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DEPARTMENT OF ENERGY AND MINES
MINERAL RESOURCES DIVISION

OPEN FILE REPORT
OF81-3

THE LOWER CHURCHILL RIVER PROJECT
(INTERIM REPORT)

by
P.G. Lenton and M.T. Corkery

1981

Funding for this program was provided under the Canada/Manitoba Northlands Agreement, Mineral Initiatives, by the Manitoba Department of Energy and Mines and Canada Department of Regional Economic Expansion

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Winnipeg, 1981

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Introduction

The Lower Churchill River Project is a regional geologic mapping program jointly funded by Federal and Provincial agencies under the Canada/Manitoba Northlands Agreement. The terms of the agreement were for two years of mapping to be undertaken in the eastern part of the Churchill Geologic Province of Manitoba. Mapping at a scale of 1:100 000 was done in NTS areas 64H and 54E west half in the 1979 season and 64A and 64B east half in the 1980 season (Fig. 1). Summary reports (Corkery and Lenton, 1979 and 1980) and preliminary maps (1979M-1 to 1979M-3 and 1980M-1 to 1980M-7) were issued after each field season.

Bedrock exposures were erratic in distribution. West of a line from Gauer Lake to Harding Lake outcrop is abundant. East of this line the Burntwood-Settee Moraines form a broad north-trending belt, extending east as far as Campbell Lake and extending north to the Etawney Moraine. East of the moraines the amount of exposure is quite low, mainly occurring on lakes and rivers. In the northern half of the area the majority of the exposures located are on the Churchill and Little Beaver Rivers and riverine lake systems.

General Geology

The majority of the project area lies within the Churchill Province. The exception is the segment in the southeast corner from the Odei River to Assean Lake that is of Kenoran age Superior Province rock. The Churchill segment is Aphebian age. As part of the project four Rb/Sr whole rock isochrons were determined for Churchill Province rocks by G.S. Clark of the University of Manitoba. Clark (1981) determined these ages using a decay constant of $1.42 \times 10^{-11}\ yr^{-1}$. The individual isochrons will be listed with the descriptions of the lithologic belts in which the units occur.

The Churchill segment of the area can be subdivided into six major east-west-trending lithologic belts. These belts, shown in Figure 2, comprise three major plutonic belts that separate three domains dominated by or containing significant amounts of supracrustal rocks. The two northern plutonic complexes, the Chipewyan and Baldock batholiths are compositionally and texturally similar and may represent the same intrusive event. They may, in fact, merge into one body to the east of the project area. The two northern batholiths are distinctly different from the Livingston Plutonic Belt. Similarly, the Partridge Breast-Northern Indian and Campbell - Waskaiowaka supracrustal belts share similar lithologies and stratigraphies that are distinctly different from the Kisseynew belt. Each belt will be described briefly as to the type and diversity of lithologies present without attempting to describe individual units in detail.

Chipewyan Batholith

This region of approximately 14,000 square kilometres represents the southern portion of an intrusive complex that extends across northern Manitoba and into Saskatchewan (where it is called the Wathaman batholith). It is a complex intrusive terrain comprising at least four phases; the two major phases differentiated on the map as units 18 and 18a. The two minor phases do not form mappable bodies but are present in most exposures of both major phases.

The most abundant rock type is a mottled pink and white magnetiferous granite characterized by variable proportions of large microcline megacrysts. The quartz content averages 30 per cent. This unit is very similar in texture and composition to the Baldock batholith. The second major phase in the Chipewyan batholith is a pink megacrystic syenite or quartz syenite.

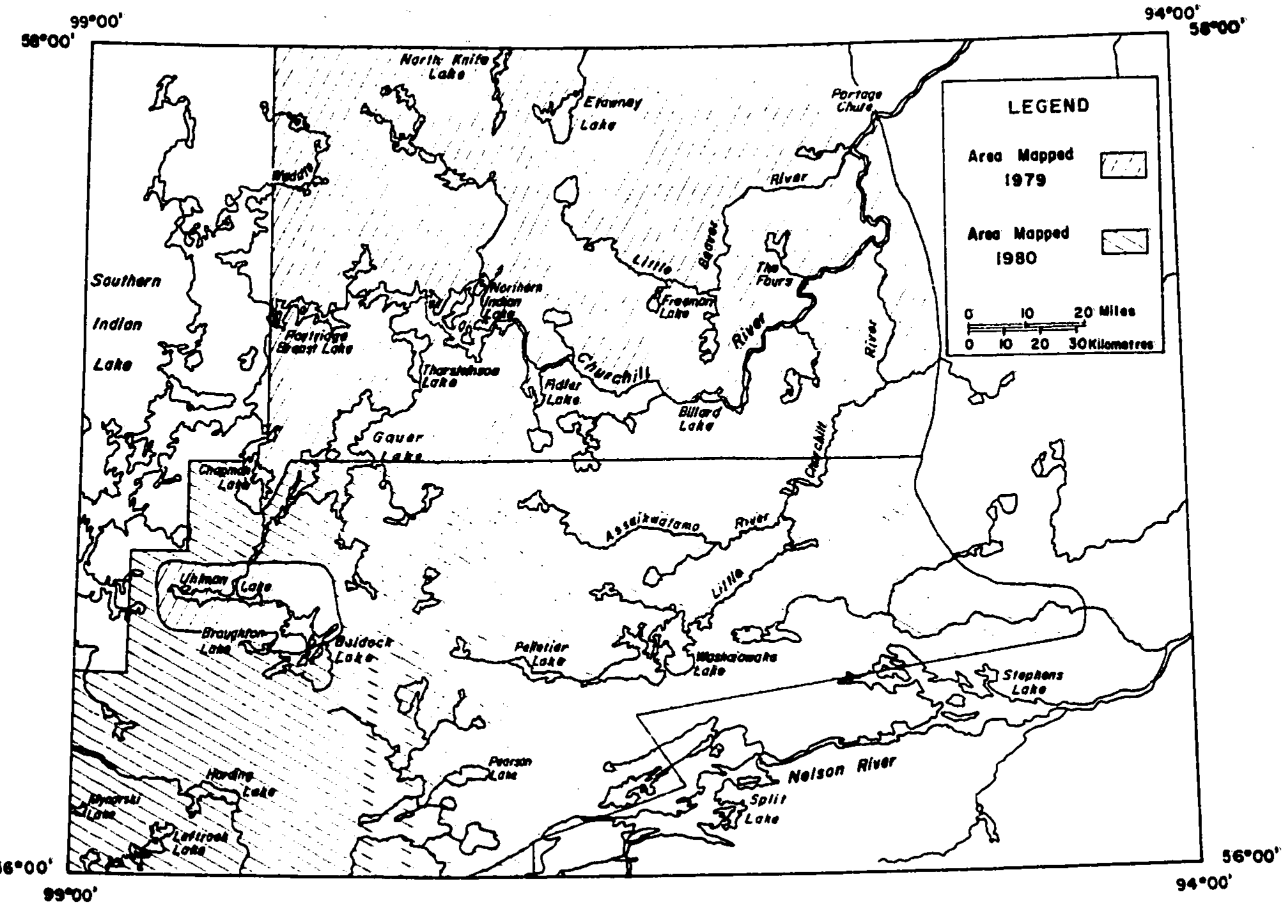

Figure 1. Index map to the location of the Lower Churchill River Project.

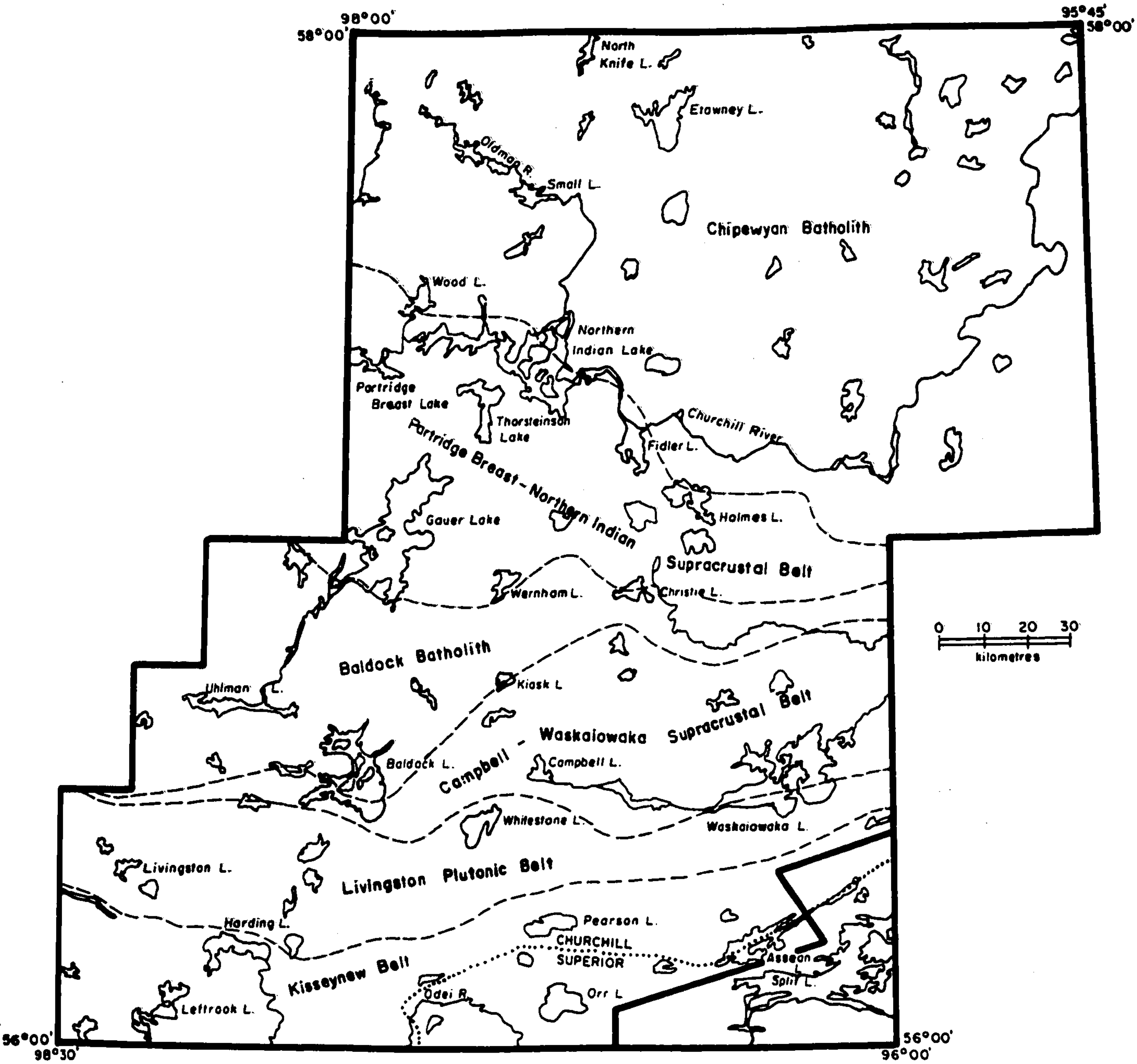

Figure 2. Subdivision of the Lower Churchill River Project area into the principal lithologic belts.

The appearance and texture of the syenite is very similar to the megacrystic granite. The principal differences are syenite has a lower quartz content (5 to 15%), a higher magnetite content (total iron in analyses is double that of the granite phase) and rare traces of fluorite (fluorine content is 2 to 3 times the content of the granites). The higher magnetite content of the syenite make it possible to roughly delineate the contacts on aeromagnetic maps. The contact between the syenite and the granite was not observed in outcrop so the relative age of the two phases is uncertain.

The two minor phases in the batholith are non-megacrystic homogeneous equigranular granites that intrude the granites and syenites of the two main phases as dykes and sills. These phases occur throughout the batholith in amounts ranging from 5 to 30 per cent of the exposed rocks. The most common occurrence is of a pink to red fine grained granite to syenogranite that intrudes the main phases as a series of parallel sills producing a sheeted complex. The fine grained granite less commonly comprises entire outcrops containing inclusions of the megacrystic phases. The second minor phase is a grey to buff coloured granite or granodiorite that occurs as randomly oriented dykes. It rarely forms discrete bodies more than a few metres in width. Both phases are younger than the megacrystic phases which occur as inclusions in the fine grained phases.

In addition to the major units encountered on North Knife Lake there are regions of inclusion screens of supracrustal rocks. These dominantly comprise amphibolites and layered hornblende rich gneisses. This region lies at the eastern end of a belt characterized by a generally low aeromagnetic signature with locally developed magnetic highs. The belt extends from North Knife Lake east through the northern half of 64H/11, and may correspond to an as yet undetermined change in the composition of the Chipewyan Batholith.

Extreme aeromagnetic highs with reliefs of 5000 to 7000 gammas above the surrounding background occur north of Etawney Lake (64H/15), east of Buckland Lake (64H/10) and north of Freeman Lake (64H/8). The magnetic signature is a "bullseye" or multi-centered bullseye of 2 to 5 km diameter. Bedrock exposures do not occur in their vicinity so they cannot be correlated with a specific lithologic unit. Proton precession ground magnetometer surveys (Fig. 3) comprising two parallel lines (400 feet apart, readings at 25 foot intervals) run in an ENE direction from the northeast shore of Abigail Lake (north of Etawney) indicating a layered complex as the anomalous rock. The circular shape of the aeromagnetic anomaly suggests a ring structure.

A preliminary Rb/Sr age for the megacrystic granite of the Chipewyan batholith of 1760 Ma (initial ratio = 0.7038) was determined by Clark (1981). A second isochron giving an age of 1740 Ma (initial ratio = 0.7013) was determined by Clark for the Thorsteinson granite. This is a discrete intrusion of megacrystic granite similar to the Chipewyan batholith (and the Baldock batholith) that occurs south of the main Chipewyan belt in the Partridge Breast-Northern Indian supracrustal belt. The ages would indicate the two bodies are related although Clark noted there are significant differences in the Rb/Sr systematics for the two bodies. He states that "the Thorsteinson granite has a lower initial $^{87}Sr/^{86}Sr$ ratio and a much higher Rb/Sr ratio (the Rb/Sr ratio for the Thorsteinson granite ranges up to about 20, whereas that of the other batholiths is about 4 and 1, for the Chipewyan and Baldock, respectively). The most significant difference between the two intrusions is that the Thorsteinson granite is a homogeneous intrusive with only one phase present.

Isotopic age determinations (Moore, et al, 1960) reported in Kretz (1967), indicate an

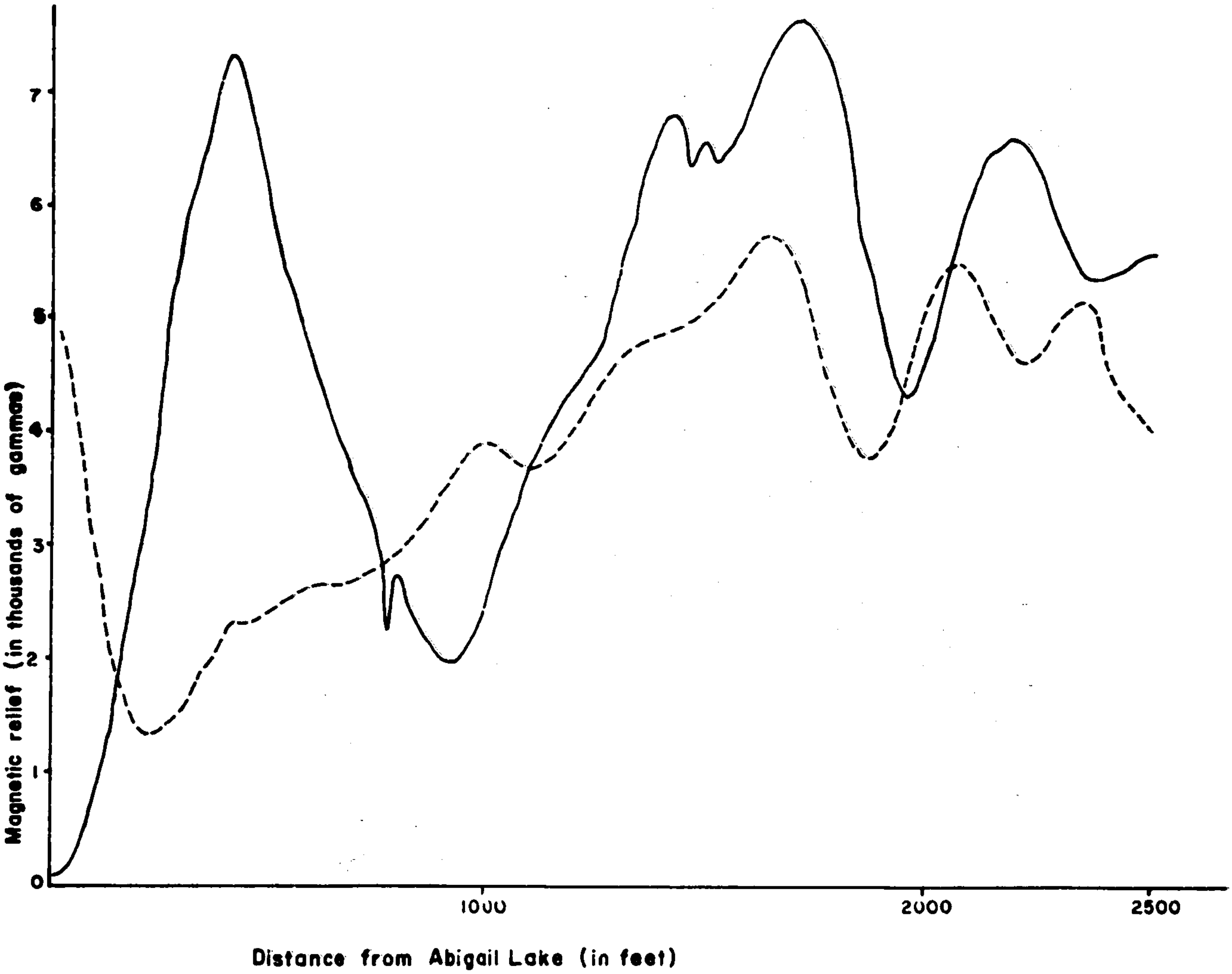

Figure 3. Results of a proton precession magnetometer survey with readings at 25 foot intervals. The solid and dashed traces represent two traverses 400 feet apart run northeast from the northeast corner of Abigail Lake.

age of 1800 Ma for a phase of the Chipewyan Batholith in the central Northern Indian Lake area and a 1740 Ma for the Thorsteinson granite.

Partridge Breast - Northern Indian Supracrustal Belt

This belt, while it is dominantly composed of granodiorite to tonalite intrusives, is characterized by regions of supracrustal rocks or abundant inclusions of supracrustal rocks in the intrusives. The variety of intrusive units present in the belt is much greater than in the large batholiths. The range spans compositions from granite to diorite and gabbro. The most common intrusive is a coarse grained, grey gneissic granodiorite to tonalite. This predates the intrusion of the Chipewyan and Baldock batholiths, occurring as inclusions in both. The granodiorite is intruded by diorite, quartz diorite, diorite to tonalite intrusion breccia, schlieric leucogranite (probably an anatectic derivative), massive grey homogeneous granite, several ages of pegmatite and at least two ages of mafic dykes.

The supracrustal rocks represent the eastward continuation of the Southern Indian Lake metasedimentary gneiss belt (McRitchie, 1977). Within the belt three distant lithologic suites have been identified. Cranstone (1972) used a two-fold subdivision in which he refers to "Wasekwan-type" and "Sickle-type" units. The lithologic suite called Wasekwan is not correlative with the type location of Wasekwan and physical correlation of the units called Sickle-type with the Sickle Group has not been established therefore the following informal terminology is suggested:

a) The term Arkosic Suite is to be used for the "Sickle-type" rocks until such time as a correlation is established. This comprises polymictic metaconglomerate, meta-arkose and feldspathic metagreywacke. These magnetiferous or hematitic metasedimentary rocks are the youngest units in the sedimentary gneiss section.

b) The Partridge Breast Suite comprises a mixed section of metavolcanic and metasedimentary rocks. Sillimanite-muscovite-rich metagreywacke is the predominant rock type with interlayers of metabasalt, meta-andesite, hornblende-rich metasedimentary rocks and oligomictic and polymictic metaconglomerates.

c) The Long Point Suite comprises a section of garnetiferous graphite-bearing metagreywacke. It is distinctly different from the metagreywacke of the Partridge Breast Suite which has less garnet, is not graphitic and commonly contains magnetite. Metavolcanic interlayers are absent in the section mapped along the western shore of Partridge Breast Lake.

The terminology defined above is intended as an interim classification and may be redefined or eliminated in subsequent reports.

The region of Partridge Breast Lake to Gauer Lake is dominantly supracrustal rocks of the Partridge Breast Suite. The structure of this part of the belt is uncertain. Metamorphic grade and intensity of deformation decrease toward the centre of the region. The stratigraphic sequence is not symmetrical across this zone but may be more homoclinal with greywacke predominant in the north and volcanic rocks and conglomerate to the south. Figure 4 is a composite stratigraphic column based on the rock exposures on Partridge Breast Lake. The lowest unit shown is Long Point Suite metagreywacke and the highest unit the base of the Arkosic Suite. Only the basal portion of the Arkosic Suite is observed, consisting of conglomeratic rocks with minor units of felsic arkosic gneiss and metagreywacke. The supracrustal sequence of the Partridge Breast Suite is dominated by the sillimanite rich metagreywackes with metavolcanics

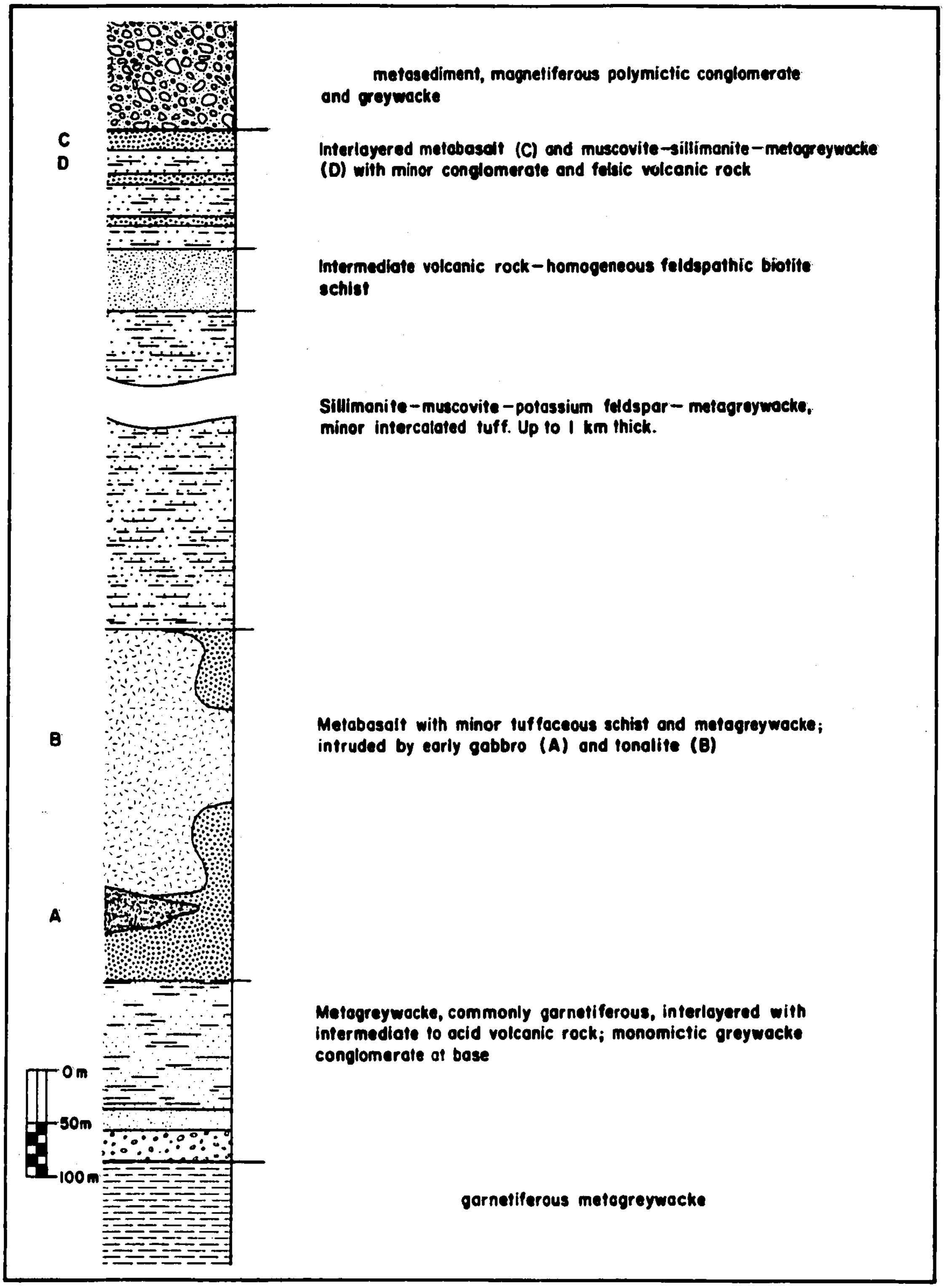

Figure 4. Composite stratigraphic column for the sedimentary-volcanic sequence exposed on Partridge Breast Lake.

at the base and top of the sequence. These metavolcanics include basaltic rocks represented by hornblende and/or plagioclase phyric basalts, rare occurrences of pillowed basalts and some probable breccias, and felsic volcanics most of which are interpreted as tuffs and flows. In the area between Partridge Breast Lake and the Gauer Lake, outcrops on numerous small lakes indicate a similar sequence to that observed on Partridge Breast Lake, however the volcanics increase in abundance and only rarely are the sillimanite greywackes observed. To the east on Northern Indian Lake the conglomerate is absent and the Arkosic Suite comprises hornblende and biotite-rich psammitic and semi-pelitic gneisses. The metavolcanic rocks of the Partridge Breast Suite decrease in abundance to the east; the last observed exposure is located at the eastern end of Northern Indian Lake. East of Fidler Lake the supracrustal rocks occur as inclusion screens in the gneissic granodiorite.

A Rb/Sr age of 1870 Ma (initial ratio = 0.7075) was determined by Clark (1981) using pelitic and psammitic gneisses of the Partridge Breast Suite. All the samples for this isochron were collected along the south shore of Partridge Breast Lake.

Baldock Batholith

This large intrusive complex has similar composition and texture, and is probably genetically related to the Chipewyan batholith and the Thorsteinson granite. The Baldock batholith has only one major phase, a pink magnetiferous megacrystic granite. Compositional variation is restricted to small fluctuations in the amount and kind of mafic minerals (hornblende and/or biotite) and the number and size of microcline megacrysts. Areas of the batholith that contain inclusions of supracrustal rocks or older intrusive rocks are restricted and generally have sharp boundaries. Most of the belt comprises homogeneous granite without inclusions. The only intrusive rock that cuts the granite consists of small bodies of felsic pegmatite which are probably synchronous with the last stages of the generation of the batholith.

The Rb/Sr age determined by Clark for the Baldock batholith is 1747 Ma (initial ratio = 0.7028). This age is comparable to the Chipewyan and Thorsteinson bodies suggesting all three are synchronous and may be cogenetic--although there are chemical differences between the three bodies.

Campbell - Waskaiowaka Supracrustal Belt

This belt is similar in structure and lithology to the Partridge Breast - Northern Indian belt. The belt largely comprises intrusive rocks of various ages and compositions ranging from granite to diorite. Zones of supracrustal rocks are present throughout the belt as discrete areas of gneisses, regions of diatexites and schlieric gneisses or as raft complexes in intrusive bodies. The abundance and degree of preservation of the supracrustal rocks decreases to the east. There is a corresponding decrease in the abundance of metavolcanic rocks. The western end of the belt comprises a series of ridges of metabasalt and mafic hornblende-rich metasediments that mark the eastern extension of the Rusty Lake greenstone belt. Arkosic gneisses increase in abundance from Baldock Lake to Campbell Lake. Massive amphibolites of probable volcanic origin crop out on Campbell Lake but were only rarely encountered east of that location. Between Campbell Lake and Waskaiowaka Lake there is a belt of diatectic gneiss derived from mafic gneisses and metagreywacke similar to the Partridge Breast Suite.

Intrusive units change from granodiorite to granite with small bodies of quartz diorite at the western end of the belt to predominantly tonalite and schlieric leucogranite in the east.

The leucogranite is interpreted as an anatectic derivative that contains numerous schlieren and inclusions of many rock types, both supracrustal and older intrusives. The older gneissic tonalites are of similar composition and texture to the tonalites on the south end of Gauer Lake.

Livingston Plutonic Belt

This belt is the most complex of the three intrusive belts. Compositions range from massive and gneissic granodiorite and granite with subordinate quartz diorite in the western region to tonalite, leucogranite and megacrystic granite to the east. The body of megacrystic granite that crops out south of Waskaiowaka Lake is similar to the Baldock batholith and may be an offshoot of the Baldock intrusion. All the intrusive bodies except the megacrystic granite have internal variations in texture and composition suggesting they formed by several phases of intrusion.

Kisseynew Sedimentary Gneiss Belt

A region of sedimentary gneisses extending from Leftrook Lake to Assean Lake marks the northeast corner of the Kisseynew sedimentary gneiss belt (McRitchie, 1974). Extensive mapping elsewhere in the Kisseynew gneissic belt has established a generalized three-fold subdivision into greywacke-derived gneisses of the Burntwood River Metamorphic Suite overlain by amphibolite which is overlain by arkose- and greywacke-derived gneisses of the Sickle Metamorphic Suite. Sections examined on Leftrook and Harding Lakes (shown in Fig. 5) illustrate the generalized subdivisions but some variations unique to this particular part of the belt are shown. The section of amphibolite encountered on Leftrook Lake is thicker and more complex than amphibolite typical to the Kisseynew gneissic belt elsewhere. Massive and layered amphibolites are interlayered with garnetiferous metagreywacke, quartz arenites and thin quartzites. The metagreywacke immediately underlying the amphibolite is a massive grey, weakly layered rock that locally contains hornblende. The hornblende-bearing metagreywacke at the base of the Sickle Metamorphic Suite is quite mafic with well developed bedding. Harding Lake exhibits a thinner section of amphibolites at the contact of the Burntwood River and Sickle metamorphic suites and the units comprising the Sickle Suite are unique to this location. Much of the basal section comprises well layered psammitic and pelitic hornblende-bearing metagreywacke with a distinctive layered pink and green appearance. Locally the basal unit comprises massive grey hornblende-rich pelitic gneisses. Unique to the Harding Lake section are the pebbly metagreywacke beds and quartz-rich pebble conglomerates that occur locally in the upper portions of the Sickle Suite.

The metagreywackes of the Burntwood River Suite comprise garnet-cordierite-sillimanite-bearing migmatites with varying amounts of granitic component. They are, in general, typical of the Kisseynew gneissic belt. One location, Assean Lake, comprises staurolite-bearing massive grey psammites and muscovite-rich pelites. The presence of staurolite gneisses within a region dominated by garnet-cordierite-migmatites has yet to be explained.

Churchill-Superior Boundary

A segment of the Churchill-Superior boundary zone extending from Assean Lake to the Odei River southwest of Pearson Lake was examined to attempt a refinement of the positioning of the boundary location. The boundary position between Pearson and Assean Lakes has been moved south with the Assean Lake fault interpreted as the boundary between the provinces. From Pearson Lake to the Odei River the boundary has been placed along the line marking a change from greywacke de-

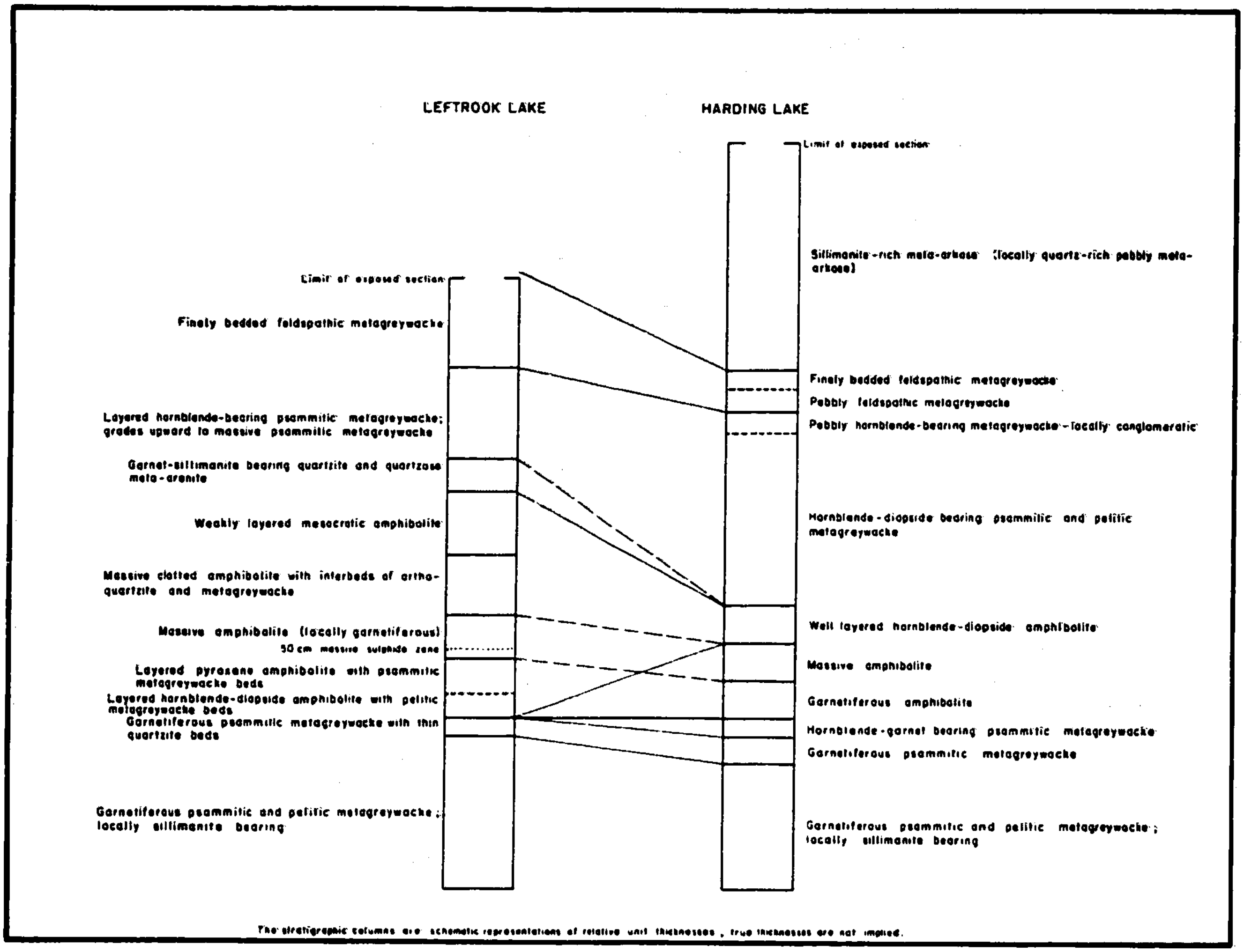

Figure 5. Schematic stratigraphic sections for the Kisseynew gneisses exposed on Leftrook and Harding Lakes.

rived migmatites of the Kisseynew gneissic belt on the north to a region of granite, massive and gneissic tonalite, and massive amphibolite to the south. This region of mixed rock types, the Orr Lake block, lies between the Assean Lake-Odei River lineament and the proposed Churchill-Superior boundary. The Orr Lake block has been placed in the Superior Province, however, problems of correlation exist that may require repositioning of the boundary zone. The lithologies encountered in the vicinity of Orr Lake are not typical of the Kisseynew gneissic belt. In general they resemble some rock types of the Split Lake area (Corkery, 1977), however, a pervasive retrograde metamorphism encountered in all rocks of the Split Lake-Assean Lake area is absent in the Orr Lake block. The principal structural direction in the block is ENE, parallel to the trend of the Kisseynew belt. The strong N and NE-trends of the Split Lake area (Corkery, op. cit.) are absent in the Orr Lake block. Until further studies can be made the Orr Lake block should be considered as a unique zone provisionally assigned to the Superior Province.

The strong northeast trending linears observed on the aeromagnetic maps in the Waskaiowaka through Owl River region, which Bell (1971) interpreted as a major shear zone conjugate to the Assean Lake shear zone, was not substantiated by field mapping in either the Waskaiowaka Lake area (Corkery, 1977) or the Little Churchill River area (Corkery, 1978).

Assean Lake

A segment of the Churchill-Superior boundary zone is exposed in shoreline outcrops on Assean Lake. A complex series of fault bounded slices of Churchill supracrustal rocks, reworked Archean gneisses of Superior Province affinity, and tonalitic gneisses of uncertain affinity were encountered. Broad linear to slightly arcuate cataclastic zones with associated thin mylonitic zones occur as relatively continuous features interrupting the geologic continuity. These generally trend 030^{o}, 060^{o}, and 090^{o} and are cut by north-trending minor faults. The complexity of the fault zones has prohibited the establishing of a time sequence although it . ·parent that the zone was active over a considerable time period. Occurrences of mylonitized mylonite. and sheared pegmatites of various ages intruding pre-existing mylonites are common.

Superior Province association rocks are the same units mapped on Split Lake by Corkery (1977) and comprise clotted granodiorite, tonalitic and amphibolitic gneisses, massive and layered amphibolites, mafic dykes and granite. These units are recognized in Burntwood Bay and west along the southeast shore of Assean Lake. Most units can be traced into the major cataclastic zones on the southeast side of the lake. They occur in all stages of cataclasis and can be mapped into the mylonite zones.

A block of Churchill supracrustal rocks occupies the central portion of Assean Lake and can be traced from the southwest shore through Lindal Bay to the northeast. The base of the section comprises garnetiferous and locally staurolite-bearing metagreywacke of the Burntwood River Metamorphic Suite. This is overlain by a variable sequence of amphibolites containing the typical hornblende granofels and in Lindal Bay, areas of metavolcanic rocks. The amphibolites are overlain by Sickle Suite metasedimentary gneisses.

A series of leucotonalites and related amphibolites observed in central portion of the lake appear to be individual slices between the fault zones, and in some cases may intrude the Churchill supracrustal rocks. Their affinity to either the Churchill Province or Superior Province rock types has not been established.

Metamorphism

Metamorphic grades of uppermost amphibolite to hornblende granulite facies were attained throughout most of the area. The grade of metamorphism was sufficient to produce partial anatexis of most rock types. Supracrustal rocks typically are migmatitic gneisses averaging 20 to 30 per cent granitic lit and may locally reach 80 per cent partial melt fraction. Some of the older intrusive phases formed anatectic lit through metamorphism. There are two isolated areas of slightly lower metamorphic grade:

1. Partridge Breast - Gauer Lake area. The rocks in this region show no development of anatectic lit. There is a gradual transition southwards from garnet-cordierite-sillimanite gneisses with rare anatectic stringers into mobilizate-free andalusite-cordierite-muscovite schists and in the Gauer Lake area a core zone of chlorite muscovite schists are found. Remnants of staurolite (mainly armoured by plagioclase) are found in some rocks. The presence of andalusite indicates a lower total pressure during metamorphism (sillimanite is the only aluminosilicate found outside of this restricted area). Further the transition in mineral assemblages from sillimanite-cordierite-potassium feldspar through andalusite-cordierite-muscovite to chlorite-muscovite indicates declining temperatures from north to south within the supracrustal belt. Thus a gradual decrease from upper amphibolite (verging on partial anatexis) to upper greenschist grades of metamorphism is observed in this belt.
2. Metagreywackes on Assean Lake contain no mobilizate and in places contain remnants of staurolite.

Economic Geology

Sulphide mineralization was encountered in several locations. While none of the showings encountered are extensive the most significant are listed according to the lithologic belt they occur in:

1. Chipewyan batholith - sulphides consisting of disseminations of 5 to 10 per cent pyrite and pyrrhotite were encountered in the syeno-granite in one location 10 km upstream of Portage Chute on the eastern end of the Churchill River.
2. Partridge Breast - Northern Indian Lake Belt
   a) Malachite staining accompanying traces of chalcopyrite was noted in three exposures of a pelitic matrix polymictic conglomerate near the top of the Partridge Breast Suite on western Partridge Breast Lake. Minor chalcopyrite was reported in andesitic rocks in this area.
   b) Seams of chalcopyrite occur in amphibolite pods in mafic hornblende-rich sediments at the west end of Partridge Breast Lake. This is also thought to be at the top of the Partridge Breast Suite.
3. Campbell - Waskaiowaka Belt
   a) The mafic metavolcanic rocks at the west end of the belt contain disseminations of chalcopyrite in trace amounts in most exposures.
   b) A body of gneissic tonalite north of Campbell Lake contains 1 to 3 per cent pyrite with traces of pyrrhotite.
   c) Extensive drilling was carried out north and west of Waskaiowaka Lake. The conductors explored were reported (based upon limited assessment files) as graphite zones and minor sulphides (pyrite and pyrrhotite) within metasediments and amphibolites.

4. Kisseynew Gneissic Belt

a) A 50 cm zone of nickeliferous massive sulphide occurs in an amphibolite on the southeast shore of Leftrook Lake (see Fig. 5).

b) A pegmatite dyke outcropping along the northern shore of Harding Lake contains narrow seams of chalcopyrite and bornite accompanied by moderate malachite staining. Mineralization was not found in the arkosic gneiss hosting the dyke.

c) Assean Lake has an extensive history of mineral exploration by several mining companies. Small showings of chalcopyrite were noted in several locations on the lake associated with amphibolites and metavolcanic rocks. Haugh (1969) describes some of the showings on Assean Lake.

Two showings were examined in some detail:

1. A small low grade gold showing, the Lindal vein, is exposed in a short trench on the northwest shore of Lindal Bay. It occurs in a gossaned shear zone in intermediate metavolcanic rocks. Pyrite associated with carbonate and quartz-carbonate veining is the only sulphide noted.
2. Dissemination and small veinlets of galena occur in a white felsic gneiss on a small island south of the entrance to Lindal Bay. The gneiss appears to be part of the lower section of the Sickle Metamorphic Suite.

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TABLE 1. INDEX TO CHEMICAL ANALYSES

NO.	UNIT NO.	LOCATION	DESCRIPTION
1	9b	Partridge Breast Lake	massive basalt
2	9b	Gauer Lake	high MG-basalt
3	9b	Partridge Breast Lake	high MG-basalt
4	9b	Partridge Breast Lake	basalt
5	9b	Partridge Breast Lake	basaltic andesite
6	9b	Partridge Breast Lake	basaltic andesite
7	9b	Gauer Lake	plagioclase-phyric basaltic andesite
8	9b	Thorsteinson Lake	massive basaltic andesite
9	9b	Gauer Lake	hornblende-phyric basaltic andesite
10	9c	Northern Indian Lake	massive andesite
11	9c	Partridge Breast Lake	andesite
12	9c	Thorsteinson Lake	andesite
13	9c	Partridge Breast Lake	andesite-dacite
14	9e	Partridge Breast Lake	intermediate volcanogenic sediment
15	9e	Partridge Breast Lake	intermediate volcanogenic sediment
16	9e	Partridge Breast Lake	intermediate volcanogenic sediment
17	9e	Partridge Breast Lake	intermediate volcanogenic sediment
18	9e	Partridge Breast Lake	intermediate volcanogenic sediment
19	9e	Partridge Breast Lake	intermediate volcanogenic sediment
20	9e	Partridge Breast Lake	intermediate volcanogenic sediment
21	9e	Gauer Lake	felsic tuff
22	9e	Northern Indian Lake	reworked felsic tuff
23	9e	Partridge Breast Lake	felsic tuff
24	9a	Partridge Breast Lake	psammitic greywacke
25	9a	Partridge Breast Lake	psammitic greywacke
26	9a	Partridge Breast Lake	psammitic greywacke
27	11b	Partridge Breast Lake	psammitic matrix of conglomerate
28	9a	Partridge Breast Lake	psammitic greywacke
29	9a	Partridge Breast Lake	semi-pelitic greywacke
30	9a	Partridge Breast Lake	pelitic greywacke
31	9a	Partridge Breast Lake	pelitic greywacke
32	9a	Partridge Breast Lake	pelitic greywacke
33	9a	Partridge Breast Lake	hornblende-bearing pelitic greywacke
34	-	Northern Indian Lake	quartz-feldspar porphyry (intrudes 9)
35	18	Northern Indian Lake	Thorsteinson granite
36	18	Thorsteinson Lake	Thorsteinson granite
37	18	Thorsteinson Lake	Thorsteinson granite
38	18	Thorsteinson Lake	Thorsteinson granite
39	18	Thorsteinson Lake	Thorsteinson granite
40	18	Thorsteinson Lake	High fluorine Thorsteinson granite
41	18	Thorsteinson Lake	High fluorine Thorsteinson granite
42	18	Northern Indian Lake	massive grey granite (intrudes Chipewyan)
43	18	Churchill R. (the Fours)	massive grey granite (intrudes Chipewyan)
44	18	Churchill R. (the Fours)	massive pink granite (intrudes Chipewyan)
45	18	Northern Indian Lake	Chipewyan granite
46	18a	Northern Indian Lake	Chipewyan syeno-granite to syenite
47	18a	Churchill R. (Bad Cache R.)	Chipewyan syeno-granite to syenite
48	18a	Freeman Lake	Chipewyan syeno-granite to syenite
49	18a	Little Beaver River	Chipewyan fluorite syenite
50	18a	North Knife Lake	Chipewyan syenite
51	18a	Northern Indian Lake	Chipewyan syenite
52	18a	Freeman Lake	Chipewyan syenite
53	18a	Kotchapaw Lake	Chipewyan syenite
54	18a	Churchill River	Chipewyan syenite
55	18	Northern Indian Lake	Chipewyan granite
56	18	North Knife Lake	Chipewyan granite
57	18	West of Knifehead Lake	Chipewyan granite

...2.

TABLE 1. INDEX TO CHEMICAL ANALYSES (CONT'D.)

NO.	UNIT NO.	LOCATION	DESCRIPTION
58	18	Churchill R. (the Fours)	Chipewyan granite
59	18	Baldock Lake	Baldock Batholith
60	18	Baldock Lake	Baldock Batholith
61	18	Baldock Lake	Baldock Batholith
62	18	Baldock Lake	Baldock Batholith

Table 2. Basalts and basaltic andesites of the Partridge Breast Lake.

	1	2	3	4	5	6	7	8	9	10	11	12	13
SiO_2	44.60	46.85	47.25	48.00	50.10	50.70	53.00	53.90	53.90	56.80	58.45	59.80	63.40
Al_2O_3	15.58	12.28	11.19	12.62	14.70	20.01	15.10	14.02	15.25	15.46	18.09	17.30	18.09
Fe_2O_3	2.02	4.31	1.08	2.38	2.24	2.86	3.27	6.20	2.94	4.35	0.92	1.30	1.06
FeO	11.68	6.38	9.28	7.73	6.89	5.37	5.48	7.34	5.24	6.16	3.99	3.52	2.79
CaO	12.75	13.18	11.82	11.88	10.93	9.04	9.39	8.12	8.54	6.90	5.84	6.50	6.19
MgO	5.42	12.03	14.28	11.99	8.83	3.92	7.11	3.73	6.80	3.60	4.95	3.95	1.97
Na_2O	2.02	1.37	1.18	1.35	2.28	3.90	3.33	2.73	2.59	3.12	3.50	3.84	3.77
K_2O	0.82	0.50	0.25	0.91	0.66	1.17	1.24	0.94	1.94	1.30	1.83	1.09	0.97
TiO_2	2.66	0.63	0.84	0.73	0.70	0.63	0.69	1.12	0.68	1.01	0.45	0.45	0.40
P_2O_5	0.17	0.13	0.12	0.12	0.12	0.11	0.19	0.22	0.16	0.20	0.09	0.11	0.09
MnO	0.23	0.20	0.25	0.19	0.17	0.16	0.15	0.20	0.17	0.16	0.09	0.08	0.06
NiO	trace			trace									
Cr_2O_3	trace			0.13	0.07						trace		
H_2O	1.52	1.99	2.05	1.85	1.66	1.60	1.06	1.12	1.27	0.86	1.25	1.01	0.71
S	0.02		trace	trace	0.01					trace	trace	0.01	0.06
CO_2	0.17	0.07	0.07	0.24	0.50	0.08	0.06	0.12	0.03	0.10	0.05	0.23	0.24
Other		0.29	0.36				0.23		0.22	0.12			
Total	99.65	100.21	100.02	100.12	99.86	99.55	100.30	99.76	99.73	100.14	99.50	99.19	99.78
Total Fe as Fe_2O_3	15.00	11.40	11.39	10.97	9.90	8.83	9.36	14.36	8.76	11.20	5.35	5.21	4.16
Geochemistry	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Cu	26	74	66	24	98	24	30	8	33	15	4	96	132
Ni	80	288	328	200	88	30	72	4	72	2	80	66	4
Pb	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	13	<3	<3
Zn	149	83	156	108	90	132	91	148	82	112	63	55	33
Cr	130	1150	1800	842	378	56	480	8	430	10	146	176	12
Rb	10	14	8	20	14	28	22	14	43	60	70	23	25
Sr	635	255	110	260	425	290	510	290	365	300	635	580	560
Ba	480	260	90	280	260	380	610	240	790	570	1030	400	420

Table 3. Intermediate volcanogenic sediments (14 to 20) and felsic tuff (21 to 23) of the Partridge Breast Lake.

	14	15	16	17	18	19	20	21	22	23
SiO_2	62.40	63.65	65.85	51.75	59.50	50.60	62.05	67.10	67.25	74.65
Al_2O_3	15.48	16.06	17.62	19.98	16.27	15.14	16.18	14.25	15.11	12.38
Fe_2O_3	0.78	1.01	0.34	0.46	1.38	1.80	1.43	2.68	2.45	0.44
FeO	4.62	4.48	3.16	6.66	7.43	8.06	6.74	2.20	2.76	2.14
CaO	5.14	4.08	4.77	8.30	3.95	3.84	3.63	2.21	3.44	1.86
MgO	4.90	1.90	1.99	6.08	2.68	3.42	2.13	0.55	1.19	0.54
Na_2O	1.70	4.84	3.05	0.38	2.58	3.20	2.79	3.14	4.15	4.04
K_2O	2.30	1.69	1.84	3.25	3.07	2.32	2.73	5.34	1.08	1.19
TiO_2	0.57	0.40	0.32	0.55	0.67	0.62	0.42	0.54	0.87	0.19
P_2O_5	0.17	0.20	0.07	0.07	0.63	0.35	0.23	0.11	0.29	0.05
MnO	0.08	0.12	0.05	0.13	0.09	0.17	0.08	0.09	0.13	0.07
C (graphite)									0.06	
H_2O	1.39	0.75	0.67	1.64	1.34	1.26	1.16	0.78	1.09	0.77
S	0.03	trace			0.05	trace	0.20	0.02	trace	0.10
CO_2	0.07	0.05	0.05	0.07	0.03	0.16	.08	0.83	0.04	0.96
Other	0.19	0.12	0.12	0.25	0.22	0.19	0.24	0.27	0.14	0.08
Total	99.81	99.35	99.90	99.57	99.87	100.13	100.01	100.10	100.05	99.42
Total Fe as Fe_2O_3	5.91	5.99	3.85	7.86	9.64	10.76	8.92	5.12	5.52	2.82
Geochemistry	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Cu	40	14	3	2	196	74	265	222	3	40
Ni	122	6	12	68	< 2	< 2	20	< 2	< 2	< 2
Pb	< 3	< 3	< 3	< 3	6	6	< 3	< 3	< 3	6
Zn	80	48	43	78	59	138	48	78	104	35
Cr	277	26	22	148	6	< 3	32	< 3	< 3	6
Rb	110	38	110	206	127	77	204	92	74	36
Sr	500	410	345	290	295	386	309	280	320	200
Ba	420	450	500	1340	1190	960	1140	1730	720	400

Table 4. Psammitic (24 to 28), semi-pelitic (29) and pelitic (30 to 33) metagreywackes of the Partridge Breast Suite.

	24	25	26	27	28	29	30	31	32	33
SiO_3	64.90	68.80	68.05	71.85	59.65	51.20	61.95	60.95	58.20	51.95
Al_2O_3	15.70	15.71	15.14	13.12	14.95	16.12	17.57	19.91	20.02	17.99
Fe_2O_3	0.78	0.55	0.76	5.11	1.08	0.93	0.81	1.24	1.11	1.00
FeO	5.44	2.62	3.68	1.40	7.76	7.78	5.06	5.42	6.08	9.84
CaO	1.32	2.83	3.49	1.08	6.18	9.63	1.11	0.71	1.55	3.82
MgO	2.35	1.50	1.99	1.49	2.47	7.37	1.93	2.26	2.45	5.66
Na_2O	2.52	4.25	2.71	1.24	2.73	2.81	1.94	0.84	2.34	0.37
K_2O	3.69	2.37	2.12	2.06	1.54	1.40	6.72	4.60	4.88	5.14
TiO_2	0.78	0.32	0.66	0.51	0.75	0.80	0.78	0.80	0.80	1.06
P_2O_5	0.13	0.08	0.15	0.14	0.64	0.13	0.06	0.11	0.09	0.09
MnO	0.09	0.05	0.08	0.08	0.36	0.19	0.06	0.06	0.08	0.15
C (graphite)	0.01			0.02			0.25			
H_2O	1.37	0.64	0.83	1.43	1.15	1.08	1.30	2.06	1.70	2.26
S	trace	0.06	0.03		0.02			0.02	0.01	
CO_2	0.06	0.05	0.02	0.06	0.44	0.05	0.09	0.05	0.02	0.03
Other	0.16	0.21	0.14	0.16	0.14	0.18	0.26	0.16	0.21	0.18
Total	99.30	100.02	99.84	99.75	99.85	99.67	99.89	99.18	99.54	99.64
Total Fe as Fe_2O_3	6.83	3.46	4.85	6.67	9.70	9.58	6.43	7.26	7.87	11.94
Geochemistry	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Cu	32	114	37	4	183	19	15	22	33	5
Ni	28	5	10	32	<2	66	20	20	32	23
Pb	6	<3	<3	<3	<3	<3	32	6	12	<3
Zn	78	43	78	92	187	130	120	80	118	152
Cr	103	17	80	220	4	283	66	18	111	72
Rb	204	102	110	73	25	37	274	217	244	330
Sr	215	430	330	115	395	515	130	70	160	145
Ba	720	1130	550	780	370	380	1590	860	1130	835

Table 5. Intrusive rocks of the Thorsteinson, Chipewyan and Baldock batholiths.

	34	35	36	37	38	39	40	41	42	43	44	45	46	47
SiO_2	76.25	71.75	73.30	73.70	75.45	75.95	76.45	76.80	74.35	74.75	76.45	72.25	65.80	69.40
Al_2O_3	12.47	15.16	13.72	13.36	12.23	11.94	11.77	11.88	14.13	13.19	12.33	14.58	15.70	13.69
Fe_2O_3	0.48	0.70	1.03	1.03	0.82	0.70	0.71	0.57	0.52	0.69	0.81	0.63	1.82	1.62
FeO	0.40	0.89	1.25	1.02	1.10	1.17	1.05	0.92	0.63	0.71	0.55	0.87	2.34	2.07
CaO	0.46	1.89	1.36	1.17	0.61	0.48	0.49	0.62	1.70	1.02	0.69	1.38	2.82	1.95
MgO	0.11	0.65	0.51	0.45	0.20	0.18	0.17	0.09	0.36	0.26	0.10	0.44	1.61	0.79
Na_2O	2.67	4.34	4.09	3.94	3.17	3.10	3.35	3.72	3.92	3.13	3.02	3.43	3.73	2.74
K_2O	6.08	3.45	3.94	4.13	5.37	5.37	5.21	4.78	3.71	5.12	5.15	5.09	4.00	5.58
TiO_2	0.08	0.22	0.24	0.22	0.28	0.29	0.24	0.16	0.13	0.22	0.16	0.28	0.62	0.66
P_2O_5		0.07	0.05	0.05	0.03	0.03	0.02	0.01	0.04	0.03	0.01	0.06	0.25	0.28
MnO	0.02	0.04	0.05	0.04	0.08	0.09	0.06	0.10	0.03	0.03	0.01	0.02	0.06	0.07
H_2O	0.22	0.40	0.51	0.45	0.54	0.51	0.37	0.27	0.30	0.30	0.24	0.50	0.55	0.43
S	0.01								0.03		0.02	trace	trace	0.04
CO_2	0.12	0.15	0.05	0.02	0.03	0.05	0.05	0.07	0.14	0.24	0.14	0.42	0.25	0.34
Other	0.11	0.25	0.25	0.22	0.18	0.19	0.23	0.38	0.19	0.19	0.10	0.23	0.42	0.36
Total	99.84	99.93	100.32	99.78	100.07	100.02	100.11	100.24	100.16	99.86	99.76	100.16	99.90	99.93
Total Fe as Fe_2O_3	1.28	1.69	2.42	2.16	2.04	2.00	1.88	1.59	1.22	1.48	1.42	1.60	4.42	3.92
Geochemistry	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Cu	12	17	30	7	8	2	3	2	13	4	6	4	5	6
Ni	< 2	6	8	6	4	6	4	< 2	< 2	< 2	< 2	< 2	8	< 2
Pb	26	20	< 4	12	36	15	12	23	17	30	27	24	14	27
Zn	15	45	47	43	115	97	70	103	26	27	36	34	92	66
Cr	< 3	14	140	86	128	128	135	86	4	< 4	< 4	4	30	4
Rb	120	134	102	126	123	132	104	160	96	221	191	153	171	266
Sr	70	370	140	155	35	25	20	10	320	100	60	330	505	190
Ba	700	920	1090	1000	580	530	310	80	990	810	390	1070	1250	1100
F		552	605	500	542	721	1430	3150	236	528	164	392	1668	1708
Be		5	4	4	1	2	2	5	5	4	3	4	5	6
Sn		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	10
Li		59	24	26	24	35	20	45	22	20	< 20	30	34	22
Cs		< 20	< 17	< 17	< 17	< 17	< 17	< 17	< 20	< 20	6	< 20	< 20	< 20
A/CNK*	1.055	1.060	1.019	1.022	1.008	1.013	0.978	0.957	1.043	1.052	1.045	1.067	1.007	0.972

Table 5. Continued

	48	49	50	51	52	53	54	55	56	57	58	59	60
SiO_2	61.40	72.60	64.50	67.90	66.55	65.65	64.25	67.70	66.90	76.90	71.55	70.25	68.60
Al_2O_3	16.88	12.61	15.81	15.09	15.23	15.89	16.89	15.33	15.45	12.00	13.88	14.87	16.28
Fe_2O_3	1.92	1.13	2.42	1.34	1.03	2.04	1.77	1.52	2.21	0.63	1.34	1.07	0.96
FeO	3.26	1.80	2.07	2.51	3.01	2.37	2.22	1.98	2.42	0.59	1.52	1.46	1.62
CaO	4.23	1.53	3.01	2.79	3.07	3.39	2.47	2.56	2.54	0.75	1.53	2.11	2.81
MgO	2.30	0.51	0.96	1.33	1.41	1.35	1.20	1.00	0.93	0.18	0.61	0.91	0.95
Na_2O	4.05	3.32	3.97	3.65	4.09	3.67	4.34	3.58	3.79	2.84	3.48	3.92	4.57
K_2O	3.51	4.58	4.70	3.92	4.09	3.95	5.17	4.13	4.54	5.54	4.50	4.18	2.91
TiO_2	0.76	0.62	0.97	0.52	0.46	0.72	0.56	0.53	0.61	0.26	0.56	0.42	0.41
P_2O_5	0.32	0.14	0.29	0.21	0.19	0.27	0.22	0.19	0.17	0.04	0.21	0.15	0.18
MnO	0.09	0.07	0.09	0.07	0.10	0.07	0.09	0.06	0.09	0.02	0.06	0.05	0.03
H_2O	0.80	0.52	0.46	0.67	0.73	0.63	0.50	0.85	0.57	0.37	0.56	0.30	0.34
S	0.02	0.01	0.02										
CO_2	0.33	0.48	0.43	0.03	0.05	0.05	0.12	0.03	0.08	0.03	0.10	0.07	0.05
Other	0.44	0.36	0.57	0.30	0.42	0.47	0.49	0.33	0.30	0.17	0.27	0.34	0.25
Total	100.24	100.20	100.19	100.29	100.36	100.47	100.22	99.76	100.58	100.30	100.14	100.07	99.93
Total Fe as Fe_2O_3	5.54	3.13	4.72	4.13	4.38	4.67	4.24	3.72	4.90	1.29	3.03	2.69	2.76
Geochemistry	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Cu	18	5	5	2	6	11	11	6	13	2	6	3	7
Ni	10	< 2	< 2	6	6	6	10	< 2	6	4	6	4	< 2
Pb	17	32	17	15	12	26	15	12	12	26	19	23	13
Zn	88	76	127	76	94	85	71	65	77	40	57	67	78
Cr	16	4	4	109	82	66	74	105	66	120	159	12	4
Rb	142	226	108	154	109	154	203	135	118	151	140	146	102
Sr	600	145	425	315	360	490	390	350	275	90	215	575	535
Ba	1560	930	2800	990	1540	2230	2090	1460	1560	680	960	1380	870
F	1488	1872	1690	1030	1690	1120	1550	820	542	382	820	800	564
Be	6	7	5	2	3	4	5	3	3	2	2	5	5
Sn	10	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 50	< 50
Li	28	37	17	26	25	23	22	24	12	12	19	41	27
Cs	< 20	< 20	< 20	< 17	< 17	< 17	< 17	< 17	< 17	< 17	< 17	< 20	< 20
A/CNK*	0.930	0.955	0.925	0.985	0.910	0.965	0.981	1.021	0.980	0.998	1.038	1.004	1.032

Table 5. Continued

	61	62
SiO_2	71.10	69.85
Al_2O_3	15.00	15.40
Fe_2O_3	0.90	1.10
FeO	1.28	1.26
CaO	1.95	1.94
MgO	0.70	0.79
Na_2O	3.94	3.81
K_2O	3.76	4.50
TiO_2	0.32	0.36
P_2O_5	0.09	0.11
MnO	0.03	0.03
H_2O	0.43	0.38
S		
CO_2	0.07	0.10
Other	0.31	0.32
Total	99.85	99.92
Total Fe as Fe_2O_3	2.32	2.50

Geochemistry	PPM	PPM
Cu	4	9
Ni	< 2	< 2
Pb	16	10
Zn	60	163
Cr	8	4
Rb	131	128
Sr	410	435
Ba	1400	1590
F	744	632
Be	4	4
Sn	< 50	< 50
Li	21	19
Cs	< 20	< 20
A/CNK*	1.064	1.050

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DEPARTMENT OF ENERGY AND MINES
MINERAL RESOURCES DIVISION

MAP OF81-3-1

NORTHERN INDIAN LAKE

(N.T.S 64H)

Legend

PHANEROZOIC

Paleozoic

O BCR Ordovician Bad Cache Rapids Group; sandstone, shale, limestone

PRECAMBRIAN

Aphebian (Churchill Province)

Intrusive Rocks

23 Mafic and ultramafic dykes
22 Felsic pegmatites of various ages
21 Grey granite; fine to medium grained magnetiferous biotite granite
20 Leucocratic granite, medium grained homogeneous buff biotite granite
19 Leucogranite, schlieric granite, anatectic granite with numerous inclusions of gneisses
18 Megacrystic granite and syenogranite, 18a) megacrystic quartz syenite
17* Granodiorite to granite
16 Granodiorite; hornblende or hornblende and biotite-bearing; locally gneissic
15* Tonalite and granodiorite, locally gneissic; 15a) garnetiferous tonalite, 15b) quartz-poor hornblende tonalite to granodiorite, 15c) gneissic magnetiferous leucocratic tonalite to granodiorite
14* Tonalite, gneissic tonalite, hornblende or hornblende biotite-bearing
13 Metagabbro, metadiorite, 13a) gabbro pegmatite
12 Quartz diorite, gabbro; 12a) leucotonalite and associated intrusion breccia

Metasedimentary and Metavolcanic Rocks

11 Arkosic gneisses, 11a) polymictic metaconglomerate with a pelitic matrix and minor pelite beds; muscovite-potassium feldspar-magnetite-sillimanite-bearing; 11b) polymictic metaconglomerate with a psammite matrix interlayered with crossbedded psammite, magnetiferous; 11c) quartzose meta-arenite, quartzite. 11d) psammitic and pelitic metagreywacke; hornblende-magnetite-bearing; locally contains polymictic metaconglomerate beds; 11e) magnetiferous feldspathic metagreywacke; locally pebbly; 11f) meta-arkose, sillimanite-bearing; locally quartz-rich pebbly meta-arkose, minor conglomerate
10 Amphibolite, 10a) layered hornblende-diopside granofels; minor metagreywacke beds; 10b) massive amphibolite; salt-and-pepper textured amphibolite with sporadic quartzite and metagreywacke beds; 10c) massive clotted leucocratic amphibolite; 10d) metavolcanic rocks; basalt, pillow basalt, intermediate metavolcanic rocks (Assean Lake)
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8 Metagreywacke; 8a) metatectic greywacke gneiss, interlayered psammitic and pelitic metagreywacke; garnet-biotite-graphite-bearing; 8b) diatectic biotite-garnet gneiss; 8c) staurolite-bearing metagreywacke

Mixed Aphebian and Archean Rocks

7* Mylonites (Assean Lake); derived from rocks of both the Churchill and Superior Provinces

Archean (Superior Province)

6* Multicomponent migmatite, tonalitic to granodioritic gneiss with numerous amphibolite layers
5* Granite
4* Mafic dykes, 4a) ultramafic; 4b) gabbroic
3* Gneisses of Kenoran age (units 1 and 2) reworked during the Hudsonian event
2* Clotted granodiorite; hornblende-bearing
1* Amphibolites (massive and compositionally layered) and associated tonalitic gneisses of Kenoran age

*Units not occurring on this map

Symbols

bedding (tops unknown)

metamorphic layering (inclined, vertical)

foliation (inclined, vertical, horizontal)

foliation and parallel metamorphic layering (inclined, vertical)

cataclastic foliation

minor fold axis with symmetry

mineral lineation

geological boundary (approximate, assumed, extrapolated using aeromagnetic trends)

approximate position of the Churchill-Superior boundary (Assean Lake to Streng Lake)

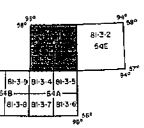
fault

limit of outcrop

isolated bedrock outcrop

mineral occurrence

Geology by M.T. Corkery and P.G. Lenton (1979-80)



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Scale 1:250 000

KILOMETRES 5 0 5 10 15 20 KILOMETRES

MILES 5 0 5 10 15 MILES

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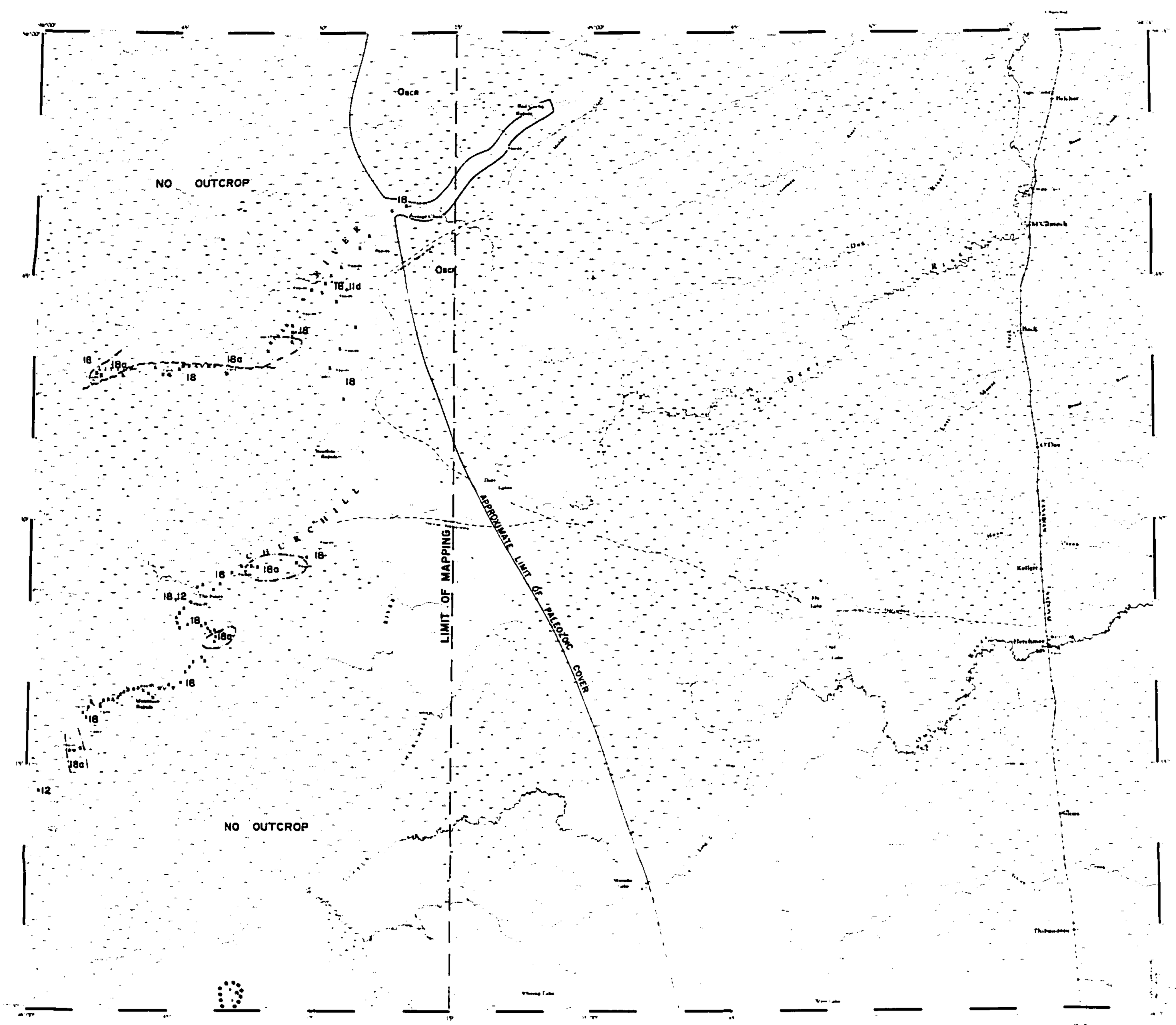
MINERAL RESOURCES DIVISION

MAP OF81-3-2

HERCHMER, WEST HALF

(N.T.S. 54E)



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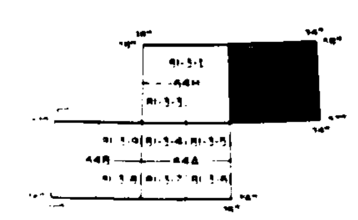
Symbols



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Scale 1:250 000

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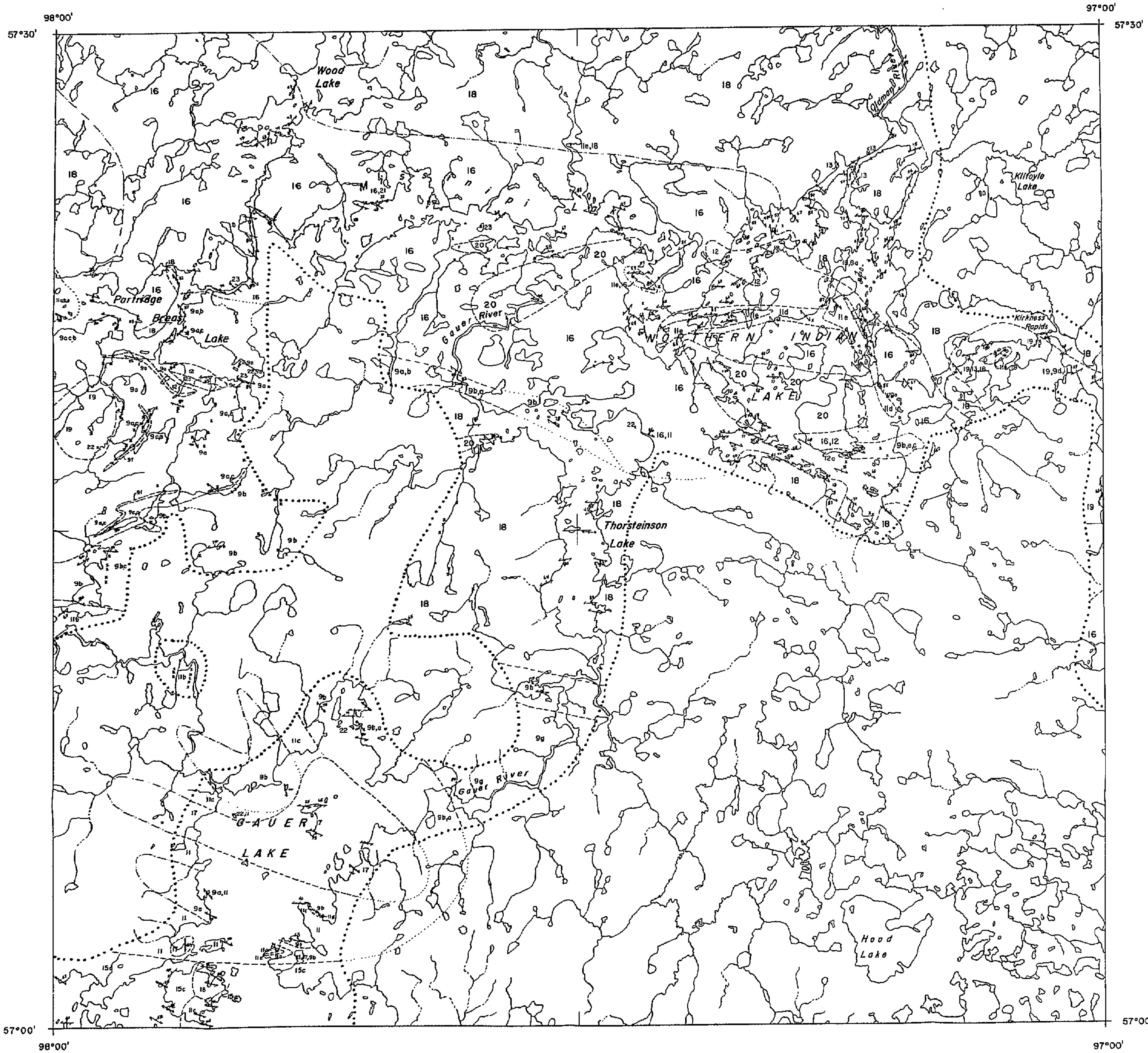
MAP OF81-3-3

NORTHERN INDIAN LAKE, SOUTHWEST

(N.T.S. 64H/3,4,5,6)



Legend

PHANEROZOIC

Paleozoic

0 [*] ECR Ordovician Red Cache Rapids Group; sandstone, shale, limestone

PRECAMBRIAN

Aphebian (Churchill Province)

Intrusive Rocks

- 23 Mafic and ultramafic dykes
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- 19 Leucogranite, schlieric granite; anatectic granite with numerous inclusions of gneisses
- 18 Megacrystic granite and syenogranite; 18a) megacrystic quartz syenite
- 17 [*] Granodiorite to granite
- 16 Granodiorite; hornblende or hornblende and biotite-bearing, locally gneissic
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- 14 [*] Tonalite, gneissic tonalite, hornblende or hornblende-biotite-bearing
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- 12 Quartz diorite, gabbro; 12a) leucotonalite and associated intrusion breccia

Metasedimentary and Metavolcanic Rocks

- 11 Felsic gneisses; 11a) polymictic metaconglomerate with a ... matrix and minor pelite beds; ... magnetite-sillimanite-bearing; 11b) polymictic metaconglomerate with a psammite matrix interlayered with crossbedded psammite, magnetiferous; 11c) quartzose meta-arenite, quartzite; 11d) psammitic and pelitic metagreywacke; hornblende-magnetite-bearing; locally contains polymictic metaconglomerate beds; 11e) magnetiferous feldspathic metagreywacke ...; 11f) meta-arkose, sillimanite-bearing, locally ...; pebbly meta-arkose, minor conglomerate
- 10 Amphibolite; 10a) layered hornblende-diopside granofels; minor metagreywacke beds; 10b) massive amphibolite; salt-and-pepper textured amphibolite with sporadic quartzite and metagreywacke beds; 10c) massive clotted mesocratic amphibolite; 10d) metavolcanic rocks, basalt, pillow basalt, intermediate metavolcanic rocks (Assean Lake)
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Mixed Aphebian and Archean Rocks

- 7 [*] Mylonites (Assean Lake); derived from rocks of both the Churchill and Superior Provinces

Archean (Superior Province)

- 6 [*] Multicomponent migmatite; tonalitic to granodioritic gneiss with numerous amphibolite layers
- 5 [*] Granite
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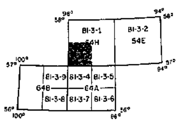
- 2 [*] Clotted granodiorite; hornblende-bearing
- 1 [*] Amphibolites (massive and compositionally layered) and associated tonalitic gneisses of Kenoran age

[*] Units not occurring on this map.

Symbols

- bedding (tops unknown)
- metamorphic layering (inclined, vertical)
- foliation (inclined, vertical, horizontal)
- foliation and parallel metamorphic layering (inclined, vertical)
- cataclastic foliation
- minor fold axis with symmetry
- mineral lineation
- geological boundary (approximate, assumed, extrapolated using aeromagnetic trends)
- approximate position of the Churchill-Superior boundary (Assean Lake to Strong Lake)
- fault
- limit of outcrop
- isolated outcrop
- massive sulphide

Geology by H.T. Corkery and P.G. Lenton (1979-80)



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Scale 1:100 000

KILOMETRES 2 0 2 4 6 KILOMETRES

MILES 2 0 2 4 MILES

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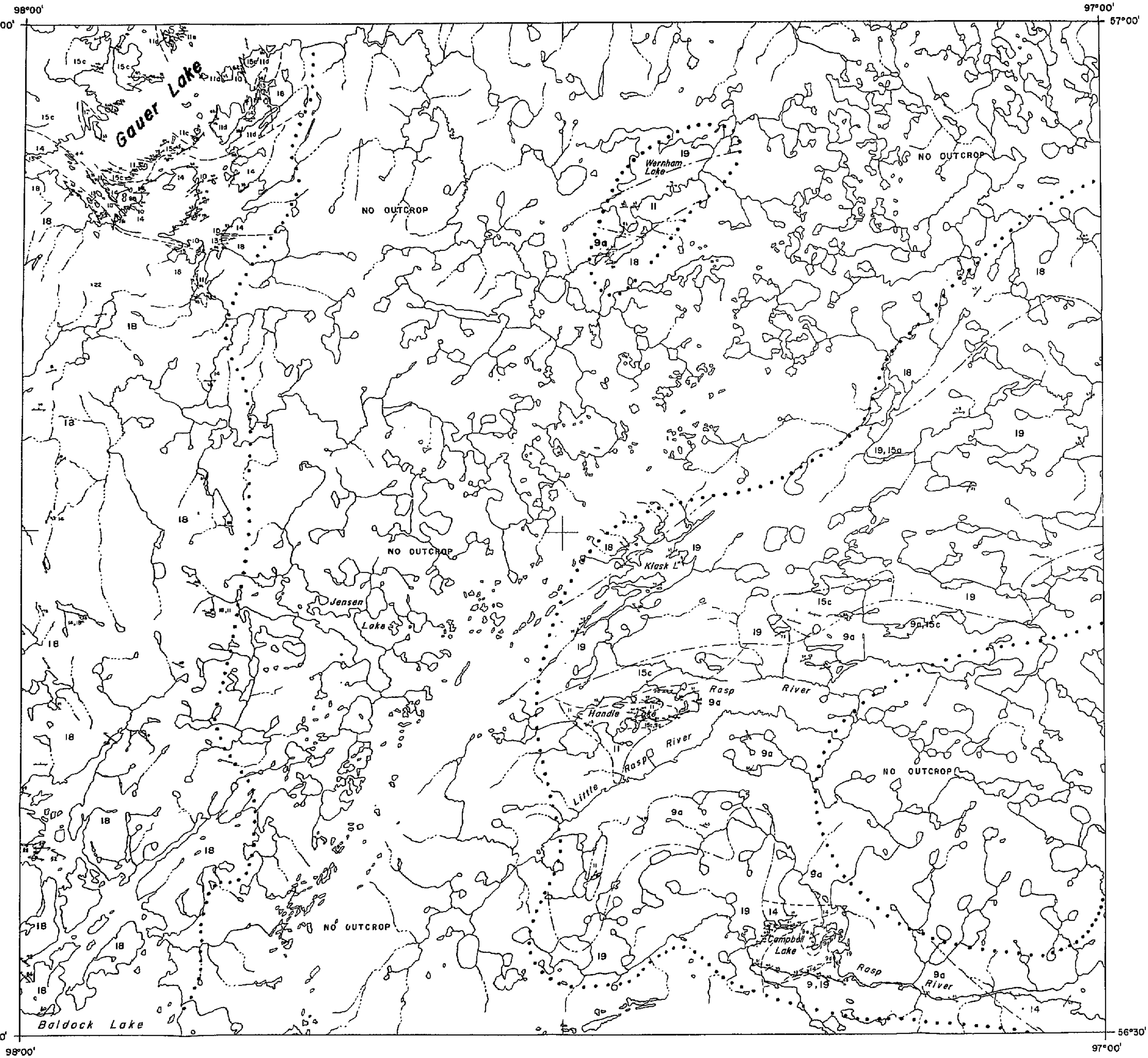
MAP OF81-3-4

SPLIT LAKE, NORTHWEST

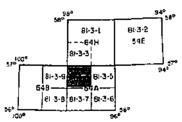
(N.T.S. 64A/11, 12, 13, 14)



Legend

Symbols

Geology by: M.T. Corkery and P.G. Lenton (1981)



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Scale 1:100 000

KILOMETRES 2 0 2 4 6 KILOMETRES

MILES 2 0 2 4 MILES

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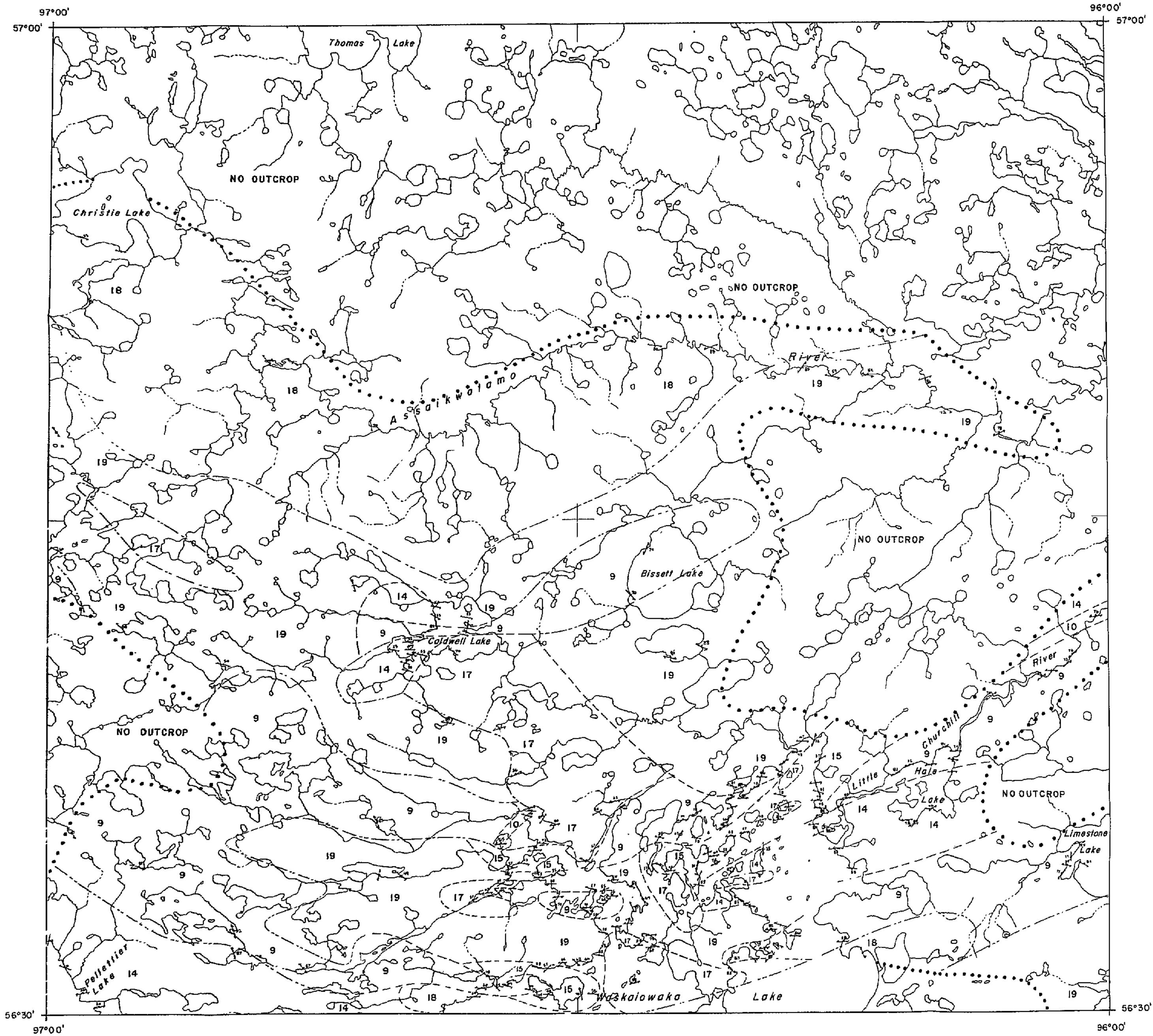
MAP OF81-3-5

SPLIT LAKE, NORTHEAST

(N.T.S. 64A/9, 10, 15, 16)



Legend

Intrusive Rocks

23* Mafic and ultramafic dykes

22* Felsic pegmatites of various ages

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20* Leucocratic granite, medium grained homogeneous buff biotite granite

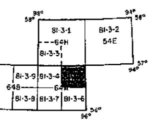
19 Leucogranite, schlieric granite, anatectic granite with numerous inclusions of gneisses

17 Granodiorite to granite

Metasedimentary and Metavolcanic Rocks

Symbols

Geology by: M.T. Corkery and P.G. Lenton (1981)



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Scale 1:100 000

KILOMETRES 2 0 2 4 6 KILOMETRES

MILES 2 0 2 4 MILES

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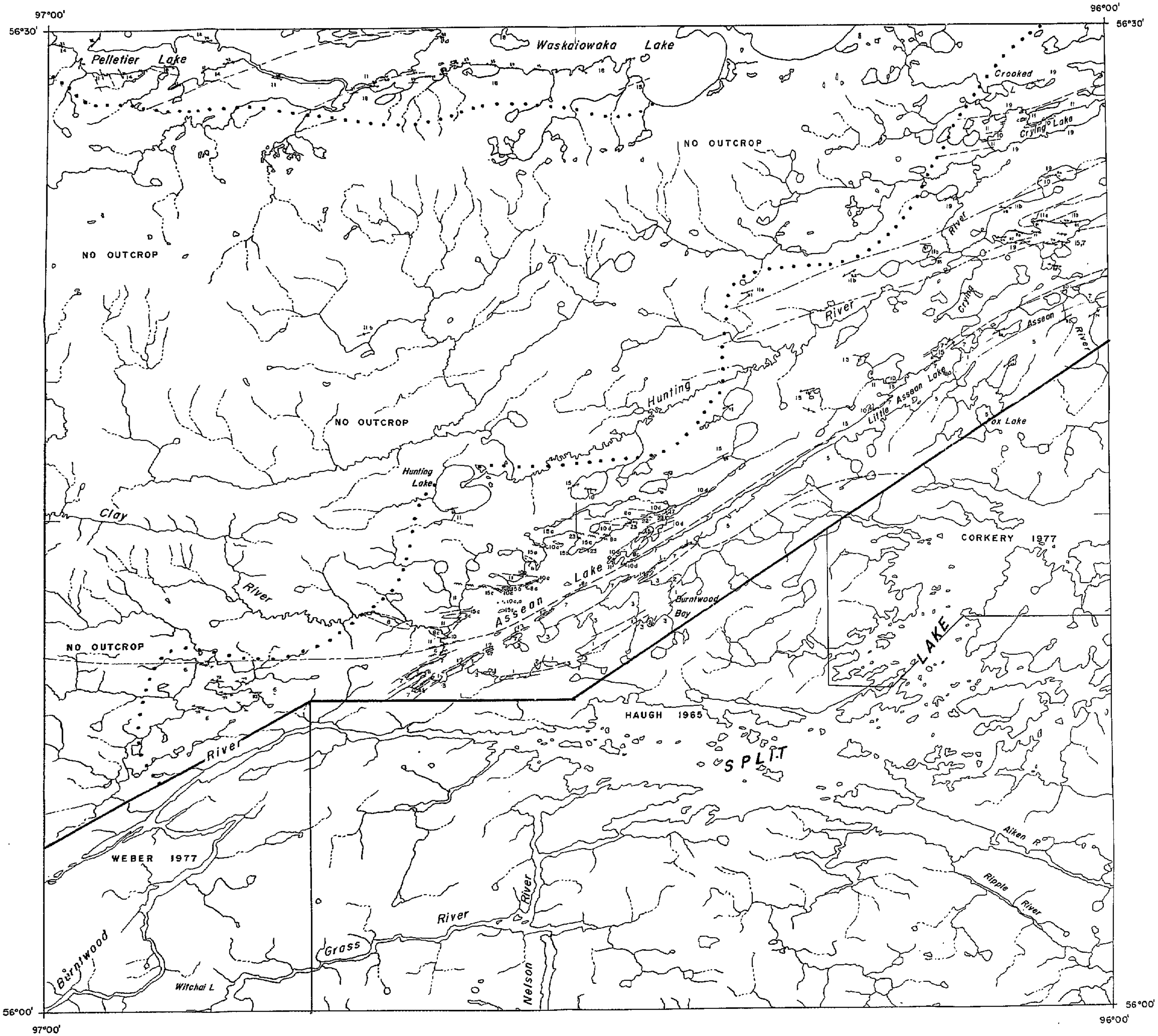
MINERAL RESOURCES DIVISION

MAP OF81-3-6

SPLIT LAKE, SOUTHEAST

(N.T.S. 64A/1,2,7,8)



Legend

PHANEROZOIC

Paleozoic

Upper Ordovician Red Head Rapids Group: sandstone, shale, limestone

PRECAMBRIAN

Aphebian (Churchill Province)

Intrusive Rocks

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- 16* Granodiorite, hornblende or hornblende and biotite-bearing; locally gneissic
- 15 Tonalite and granodiorite, locally gneissic; 15a) garnetiferous tonalite; 15b) quartz poor hornblende tonalite to granodiorite; 15c) gneissic magnetiferous leucocratic tonalite to granodiorite
- 14 Tonalite, gneissic tonalite; hornblende or hornblende-biotite-bearing
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Metasedimentary and Metavolcanic Rocks

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Mixed Aphebian and Archean Rocks

- 7 Mylonites (Assean Lake); derived from rocks of both the Churchill and Superior Provinces

Archean (Superior Province)

- 6 Multicomponent migmatite; tonalitic to granodioritic gneiss with numerous amphibolite layers
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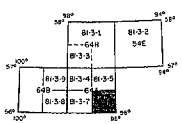
*Units not occurring on this map.

Symbols

Bedding (tops unknown)

Metamorphic layering (inclined, vertical)

Geology by: M.T. Corkery and F.G. Lenton (1980)



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Scale 1:100 000

KILOMETRES 2 0 2 4 6 KILOMETRES

MILES 2 0 2 4 MILES

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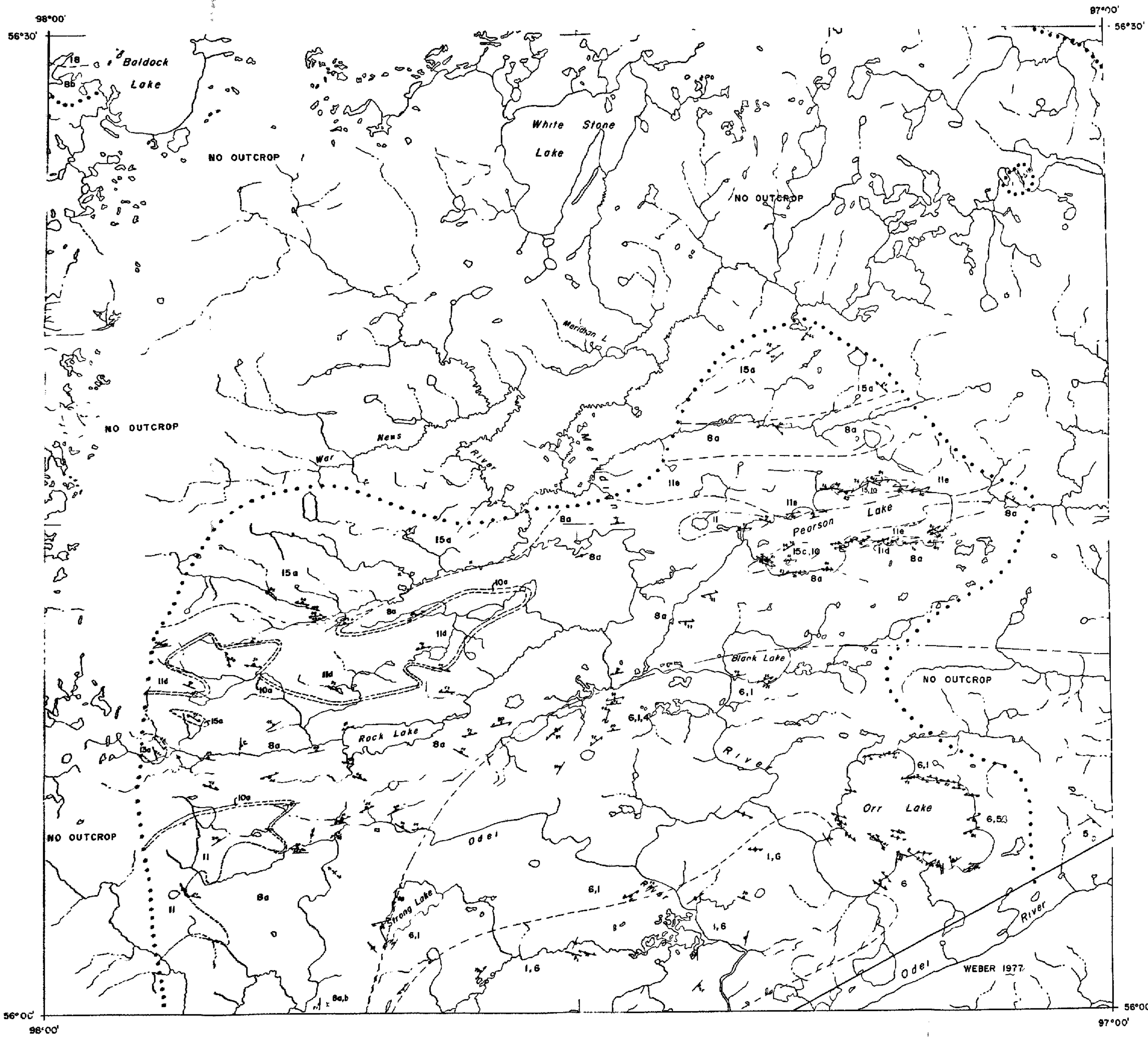
MINERAL RESOURCES DIVISION

MAP OF81-3-7

SPLIT LAKE, SOUTHWEST

(NTS 64A/3,4,5,6)



Legend

PHANEROZOIC

Paleozoic

OBCR Ordovician Bad Cache Rapids Group: sandstone, shale, limestone

PRECAMBRIAN

Aphebian (Churchill Province)

Intrusive Rocks

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- geological boundary (approximate, assumed, extrapolated using aeromagnetic trends)
- approximate position of the Churchill-Superior boundary (Assean Lake - Strong Lake)
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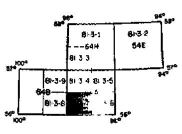
- limit of outcrop
- isolated bedrock exposure
- massive sulphides

Geology by M.T. Corkery and P.G. Lenton (1980)



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Scale 1:100 000

KILOMETRES 2 0 2 4 6 KILOMETRES

MILES 2 0 2 4 MILES

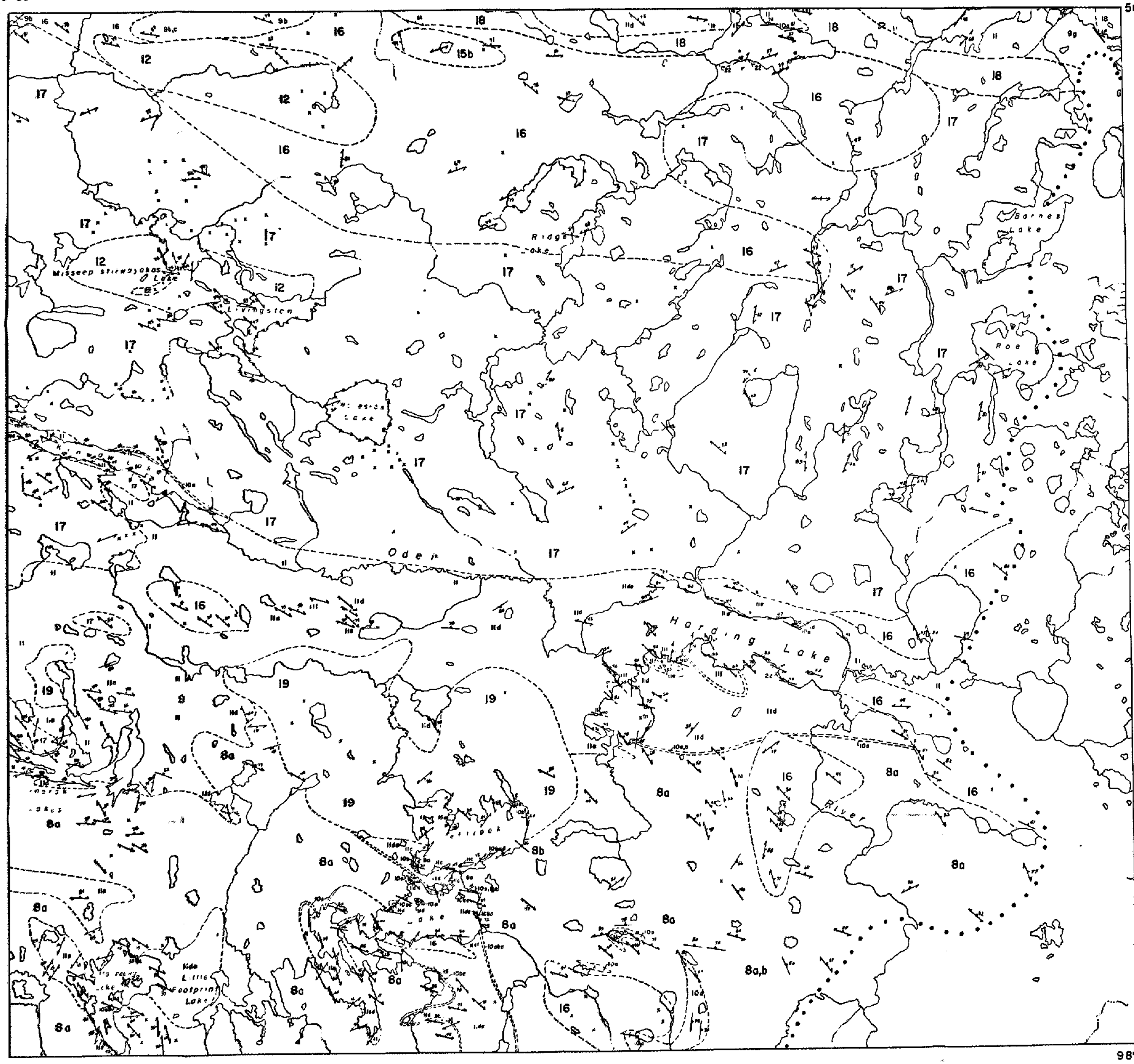
MANITOBA
DEPARTMENT OF ENERGY AND MINES
MINERAL RESOURCES DIVISION

MAP OF81-3-8

UHLMAN LAKE, SOUTHEAST

(NTS 64B/1,2,7,8)

99°00' 98°00'
56°30' 56°30'



56°00' 56°00'
99°00' 98°00'

Legend

PHANEROZOIC

Paleozoic

OBCR Ordovician Bad Cache Rapids Group: sandstone, shale, limestone

PRECAMBRIAN

Aphebian (Churchill Province)

Intrusive Rocks

23* Mafic and ultramafic dykes
22 Felsic pegmatites of various ages
21* Grey granite: fine to medium grained magnetiferous biotite granite
20* Leucocratic granite, medium grained homogeneous buff biotite granite
19 Leucogranite, schlieric granite, anatectic granite with numerous inclusions of gneisses
18 Megacrystic granite and syenogranite. 18a) megacrystic quartz syenite
17 Granodiorite to granite
16 Granodiorite: hornblende or hornblende and biotite bearing, locally gneissic
15 Tonalite and granodiorite, locally gneissic. 15a) garnetiferous tonalite. 15b) quartz-poor hornblende tonalite to granodiorite. 15c) gneissic magnetiferous leucocratic tonalite to granodiorite
14* Tonalite, gneissic tonalite: hornblende or hornblende-biotite bearing
13* Metagabbro, metadiorite. 13a) gabbro pegmatite
12 Quartz diorite, gabbro. 12a) leucotonalite and associated intrusion breccia

Metasedimentary and Metavolcanic Rocks

11 Arkosic gneisses. 11a) polymictic metaconglomerate with a pelitic matrix and minor pelite beds; muscovite-potassium feldspar-magnetite-sillimanite-bearing. 11b) polymictic metaconglomerate with a psammite matrix interlayered with crossbedded psammite, magnetiferous. 11c) quartzose meta-arenite, quartzite. 11d) psammitic and pelitic metagreywacke, hornblende-magnetite-bearing, locally contains polymictic metaconglomerate beds. 11e) magnetiferous feldspathic metagreywacke, locally pebbly. 11f) meta-arkose, sillimanite bearing, locally quartz rich, pebbly meta-arkose, minor conglomerate
10 Amphibolite. 10a) layered hornblende-diopside granofels, minor metagreywacke beds. 10b) massive amphibolite, salt-and-pepper textured amphibolite with sporadic quartzite and metagreywacke beds. 10c) massive clotted mesocratic amphibolite. 10d) metavolcanic rocks: basalt, pillow basalt, intermediate metavolcanic rocks (Assean Lake)
9 Metasedimentary and metavolcanic rocks. 9a) pelitic to psammitic metagreywacke, magnetite-sillimanite bearing, contains sporadic conglomerate beds. 9b) metabasalt: massive basalt, basaltic breccia, basaltic tuff. 9c) intermediate metavolcanic rocks. 9d) massive amphibolite, layered hornblende-diopside gneiss derived from mafic metavolcanic rocks (9b). 9e) intermediate to acid tuffs. 9f) quartzite. 9g) garnetiferous metagreywacke, graphitic
8 Metagreywacke. 8a) metatectic greywacke gneiss, interlayered psammitic and pelitic metagreywacke, garnet-biotite-graphite-bearing. 8b) diatectic biotite-garnet gneiss. 8c) staurolite-bearing metagreywacke

Mixed Aphebian and Archean Rocks

7* Mylonites (Assean Lake) derived from rocks of both the Churchill and Superior Provinces

Archean (Superior Province)

6* Multicomponent migmatite: tonalitic to granodioritic gneiss with numerous amphibolite layers
5* Granite
4* Mafic dykes. 4a) ultramafic. 4b) gabbroic
3* Gneisses of Kenoran age (units 1 and 2) reworked during the Hudsonian event
2* Clotted granodiorite, hornblende-bearing
1* Amphibolites (massive and compositionally layered) and associated tonalitic gneisses of Kenoran age

*Units not occurring on this map

Symbols

- bedding (tops unknown)
- metamorphic layering (inclined, vertical)
- foliation (inclined, vertical, horizontal)
- foliation and parallel metamorphic layering (inclined, vertical)
- cataclastic foliation
- minor fold axis with symmetry
- mineral lineation
- geological boundary (approximate, assumed, extrapolated using aeromagnetic trends)
- approximate position of the Churchill-Superior boundary (Assean Lake to Strong Lake)
- fault
- limit of outcrop
- isolated bedrock exposure
- massive sulphide

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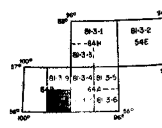

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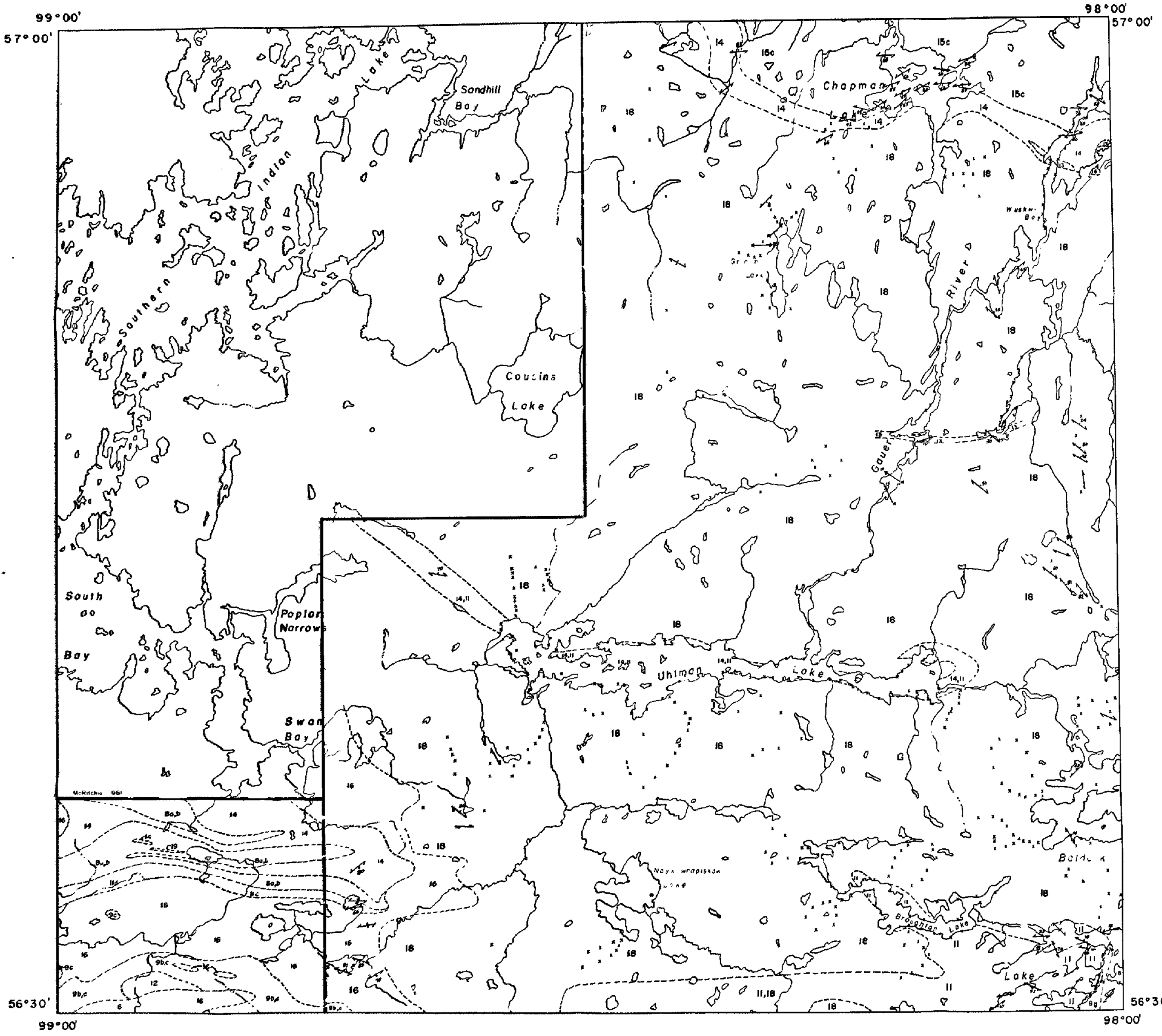
MAP OF81-3-9

UHLMAN LAKE, NORTHEAST

(NTS 64B/9,10,15,16)



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14 Tonalite, gneissic tonalite: hornblende or hornblende-biotite-bearing

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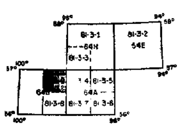

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