CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES, FORESTS AND SCIENTIFIC SERVICES BRANCH

GEOLOGICAL SURVEY OF CANADA

PAPER 49-18

Preliminary Map

SNAKE RAPIDS

SASKATCHEWAN

(Map and Descriptive Notes)

By

G. E. P. Eastwood

OTTAWA

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DESCRIPTIVE NOTES FOR SNAKE RAPIDS MAP, SASKATCHEWAN

Introduction

Snake Rapids 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 southeast corner of the area. The remainder of the southwestern half of the area can be reached only on foot from Sturgeon-weir River or Landing Lake, which is suitable for Norseman aircraft landings.

Mapping was extended west of the area to Hanson Lake, in order to examine the sedimentary formations and basic intrusive rocks exposed there.

Amisk Group

The continuous succession of Precambrian surficial 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)

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1 Figures in parentheses are those of map-unit numbers in map-legend

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underlies a large part of the area east of the Sturgeon-weir, and patches and bands are included in the batholithic rocks between the river and Hanson Lake. Apparently the strata also underlie much of the eastern half of this lake. Their 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. Both agglomerate and conglomerate occur on the islands in the north part of Hanson Lake. Biotite was seen everywhere in these rocks, with garnet along most intrusive contacts and scattered 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 were observed near Seahorse Lake. Crossbedding is sparsely developed in the upper part of the sedimentary succession. The contact with the overlying volcanic rocks (2) is gradational in the northeast corner of the area, and the transitional types are probably metamorphosed tuffs. On Hanson Lake, however, dacite can be seen interbedded with agglomeratic greywacke near the contact.

The sedimentary formations are overlain by a predominantly volcanic assemblage (2) in the northeastern part of the area and on Hanson Lake. Flows appear to constitute the bulk of these rocks, with a few small lenses of intercalated tuff and sediment, and several diorite dykes too small to show on the map.

The flows in the northeast corner of the area consist chiefly of metamorphosed andesite, but include a rhyolite-dacite band (2a). On Hanson Lake, rhyolite and dacite (2b), both containing abundant quartz 'eyes', predominate, although a few andesite flows and tuff lenses were seen.

The 'eyes' comprise both small, clear quartz crystals and large, opalescent crystal aggregates. Both types occur together in places.

Pillows, flow contacts, and primary flow structures are rarely recognizable. Schistosity is commonly well-developed, and locally in the northeast corner of the area the rock passes into a hornblende schist.

The chief, and possibly the only, fold within the map-area is the anticline whose axis passes under the first portage on Hanson River. The east limb flattens slightly east of Snake Rapids, but the synclinal axis lies somewhere east of the area. Any minor folding of the west limb between Hanson Lake and the lake on Hanson River has been obliterated by igneous invasion. However, sparse top determinations indicate that at least one syncline and anticline pass through Hanson Lake.

Igneous Complex

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 map-area, to stringers a fraction of an inch wide injected along bedding planes in the Amisk sedimentary rocks. In addition to the batholith, fourteen smaller bodies were mapped that appear to form parts of this complex. The largest of these, the Snake Rapids pluton, extends from near Snake Rapids to beyond Scoop Rapids, north of the area.

An equigranular quartz monzonite or granodiorite (3) appears to be the principal lithologic type, but four others can be distinguished in the field. A diorite facies (3b) underlies Bulldog Lake, and other smaller units are present here and there within the gneissic, porphyritic, granodiorite facies (3c) of the batholith. A granite facies (3d) underlies the northwest corner of the area and a small section around Wave Western Lake. Most of the smaller bodies consist of equigranular or porphyritic quartz monzonite; the largest, Snake Rapids pluton, was, however, intruded principally as a pyroxene diorite (3a), with small gabbro and syenodiorite facies. It was subsequently much modified by hydrothermal solutions accompanying pegmatitic and aplitic injection.

Pegmatite and aplite (4) are abundant near Sturgeon-weir River, as concordant sheets in the gneissic granite and granodiorite and sedimentary rock, and as irregular dykes in the more massive intrusion near Snake Rapids. None exceeds 200 feet in width, and few are more than 10 feet wide. Along the lower part of the river, however, several concordant sheets apparently coalesce to form a relatively large, massive body. Quartz, albite, and potash feldspar are the predominant constituents.

The equigranular quartz monzonite and granodiorite facies are usually massive, but are gneissic in some of the smaller bodies. The dioritic rocks are fairly massive, and contain few sedimentary inclusions, although the large body near Snake Rapids becomes gneissic in the north. The porphyritic facies (3c) is strongly gneissic west of Sturgeon-weir River, with numerous sedimentary inclusions and aplite-pegmatite injections, but is relatively massive in some of the smaller bodies. The granite around Wave Western Lake contains no sedimentary inclusions or pegmatite, but the reverse is true of the granite north of Hanson River. The smaller intrusive bodies contain few inclusions or pegmatite dykes, and appear to be merely large injections. The large dioritic intrusion near Snake Rapids engulfed some sedimentary rock in its advance, but

was emplaced mainly by thrusting aside the overlying rock, as indicated by the structural trends in the enclosing sedimentary strata and the steepening of dips at the contact.

The only definite evidence of faulting in the map-area was encountered at one place along the north border. However, granite and sedimentary rock are strongly sheared at several places along the upper Sturgeon-weir, although pegmatite sheets and dykes are nowhere disturbed. The smooth, curving contact between the batholith and sedimentary rocks southwest of the lower part of Sturgeon-weir River is likewise suggestive of a fault. Drag-folding at one place indicates that, if such a fault exists, the movement of the east block was down and to the north. Aplite stringers have been displaced a matter of inches along innumerable small high-angle faults near the river, and for some distance west.

The massive facies of the igneous complex seem to be somewhat basic, and to have been emplaced by thrusting aside and assimilation, whereas the gneissic types may be explained by wholesale lit-par-lit injection of acidic material, with some assimilation and contemporaneous regional deformation. After consolidation of the major bodies the regional stress became concentrated along the present general line of the Sturgeon-weir, resulting in faulting or intense shearing. Channelways were thus opened up for aplitic and pegmatitic residuals.

Basic Intrusions (5)

Small bodies of diorite, hornblendite, and gabbro, probably of widely different ages, are scattered through the northern part of the 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 Totem Lake may be segregations, but others are at least as young as the pegmatite sheets. The small diorite dyke near Wave Western 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).

Palaeozoic Rocks (6)

Palaeozoic limestone covers the southwestern half of the area, separated from the Precambrian part by a low, irregular, rubble-strewn escarpment, which faces generally north or northeast. The basal member of pure quartz sand outcrops only near Hanson Lake. 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 Palaeozoic rocks of the map-area are of Ordovician age as heretofore assumed.

Pleistocene and Recent

The map-area was covered by the continental ice-sheet, the northeast half being stripped clean of weathered mantle and any remnants of Palaeozoic and Mesozoic rocks. A few boulder trains have been carried southwest onto the Palaeozoic limestone. However, erratics are not common in the area, and glacial till is present only northeast of Wave Western 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 Palaeozoic basal sand member, incompletely eroded by the glacier and its outwash.

Economic Geology

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 surficial rocks.

Pyrrhotite occurs in appreciable amounts in two larger basic intrusions (5), and in the one at Hanson Lake it is nickoliferous and is associated with chalcopyrite. As a whole, the body does not constitute ore, but it seems to be somewhat richer along minor shears. Forty-five claims staked by the International Nickel Company of Canada, in August 1948, cover the whole intrusion.

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 hornblendite body on the north border of the map-area east of Totem Lake, in the flows near the contact with a granite band in the northeast corner, and in the tongue of Amisk volcanic rocks on the east border. Assays from the Totem 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 east 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 Palaeozoic dolomitic sandstone.

The pure quartz sands at the base of the Palaeozoic 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 sizeable markets, present exploitation of other industrial minerals does not appear feasible.