river. A few sheets and dykes of pegmatite attain widths of 200 feet, but most of them are less than 10 feet wide. Several sheets coalesce on either side of Sturgeon-weir River at the east border of the area to form a fairly large body of intimately associated pegmatite and aplite (4), which extends southeast beyond Spruce Rapids.

The only evidence of faulting in the area occurs within, or in association with, this igneous complex. Granite, granodiorite, and sedimentary rocks have been sheared and even drag-folded at several places along the upper part of Sturgeon-weir River, with indications that the east side has moved relatively down and to the north. Aplite stringers have been displaced a matter of inches along innumerable small, high-angle faults.

The massive facies of the igneous complex seem to have been emplaced by thrusting aside and assimilation, whereas the gneissic types are the result of extensive *lit-par-lit* injection of acidic material, with some assimilation and contemporaneous regional deformation. After consolidation of the larger masses, the regional stress became concentrated along the present general line of the Sturgeon-weir, resulting in faulting or intense shearing. Channelways were thus opened for aplitic and pegmatitic residuals.

Small bodies (5) of diorite, hornblendite, and gabbro, probably of widely different ages, are scattered through the northern part of the map-area. Many of the small dykes in the Amisk volcanic rocks (2) may represent flow feeders, but the intrusion in the northeast corner of the area appears to be distinctly younger. Some small, irregular, unmapped bodies around Morton Lake may be segregations from the batholithic complex, but others are at least as young as the pegmatite sheets. The small diorite dyke near Blackduck Lake exhibits good chilled contacts. Largely on structural grounds, these intrusions are regarded tentatively as younger than those of the main igneous complex (3, 4).

Palæozoic strata (6), mainly limestone, cover the southwestern half of the map-area, separated from the Precambrian part by a low, irregular, rubble-strewn escarpment that faces north or northeast. The basal member of pure quartz sand outcrops only near Hanson Lake to the west of the map-area. It is overlain by about 10 feet of dolomitic sandstone and a continuous succession of rather pure limestone, thin bedded to massive. The strata are almost horizontal.

Calcareous fossils are sparsely distributed, and do not weather out on bedding surfaces. According to Alice E. Wilson of the Geological Survey of Canada, the few identifiable forms that were obtained, just above the dolomitic sandstone, suggest an early Silurian age, and indicate that not all the Palæozoic rocks of the map-area may be of Ordovician age, as heretofore assumed.

The map-area was covered by the continental ice-sheet, the northeast half being stripped clean of weathered mantle and any remnants of Palæozoic or younger rocks. A few boulder trains have been carried southwest onto the Palæozoic limestone. However, erratics are not common in the area, and glacial till was observed only northeast of Blackduck Lake.

The extensive clays of the east-central part of the area appear to represent glacio-lacustrine deposits, possibly of a northwestward extension of glacial Lake Agassiz. The fine-grained, rather pure sand (7) along part of the north border is probably a shore deposit of this lake, but may be a remnant of the Palæozoic basal sand member.

Metallic minerals are sparsely distributed throughout the area. All but the most acidic of the plutonic rocks contain small amounts of magmatic ilmenite, magnetite, and pyrite. These minerals are also distributed in places through the layered rocks.

Pyrrhotite is sparsely distributed in the basic intrusions in the northeast corner of the area. On Hanson Lake, west of the map-area, it is nickeliferous.

Pyrite is disseminated through the slates around the south end of Seahorse Lake, and forms a massive body of sulphide in a small shear at the southwest corner, trenched many years ago. Polished section examination disclosed only pyrite, and an assay by the Bureau of Mines, Ottawa, yielded only traces of gold and silver.

Arsenopyrite is sparsely scattered along most Precambrian geological contacts, and these might well be prospected more closely. It was noted especially in a small unmapped hornblendite body on the north border of the map-area east of Morton Lake, in the Amisk sedimentary rocks near their contact with the lavas, and in the tongue of Amisk volcanic rocks on the east border of the area, northeast of Snake Rapids. Assays from the Morton Lake body and the volcanic tongue, however, showed only traces of silver and no gold.

Specks of chalcopyrite occur in quartz veins in sheared granodiorite north of Snake Rapids, and in similar veins in slate 2 miles west of these rapids. A little trenching was done at the latter place many years ago. Crystals of pyrite and galena are scattered through the Palæozoic dolomitic sandstone.

The pure quartz sands at the base of the Palæozoic section and along the north border of the map-area may become useful as acid fluxes if mining develops in the area. Because of the distance from sizable markets, present exploitation of other industrial minerals does not appear feasible.

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