RESEARCH COUNCIL OF ALBERTA

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PRELIMINARY REPORT OF GEOLOGICAL FIELD WORK

NORTHEASTERN ALBERTA

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by

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General Statement

A geological field party of the Research Council of Alberta, conducted a preliminary survey north and east of Chipewyan, Alberta, making detailed studies of selected areas that had been staked during recent prospecting activities. Transportation in the area is by aircraft on floats or by small boats along the shore of Lake Athabasca. All traverses were on foot, and pace and compass mapping was carried out. The north shore of Lake Athabasca had been previously mapped by Alcock (1) and Cameron and Hicks (2) and the following geological section is the result of those surveys.

Geological Table of Formations
Lake Athabasca

Quaternary -	Recent	beaches sand dunes clays
	Pleistocene	sand plains
	Unconformity	
Precambrian	Athabasca series	sandstone arkose conglomerate
	Unconformity	
Metamorphic -	Igneous contact	granite migmatite
	Tazin series	conglomerate slates and volcanics
	Uncomformity	
		migmatite and undifferentiated Precambrian granite gneiss.

(1) Alcock, F.J., Memoir 196, Geological Survey of Canada. - Geology of Lake Athabasca Region, Saskatchewan.

(2) Cameron, A.E., and Hicks, H.S. - Geology of N.E. Alberta, unpublished notes.

The oldest sediments observed were the Tazin series that are predominantly slate, cherty slates and minor altered volcanics or greenstones. Gneissic and granite pebbles were found in a Tazin conglomerate but the base of the series was not observed.

On the north shore of Lake Athabasca between Big Bay and Sand Point the Tazin slates are exposed along the north shore and grade northerly by regional metamorphism to a metamorphic - migmatite complex that occupies the major portion of the area mapped. The total thickness of Tazin slates exposed is less than one thousand feet but the group is known to be many times thicker outside the map area.

Granite migmatites, granites and coarse pegmatite complexes were found in close proximity to Tazin type sediments but nowhere were intrusive relationships between the igneous and highly folded sediments observed.

Grey granite at Fidler Point contains many inclusions of sedimentary slates and has other characteristics that indicate an igneous derivation. The field relationships between the grey granite and the pink orthoclase quartz granite is obscured by a deep valley separating the two rock types west of Fidler Point.

At the eastern edge of Allison Bay and extending east along the shore for five miles, coarse simple pegmatite constitutes the major rock type. Traced east, the coarse pegmatite is replaced as the rock type by apalite intruding volcanics and fine grained metamorphic rocks.

The Athabasca series, sandstones, arkose and conglomerate, overlie the igneous - metamorphic complex unconformably in the area west of Fidler Point. The thin basal conglomerate and red arkosic sandstones are preserved in valley depressions, being protected from glacial ice advancing down the

axis of Lake Athabasca by northerly striking granite ridges. Where the cover of Athabasca series preserves the surface below the basal conglomerate, an oxidized and deeply weathered surface of granite and migmatite is exposed in sections. In plan where the basal conglomerate has been removed, but erosion has not been deep enough to remove the weathered granite, the product of the chemical breakdown of the ferro-magnesian minerals leaves an iron-stained surface. These weathered zones have been mistaken by some prospectors for the gossans that are produced by weathering of sulphide mineralization.

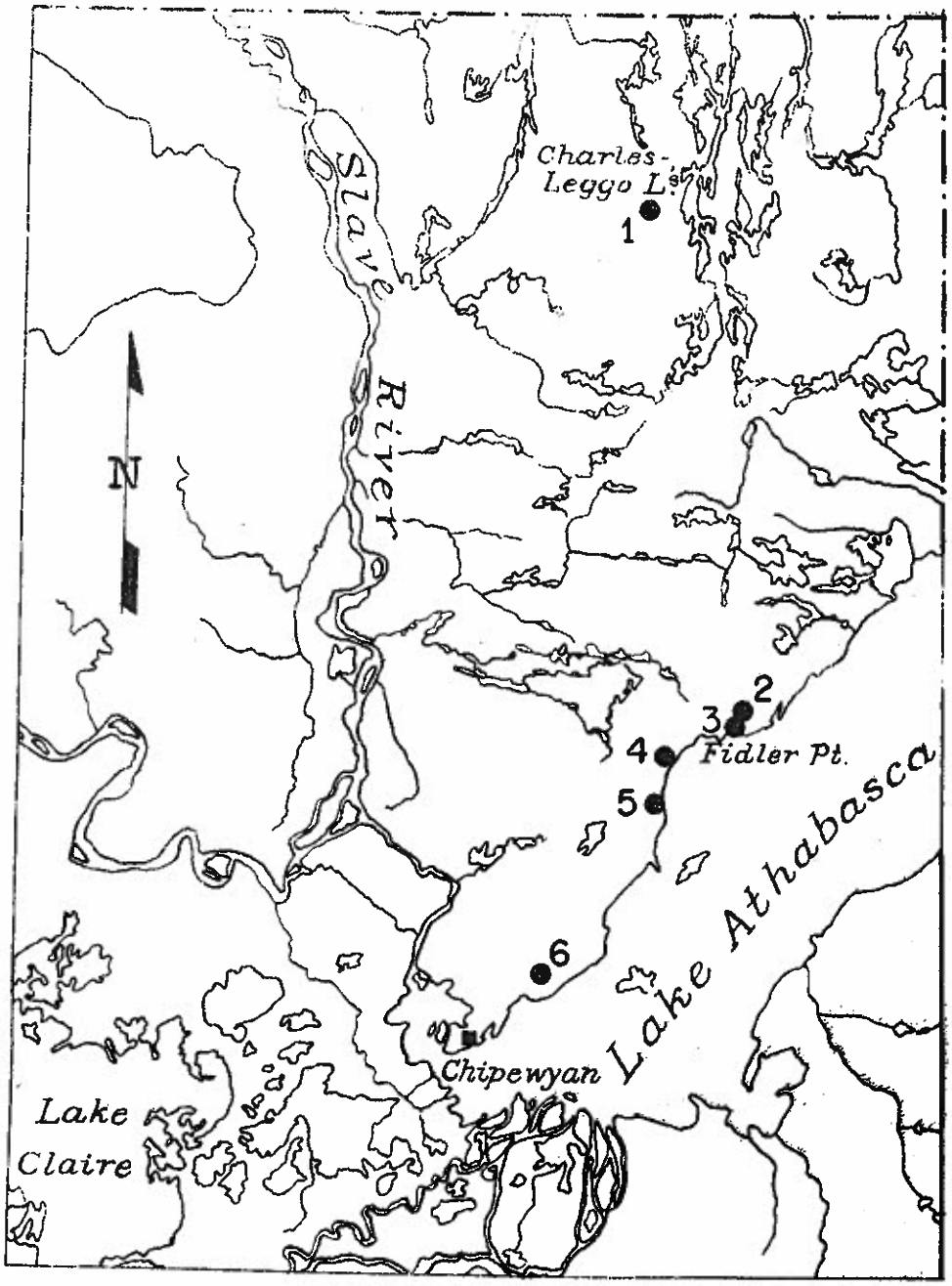
Topography and Glacial Geology

The country north of Lake Athabasca and east of the Slave River is a region of low rocky hills and ridges separated by depressions which are occupied by lakes and swamps. The area is of low relief with small spruce, pines and poplar timber.

Glaciation has imposed a complex lineation upon the region. Major ice advance paralleled the axis of Lake Athabasca in the south and east while other ice advanced from N 60°E along the boundary with Northwest Territories. Strike of bed rock varies from north-south in the north-central region to N 50°E in the Chipewyan Area.

At Leggo Lake in the central area, ice advance did not coincide with structural trends and the resultant topography has the major axis of the lakes parallel to the bed rock strike direction of north-south while minor bays have been plucked to the south-west of the lakes by the advance of the ice from the north-east.

Near Chipewyan townsite glacial advance paralleled the bed rock trend and a steep cliff section of granite remains as remnants of strike joints or minor faults.



SCALE 1 INCH TO 16 MILES.

16 12 8 4 0 16 32 48

-NORTH EAST ALBERTA —

References for Area Map of Northeast Alberta of locations mentioned in text.

1. Leggo and Charles Lakes

2. Fishing Lake

3. Fidler Point

4. & 5. Prospects, east of Sand Point Lake Athabasca

6. Allison Bay Prospects

ECONOMIC GEOLOGY

Claims have been staked along the north shore of Lake Athabasca and at Meyers, Leland and Leggo Lakes in the north central portion of the Precambrian outcrop area in Alberta. It has been brought to the attention of the survey that samples taken from north of Fidler Point and Leggo Lake had returned positive chemical assays for uranium oxide. Based on this limited information special attention was given to those two areas, to attempt to ascertain the nature of the uranium mineralization.

Leggo and Charles Lakes Central Area

The Leggo-Charles Lakes area was studied in detail and mapped on a scale of one mile to one inch. Leggo Lake is in an area of granite rocks with a linear fabric direction of N 10°E. The two above mentioned lakes are separated by a metamorphic transition zone, between a vertically dipping sedimentary and volcanic group, that may be an equivalent of the Tazin rocks, and the Leggo Lake granite and granite gneiss.

The transition zone is marked by no sharp line of rock changes but rather a progressive metamorphism of the sediments to a granite by increase of visible feldspar and quartz. Dark green, mafic inclusions in the granite were interpreted as assimilated volcanics.

A secondary mylonite or crushed structure has been imposed on the granite complex and the rocks are sheared along a N 40°E strike direction. The mylonite structure is visible on rock outcrops as small open fractures. The development of green chlorite and epidote, supports the theory that the area has undergone secondary structural readjustments.

Quartz has been introduced parallel to the N 40°E crushed zones in two places on Leggo Lake. Each of the quartz zones are weathered to gossans or iron-stained areas by oxidation of minor sulphides of iron and traces of chalcopyrite.

No uranium alteration products were visible on the surface in the Leggo Lake area. Radioactivity surveys on close spaced traverses found only minor anomalies of two or three times background count. Anomalies of this order cannot be interpreted as originating from uranium mineralization.

Mineral specimens of pitchblende in the form of films on joints or shear planes have been reported by prospectors in the area.

Fishing Lake Group
North of Fidler Point, Lake Athabasca

These mineral claims were visited by traversing north from Fidler Point over migmatite rocks of a pink orthoclase - quartz granitic type. Along the north shore of Fishing Lake, a prospector for the group, outlined the prospect.

The radioactive anomalies, four or five times background count, occur in mylonized or crushed rock zones along an east-west strike. Minor amounts of yellow uranium alteration products were visible at the most westerly occurrence. It was reported that at more easterly points that were not visited, the alteration products are more continuous and radioactive anomalies of a higher order have been found.

Fidler Point, Lake Athabasca

On Fidler Point and west of the Hayes group, claims have been staked along the contact of the Tazin slates and migmatite. In this area, Athabasca sandstones that occupy valley depressions in the Proterozoic surface have been protected from glacial erosion by unfractured granite ridges on Fidler Point. The ridges have their axis at an oblique angle to the advance of glaciation down the Lake Athabasca depression. The sandstone formation has a basal conglomerate that includes highly weathered ferro-magnesian minerals and red-orange stained clays. These oxidation and erosion products have been mistaken by some prospectors for uranium alteration products. No radioactive anomalies were found on the Fidler Point properties.

Hayes Group, East of Sand Point, Lake Athabasca

This group was staked along the contact of the Tazin slates with their metamorphic equivalent a migmatite granite complex. In the slates introduced quartz forms fine stock-works, and flecks of specular hematite were found. Small anomalies above the radioactive background count were recorded.

In the more competent migmatites and granites that occur a quarter mile north of the shore, the introduced white quartz forms veins (outcropping on the cliff section) which are visible from the lake. These last mentioned veins which are more continuous than the quartz stringers in the slates, are quite barren of sulphide mineralization.

Allison Bay, Lake Athabasca

Four miles, N 40°E, of Allison Bay, yellow stains of uranium alteration products were observed over an area 30 feet by 400 feet, and, at one locality where surface blasting had been undertaken, a radioactive anomaly was found that reached a maximum of 10 times background count on a geiger ratemeter. The rocks were granitic with visible quartz-orthoclase and minor ferro-magnesian minerals. No faults were observed but deep valleys with steep walls which parallel the structural trends in the area, may be traces of local faults or joint surfaces.

CONCLUSIONS

In conducting this survey, no test holes were drilled and all the geological information was obtained from observation of surface samples.

The northeast corner of Alberta lies within an area of metamorphic-granitic rocks of Precambrian age. These metamorphic-granitic rocks have been altered from sedimentary rocks of Tazin type. The uranium mineralization that was observed is associated with small features in regions that had been mylonized or crushed. No uranium was found associated with quartz veins.

The Research Council of Alberta does not contemplate further field work by the Geological Section in the area at the present time. Fullest co-operation with prospectors in the indentification of samples will be continued.