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A GEOLOGICAL REPORT ON PARTS OF PALMAROLLE, DUPARQUET, POULARIES AND DESTOR TOWNSHIPS,  
ABITIBI WEST COUNTY

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ET MINÉRALE

PARTS OF PALMAROLLE, DUPARQUET, POULA-  
RIES AND DESTOR TOWNSHIPS

B. Lee

A Geological Report

on parts of

PAIMAROLLE, DUPARQUET, POULARIES and DESTOR TOWNSHIPS

Abitibi West County, Quebec

- 1950 -

Ministère des Géologie et Géophysique
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by

Burdett Lee

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A REPORT ON PARTS OF PALMAROLLE, DUPARQUET, POULARIES AND DESTOR TOWNSHIPS, ABITIBI WEST COUNTY, QUEBEC.

- 1950 -

INTRODUCTION

During the summer of 1950 mapping was continued within a forty-mile long strip of ground, extending eastward from the Quebec-Ontario border in the Townships of Roquemaure-Hebecourt, Palmarolle-Duparquet, Poularies-Destor, Privat-Aiquebelle, County of Abitibi-West.

The writer and assistants mapped the geology of seventy square miles, comprising the following areas:

Palmarolle Twp., Ranges I and II, east half  
Poularies Twp., Ranges I and II,  
Duparquet Twp., Ranges IX and X, east half  
Destor Twp., Ranges VIII, IX and X

Mapping was done on a scale of 1" = 1000'.

The area thus has as its western boundary the center line (N-S) of Palmarolle-Duparquet Twps., which coincides with the LaSarre-Duparquet Highway, #

The area is covered by two reconnaissance maps, issued in 1934 by the Geological Survey of Canada; Map 293A, "Palmarolle Sheet, Abitibi Co., Quebec", which extends as far eastward as the mid Poularies-Destor region, and Map 285A, "Taschereau Sheet, Abitibi Co., Quebec", which includes the remainder of the present map-area. Both sheets are on a scale of 1" = 1 mile. These sheets represent remapping and revision, undertaken by Dr. A. H. Iang of the G.S.C. in 1932 of earlier work undertaken by Dr. B.S.W. Buffam in 1925-26. The accompanying report

by Dr. Lang is found in the Summary Report, 1932, Part D.

The map-area lies in a most accessible part of Abitibi County, and is well supplied with roads. The western boundary coincides with the Duparquet-LaSarre Highway, Duparquet lying some six miles to the south, and LaSarre some fourteen miles to the north. The Macamic Road (Highway No. ), connecting the town of Macamic with Rouyn-Noranda, crosses the center of the area. Macamic lies some ten miles north, and Rouyn-Noranda some twenty-six miles south, of the map-area. To the west of the Macamic Road the area is traversed by range-roads along its E-W center-line. The central and north-boundary roads are connected in lot 53 by a north-south road which passes through the parish of Ste. Germaine de Palmarolle. All roads mentioned here are gravelled, and were passable in all weathers during the field-season.

The portion of the map-area which lies west of the Macamic Road is under cultivation, with the exception of the southern portions of Range X, Duparquet and Destor Twps., the western portion of Range IX, Destor Twp., and the eastern section of Ranges I and II, Poularies Twp., from lot 9 east.

No colonization whatever has taken place within the map-area east of the Macamic Road, and thus there is no organized system of roads. Access to this portion of the map-area is, however, easy, due to the number of winter-roads and trails. The eastern and north-eastern portions are most easily reached by means of the Range I - II road in Privat Twp., a road which extends some two miles into Poularies Twp. The south-eastern section can be reached from the south shore of Lake Lois, or via the Rouyn-Taschereau line of the C.N.R., which lies some 1000' off the south-east corner of the map-area.

The undeveloped portions of the map-area are taken up with

parallel, bare rock-ridges separated by draws floored with sand and gravel, and covered by young, dense deciduous bush. The central portion of the area east of the Macamic Road is covered by an extensive apron of sand and gravel.

The method used in mapping the area involved the direct use of aerial photographs in the field.

The entire mapping project, some forty miles long by a width varying from three miles at the western end to some five miles in the area east of the Macamic Road, was photographed in the spring of 1949, before deciduous trees had leafed. Photographs thus taken shew all exposed bedrock very plainly, and there is, therefore, little likelihood of overlooking outcrops of almost any size.

Actual mapping simply involved navigation by pace and compass between the outcrops on the photographs. Bearings were measured from the photographs, across the centers of which meridians were drawn, and distances were scaled off the photographs. The errors, both of bearing and scale, due to distortion near the edges of any photograph, were sufficiently slight that even in heavy bush, no outcrop was overlooked or missed.

In conjunction with aerial photographs a controlled mosaic was used on which roads, rivers, buildings, etc., coincide exactly with the same as positioned on the township plan. Selected roads were chained during the summer as a check on the accuracy of the mosaic. Geology, mapped from day to day onto individual photographs, was transferred to an acetate sheet cut to fit the mosaic. In this way the outcrops were correctly positioned, since any error due to scale change towards the margins of individual photographs disappeared when identical points were located on the mosaic. Thus the need of distributing traverse errors,

such as arises in a pace-and-compass traverse, did not arise.

Such a system also resulted in more ground's being covered in a single field-season than can be covered by spaced and set compass traverses.

During the season the writer was ably assisted by Mr. Walter Gibb, a recent graduate of Mount Allison University, by M. Louis-G. Tangé, a third-year student at Laval University, and by Messrs. Donald Pollock and George Mannard, both of Montreal.

Bibliography:

Listed below are the publications of those who have done some work in the area:

McOuat, Walter; "Country between Lakes Temiscamang and Abbitibbe"; G.S.C. Rept. of Progress 1872-73, pp. 112-135.

Barlow, A.E.; "Report on the Geology and Natural Resources of the Region of Lakes Nipissing and Temiscamang"; G.S.C. Annual Rept., new series, vol. X., pt. I, pp. 1-322.

Johnson, J.F.E.; "Eastern Part of Abitibi Region"; G.S.C. Annual Rept., vol XIV, p. 130.

Wilson, M.E.; "Timiskaming County, Quebec"; G.S.C. memoir 103, 1918.

Tanton, T.L.; "The Harricanaw-Turgeon Basin, Northern Quebec"; G.S.C. memoir 109, 1919.

Wright, D.G.H., & Segsworth, W.E.; "Extension of the Porcupine Gold Belt into Quebec"; Eng. & Min. Jour., vol. 117, p. 763, (1924).

Coleman, A.P.; "Glacial and Post-Glacial Lakes in Ontario"; U. of T. Studies, Biological Series, 1922.

Buffam, B.S.W.; "Destor Area, Abitibi Co., Quebec"; G.S.C., Summ. Rept., 1925, pt. C., pp. 82-104.

Iang, A.H.; "Palmarolle and Taschereau Map-Areas, Abitibi Co., Quebec"; G.S.C. Summ. Rept., 1932, pt. D., pp. 22-35.

Wilson, J.T.; "Glacial Geology of Part of North Western Quebec"; R.S. Canada, Memoirs, XXXII, 1938, section IV, pp.49-59).

## PHYSIOGRAPHY

The map-area lies within the clay belt of northwestern Quebec, but only a portion of the area shews the characteristic relief of this region.

Range X of both Duparquet and Destor Twps., and Ranges I and II of Palmarolle and Poularies Twps., from the western boundary of the map-area as far east as lot 9 in each of Destor and Poularies Twps. (i.e. to within one mile of the Macamic Road) lie within the Abitibi Plain.

Here the terrain is extremely flat, punctuated by occasional rocky hills which pierce the clay cover. North of the Duparquet-Palmarolle boundary road these blunt hills are of grey granite. The most extensive single granite hill lies on the western edge of the village of Ste. Germaine de Palmarolle; other hills are considerably smaller, many being the size of roches moutonnees, perhaps some 50 ft. long by 20 or 30 ft. wide.

The clay area is for the most part now under cultivation, and both hay and oats are raised. No other crops are apparently successful, and the principal products of the area are milk and butterfat. Some potatoes are grown, but the frequency of early frosts (the 6 a.m. temperature on 19 August 1950 was  $\neq 23^{\circ}\text{F}$ ) make their maturing somewhat questionable.

The soils in the lower regions range from black mucks to peat soils which are quite fibrous. The soils higher up the valley slopes become grey and merge into the grey wooded soils of uncleared areas. These soils may shew a thin layer of dark leaf-mold.

There is no standing water on this portion of the map-area, and very little swamp. The few rivers have cut sharp-walled, shallow valleys some forty feet below the level of the Abitibi Plain, into the soft sand

and clay cover, and presently flow in sinuous courses with slight current. In an attempt to drain the broad valley bottoms and thus extend the agricultural lands, the river channels have been dredged, this is leading to the drainage and drying of the peaty floors of the valleys, which support the only muskegs within the Plain.

With the altimeter (aneroid) set at 1035 ft. at the corner of the Macamic Road and the Destor-Poularies boundary, the altitude of the Abitibi Plain in the Parish of Ste. Germaine de Palmarolle lies in the neighbourhood of 955' A.W.S.L.

To the east of the Plain, in Poularies Twp., the terrain consists of large, closely-spaced granite hills, roughly equidimensional in ground plan, and separated by draws either floored with sand, or swampy. The highest of these hills rises some 520' above the Plain. The hills follow no pattern in the manner of their location, and continue as far east as lot 43 in Ranges I and II, Poularies Twp., where the granite dies out. To the east, beyond the granite, the terrain reverts to clay and sand-plain, above which project isolated hills of volcanics.

The southern portion of Range X, the entire Range IX, Duparquet Twp., and Ranges VIII and X, Destor Twp., are taken up with large, steep-walled rock ridges elongated in the direction of strike of the volcanics forming them. These are a continuation of the ridge which marks the southeastern corner of the previous year's map-area. Like similar ridges in Roquemaure Twp. the Duparquet and Destor strike-ridges are separated by wide, flat, sandy-floored valleys. Again, like the ridges to the west, the profiles shew steep north-facing slopes and much gentler southern slopes. The southern slopes are further softened by the occurrence of aprons of sand and gravel. Towards the east the ridges become more frequent, and considerably higher, to culminate in the so-called Destor Hills.

The Destor Hills lie to the west of the Macamic Road, extending from a point some 1500 ft. west of the road to some two miles to the west in Range VIII, Destor Twp. This group of hills, composed of massive and pillowed andesite, rises to heights some 420 ft., 450 ft., 460 ft. and 520 ft. above the Abitibi Plain to the north. (These altitudes were determined by aneroid barometer, and are, therefore, only approximate). The Destor Hills mark the highest and most rugged ground in the map-area; and, in contradistinction to the north, shew a definite alignment along the regional strike of the lavas of N 75 W.

Looking south across the Abitibi Plain, the profile of the Destor Hills shews a distinct pattern of gentle eastward-facing slopes and steep westward-facing slopes. In general, too, northward-facing slopes are steep-to-precipitous, while southerly slopes are gentle. The hills next west of the high-tension line have quite precipitous westerly-facing scarps which give every appearance of being fault-line scarps. Between two of these hills, lining the steep east and flatter west walls of a deep trench there are two sheets of diabase, which are possibly the walls of a diabase dyke along which faulting has taken place.

The Destor Hills could be fitted into a system of lozenges bounded each by two parallel faults and, to east and west, by a pair of southwardly-converging faults. The fault blocks have been tilted up towards the west.

The controlling system of faults thus suggested involves (a) one set parallel to the trend of the major shear of the area, i.e. N 75 E, with a nearly vertical dip; (b) a set striking on the average N 28 E, with a steep westerly dip ... this is a clearly-defined fault direction throughout this southern part of the map-area, and evidenced in the Destor Hills by steep, sharp trenches between the hills; (c) a less well-defined set striking N 60 W, with unknown dip.

Between the granite hills on and north of the Destor-Pouliaries boundary, and the Destor Hills of volcanics, whose northern boundary lies in the southern portion of Range IX, Destor Twp., lies an extensive area of sand. In Range X and the northern portion of Range IX, Destor Twp., this apron of sand is pierced by rocky hills, widely scattered in Range X, forming an east-west chain of outcrops in the northern portion of Range IX.

For a matter of some 2500' - 4000' in the central portion of Range IX the low, sandy area is uninterrupted save for certain swampy areas and for Lake Lavoie, which lies 3/4 mile to the east of the Macamic Road. This valley represents the westward extension of the Lake Lois trough.

The easterly extension of volcanic ridges forms the south shore of Lake Lois within the map-area. North of the ridges the heavy apron of sand, mentioned above, extends to form the western end of Lake Lois.

Lake Lois penetrates the map-area from the east for some two miles, and drains northward across the northeast corner of the area via the Lois River into Lake Macamic. Lake Lois is 3/4 mile wide at its widest point within the area, but has an average depth of perhaps four feet. Like other lakes of northwestern Quebec which in part or wholly lie within the Abitibi Plain, it is very shallow and turgid.

A small lake lies on the west side of the Macamic Road across the Range VIII - IX line. It is quite equidimensional, lies on the sand apron, and lacks both inlet and outlet. It is presumed to represent a Kettle-lake.

Beaches of the former Lake Ojibway-Barlow occur on the flanks of hills in scattered localities. Two excellent examples are visible from the Macamic Road in lot 12, Range X, Destor Twp., just to the west of

the highways. Here boulder beaches occur at two levels, separated by about 12 ft. (of elevation). The boulders are mostly of grey granite, diorite, and granite-gneiss.

Well-rounded boulders of granite and diorite, mixed with somewhat angular blocks of local lavas, occur at the north end of lots 3 - 4, Range VIII, Destor Twp. in the form of a well-developed beach terrace.

An extensive apron of sand and gravel, which stands above the general plain level as a possible delta or alluvial fan occurs in lots 20 - 23, Range X, Destor Twp. This deposit has been opened extensively for road ballast.

The few narrow rivers which drain this sandy portion, like those which drain the clay plain, occupy wide, steep-walled valleys. Where studied, all rivers within the map-area had failed to discover bedrock, and the valleys were cut entirely in unconsolidated material. The majority of valley walls shew terraces which are matched, and which were interpreted as representing former levels of grade.

## GENERAL GEOLOGY

The consolidated rocks are all of preCambrian age, and consist of a series of Keewatin-type acid and intermediate volcanics, within which lie beds of flow-breccia, agglomerate, and narrow, discontinuous bands of tuff. A number of algonian-type intrusives, both acidic and basic, is found cutting the volcanics. The flows dip steeply south and top south. The flows are locally, though infrequently, overturned. Strikes are very consistently N 70 - 75 E throughout the area.

The folded volcanics represent the north limb of a syncline, with axis lying south of the map-area. Following the folding of the volcanic series, intense shearing took place. This major shear-zone crosses the map-area in a direction S 70 - 75 W, from Lake Lois to the south-east corner of Range IX, Duparquet Twp. The shear-zone is almost entirely mantled with sand, and thus its width is unknown. Highly sheared rocks occur in outcrops some 1500 ft. apart across the general strike of the zone, thus giving the zone a width of at least 1500 ft.

To the north of this shear-zone the bulk of the volcanics are rhyolitic, in part trachytic. Close to the granite mass the rhyolite is largely intruded by felspar-porphyry, and, as in the case of like material lying farther to the west, it is most difficult to differentiate the two types, possibly because of either a process of granitization or of near-contemporaneity of emplacement.

South of the shear-zone the volcanics are mainly meta-andesites, both massive and pillowed.

Following folding, the volcanic series has been intruded by large quantities of granite, smaller amounts of diorite and gabbro, and by dykes of quartz- and felspar-porphyrines and of diabase. A single mass of peridotite

occurs within the granite or the northern portion of the map-area. The visible contacts are fault-contacts and, as a result, the relative age of the peridotite was not determined.

Numerous faults and shears are found which cut the volcanics and pyroclastics. They have an average strike of N 25 - 30 E. For the most part such faults occur south of the major shear-zone, and thus in the andesites. Where such faults occur north of the shear-zone they apparently die out before the granite contact is reached. Evidence of the presence of such faults is, for the most part, topographic. Offset contacts usually occur on opposite sides of rather wide draws, and therefore constitute questionable evidence.

A portion of the rhyolite adjacent to the granite, and lying between lots 42 - 49, Range IX, Duparquet Twp., is notably granitized.

The following table lists the geologic data as interpreted  
within the map-area:

	(forest soils (gravels and sands Recent, and Pleistocene-(varved clays (tills
- great unconformity -	
post-Algoman	(diabase -(porphyries: quartz and felspar
Algoman (?)	(diorite - (granite (gabbro ("older" diorite) and peridotite (position unknown)
Keewatin-type	(andesites: pillowed and massive (pyroclastics: tuff, agglomerate -(rhyolite: trachyte (andesite: massive

## KEEWATIN-TYPE ROCKS

The greater portion of the map-area is underlain by Keewatin-type rocks. To the north and west of the major shear-zone, i.e. the entire map-area the portion of Destor Twp. mapped, the rocks are predominantly acidic, consisting of rhyolite-like lavas, little trachyte, and wide bands of tuff and agglomerate. A separate band of meta-andesite lies against portions of the granite mass of the northern part of the area.

South of the shear-zone, in Destor Twp., the rocks are intermediate, consisting of meta-andesite, both massive and pillowed.

Andesite:

Greenstones (andesitic lavas) are the predominant extrusive rocks of the map-area, and occur both as massive and as pillowed flows.

The older andesite, that is, the andesite which occurs in contact with the granite, occurs as a narrow southeasterly-trending nose which enters the area at the western boundary in the central half of Range I, Palmarolle Twp. Here the flow is 1700 ft. wide and rapidly tapers to die out at the north end of lot 37, Range X, Duparquet Twp. This andesite is massive and fine textured, and occurs within the area as three small glacially-polished and striated surfaces which have been exposed in a ditch at the roadside. These fresh, polished surfaces are a dark greyish-green.

The remainder of the older andesite occurs in small patches scattered along the granite contact. The largest of these patches lies against the north-east boundary of the granite, and occupies a triangular area between granite and pyroclastic rock, extending from the south end of lot 43, Range II, Poularies Twp., northeasterly to the north end of

lot 5b, Range II, Poularies Twp., within this area the andesite is again massive, and shews considerable development of secondary albite, giving the rock, in places, the appearance of a porphyry.

The older andesite shews little structure, shews a brownish to rusty weathered surface and a dark grey to greenish fresh surface. The texture varies from place to place from the very fine-grained, almost glassy rock found in the westerly tongue, to the coarsely crystalline rock containing albite, mentioned above, which can be confused with a diorite.

The greater mass of andesites has, as its northern boundary, the major shear-zone of the map-area. Thus the northern boundary is a relatively straight line, trending S 72° W, which includes the south shore of Lake Lois, and which leaves the area in the southeast corner of Range IX, Duparquet Twp. South and east of this line the exposed rock, occurring in strike ridges, is mainly pillowed andesite.

This mass is made up of a considerable number of individual flows, which range in width from some 5 ft. or so up to several hundreds of feet. Both massive and pillowed flows contained fragmental material which appears to have been stirred into the lavas. Pillows vary in size from 8 inches up to 8 ft. in length by 3 inches to 4 ft. in width. The rims are intact and well vesiculated, and a high proportion of quartz amygdules are found. Many of the pillows are quite irregular in outline, making strike determinations difficult. Pillows of yet other flows exhibit both the flat bottoms or the "v-shaped" projections of the classic pillow, permitting the determination of tops, which face southerly.

The massive flows of this portion of the map-area are much narrower and discontinuous in comparison with the pillowed flows.

#### Trachyte:

Trachyte occurs in a narrow wedge lying within rhyolite, and

extending from the south-central portion of lot 37, Range IX, Duparquet Twp., where it is 300 ft. wide, N 70 E to abut against the granite in the northern quarters of lots 44 - 49, same range. A second mass occurs in the form of a small lens, 2300 ft. by 300 ft., with long axis striking N 80 E, in the southern halves of lots 50 - 52, Range IX, Duparquet Twp.

The trachyte is light grey on a fresh surface, and weathers to a darker grey or brownish colour. The rock is very fine-grained and massive. The larger mass, above, is considerably granitized for some 500 ft. to 750 ft. from the contact with the granite.

#### Rhyolite:

A wide belt of rhyolite flows enters the map-area from the west, extending from the south-west corner, in Range IX, Duparquet Twp., north to a point one third the way up the west boundary of lot 32, Range I, Palmarolle Twp. Flows within this belt trend N 72 E into the map-area, where they abut against the irregular contact of the granite mass. To the west of lot 44, Range IX, Duparquet Twp., the width of the rhyolite forms a narrow belt along the southern boundary of the granite, rarely exceeding 1500 ft. in width, and trending, on an average, N 70 E, to die out at the north end of lot 31, Range X, Destor Twp.

The rhyolite is very fine-grained, locally quite glassy, but also locally appears quite porphyritic, shewing phenocrysts of felspar and quartz. Locally the rhyolite carries considerable tuffaceous and rhyolitic fragments and resembles an agglomerate.

As described in the previous year's report, there are localities in which the porphyritic texture of the rhyolite gives the rock the appearance of intrusive material. Much of the rock shews undoubted extrusive material apparently intruded by porphyritic rhyolite. Structural relationships, e.g. lack of chilled edges, suggest slight

temperature gradients between intruded and intrusive rocks, and as before it is suggested that such a complex can best be explained as the filling of cavities (tunnels, blisters, etc.) within older flows by the liquid material of younger flows.

A fresh surface of rhyolite varies from a pinkish-grey to a whitish-grey colour. This weathers to a light-grey or almost white colour. A small percentage of epidote present gives certain whitish surfaces a very pale greenish cast.

In the extreme southwest corner of the map-area the rhyolite is highly sheared, carbonatized, and pyritized. The rock is extremely fissile, and the material of the laminae shews a sugary texture, weathers to a crumbling granular mass lightly cemented with a ferruginous calcite. This portion of the rhyolite also encloses several striking quartz veins, notably in the south ends of lots 35 - 36, and in the south-central part of lot 34, Range IX, Duparquet Twp.

In the south-eastern portion of Range IX, Duparquet Twp., it is difficult to separate rhyolite, which here contains numerous fragments, from the pyroclastics (tuff and agglomerate) which occupy the south-eastern part of this Range.

Pyroclastic Rocks: (Tuff and Agglomerate)

A wide zone of coarse pyroclastics trends N 72 E across the central part of the map-area. Within this zone narrow bands of silicified tuff lie within the coarser-grained, with a finely pitted grey surface, much like that of a coarse sandpaper. The most striking bands occur in the south-central portions of lots 50 - 53, Range IX, Duparquet Twp., where iron-formation occurs with the tuff. Here the tuff occurs as a parallel series of narrow bands, each some 2 - 3 in. wide, and not exceeding 300 ft. in length. Between the individual bands there lie

bands of iron formation of similar width which weather out to a deep chocolate-brown.

Agglomerate occurs as a band of unknown width at the top of the rhyolite. This band enters the area at the south end of lot 46, Range IX, Duparquet Twp., and trends N 72 E across the map-area as a band of variable width, of which the southern boundary is obscured, lying, as it does, in the major shear-zone of the area. Agglomerate occurs along the south boundary of Range IX, Duparquet Twp., from lot 46 to lot 61, in which lot the shear-zone is encountered. From this point north-easterly as far as lot 19, Ranges IX - X, Destor Twp., the agglomerate occurs as a narrow, highly-sheared band averaging 1000 ft. in width. From this point the band widens, its southern boundary continuing N 72 E while the northern boundary swings N 60 E to pass out of the area at the north end of lot 5b, Range II, Poularies Twp. Thus, in the eastern half of the area the agglomerate thickens from 1000 ft. to some 10,000 ft. at the eastern boundary.

The fragments which constitute the agglomerate vary greatly in size, from lapillae some 2.5 mm. in diameter to blocks 12 - 18 in. in size. The coarser type occurs in the lower horizons, i.e. in the north portion of the agglomerate band, with the finer types lying in the more southerly portions of the band.

The outstanding coarse type of agglomerate contains whitish-weathering trachytic and andesitic fragments in a fine-grained tuffaceous matrix. On a weathered surface the tuff is whitish-grey in colour and finely pitted. A fresh surface is often quite green and very glassy. In many cases a fresh sample of the tuffaceous matrix appears very similar to an adesite; this is unfortunately especially true of diamond-drill core.

## POST KEEWATIN-TYPE INTRUSIVE ROCKS

The Keewatin-type volcanics are intruded by a batholith and several bosses of granite, as well as by stock-like masses of gabbro, peridotite and diorite. Numerous dykes, by acidic and basic, intrude both the volcanics and the stocks mentioned above.

Gabbro:

A single narrow mass of gabbro occurs invading massive and pillowed andesites in the north central portions of lots 4 and 5, Range VIII, Destor Twp. The gabbro stock extends S 20 E for 1300 ft. and is between 150 ft. and 200 ft. wide. A distinct chilled edge occurs on the east, north, and west contacts; to the south the gabbro is open. Within a few feet of the contact the gabbro is coarse-grained, with ferro-magnesian minerals and feldspars reaching a maximum size of  $\frac{1}{4}$  in. Quartz occurs in the form of bluish eyes, scattered throughout the gabbro. The gabbro weathers to a rich chocolate-brown, and is greenish on a fresh surface.

Peridotite:

Peridotite occurs within the grey granite of two large hills in lots 37, 38, 39 and a portion of lot 40, Range II, Poularies Twp.

The rock occurs as two distinct masses, both narrow, and both trending S 40 E. The northwest mass is 400 ft. wide by 1500 ft. long, the more easterly mass is 800 ft. wide by 2000 ft. long. These masses are easily reached by way of a fair trail which starts on the Macamic Road at the north end of lot 30, Range II, Poularies Twp.

The relationship between the two peridotite masses and the grey granite is unfortunate. In both cases the southern boundary is a distinct fault, represented by a narrow, straight trench. In lot 37

the north boundary is represented by a similar trench. The north boundary of the more easterly peridotite is quite hidden beneath the floor of a sand- and gravel-covered draw, north of which lies a hill of diorite and grey granite.

In both cases the southern boundary shows the same features, from NE to SW: peridotite, fault trench, diabase dyke, grey granite.

The diabase dyke grades from a medium-grained rock on the southern wall of the trench into a very fine-grained distinct chilled edge where it is in contact with the granite. There is a distinct difference, megascopically, between the peridotite and the diabase (rather, the rock termed 'diabase'). The peridotite is black on a fresh surface and appears to be either aphanitic or rather coarse-grained. It lacks visible evidence of any mineral other than the dull-black ferromagnesian. On the other hand the diabase is a medium- to fine-grained rock with a distinct salt-and-pepper appearance. The granite is grey, and locally has segregations of hornblende. The segregations do not appear to be, or to have been, xenoliths of peridotite.

In lot 37, across the north boundary the sequence is, from SW to NE: peridotite, a narrow (4 ft. - 6 ft) sand- and gravel-floored trench, a NW-SE trending spine of diabase, a trench, the grey granite.

One small portion within the general granite mass, and abutting directly upon the trench, consists of a very dark, heavy, rather coarse-grained rock. Contact between this rock and the granite is quite definite, though there is no chilled edge. This portion may be a larger segregation within the granite, or possibly a xenolith of peridotite in part digested by the granite.

The lack of contacts other than fault-contacts gives no chance for determination of the position of the peridotite in the intrusive sequence.

In the G.S.C. Summary Report, part C, 1925, p. 99c, Buffam states: "...In northeastern Ontario, from a number of localities more or less in the same latitude, many bodies of serpentine have been reported, and their description is identical with that of the serpentine from Destor. As the peridotite has been generally considered to be older than the granite in these areas, and as there is no information in the Destor map-area regarding its place in the sequence of igneous activity, it has been assumed as older than the granite of northern Destor and Duparquet, and younger than the older gabbro which it cuts in Ontario."

On p. 61c of the same report, James, with reference to peridotites in LaMotte Twp. where they occur on Kewagama peninsula, states that they are there cut by granite ... hence are older than that particular granite.

The peridotite is closely jointed and weathers readily. Because of this close jointing and ease of weathering the surface has a distinct mammillary appearance. The weathered surface, which is whitish, is very soft, and scars easily under the hammer. A fresh surface is black.

Serpentine is common along the joint surfaces, and considerable asbestos also occurs. The weathered surface, when viewed correctly with respect to the sun, shews numerous shiny, silky streaks. These ribbons or fibre are usually parallel, occupying one particular joint set. The ribbons average about 1/5 in. in width, the asbestos is cross-fiber, usually white, and relatively brittle. Selected areas run up to 3% asbestos; however, the overall content is less than 1%, possibly in the neighbourhood of 0.1% asbestos.

Considerable magnetite occurs with the peridotite, and there is a local deviation of some 20°. In certain joint surfaces coarse octahedra of magnetite occur.

Granite:

Fifty percent of the map-area is underlain by granite which forms part of an extensive batholith which occupies the majority of the northern three-quarters of Palmarolle and Poularies Twps.

Granite enters the map-area in the northern end of lot 31, Range I, Palmarolle Twp., where it lies in contact with massive andesite, and trends S 60 E to the northern quarter of lot 44, Range IX, Duparquet Twp. From this point the contact swings to slightly north of east to cross Duparquet and Destor twps. as far as the Macamic road. Thence the contact trends N 60 E to the south end of lot 45, Range II, Poularies Twp., from which point it swings north, then west of north, to leave the area at the north end of lot 41, same range.

The contact between the granite and the invaded rocks is rarely sharp; rather, is represented by a diffuse zone of variable width. Within this zone the older rocks are cut by numerous tongues and apophyses of granite. Further, the lavas, as the granite mass is approached, are granitized to a greater or less extent. It is possible to find gradations from undoubted lavas through lavas which have become coarse-grained and quartzose, through granites which shew a greenish andesite-like colour, into undoubted granites.

The granite varies in colour from a grey hornblende granite at the edge of the batholith to a pink-to-reddish hornblende granite within the batholith. All gradations occur, and there is no evidence that the mass is composite.

Grain-size also varies considerably, and this variation is not related to position with respect to the batholith boundary.

In the grey granite the majority of the felspar is a whitish to pale-grey plagioclase. In the pink variety, grey felspar is present in

smaller amounts, and orthoclase predominates. Finely-divided epidote occurs both as a coating and as distinct fine grains. The epidote gives the rock a decided greenish-yellow cast, which is most evident on a glacially-polished surface.

Diorite:

A number of small masses and dykes of diorite cut all the major rock-types of the area. None are of great size, the largest, lying in the north ends of lots 40 to 43, Range I, Poularies Twp., is some 3200 ft. by 500 ft.

The diorite has a granitic texture and varies from medium- to coarse-grained. Unlike the diorite farther to the west, in Range X, Hebecourt Twp., the texture is one of distinctly interlocked grains, and on this basis the rock was mapped. The felspar in all cases is a grey plagioclase, and the ferromagnesian minerals have largely altered to chlorite.

From place to place the diorite contains considerable glassy quartz. This quartz occurs in two ways: either as rounded eyes of a pale bluish quartz, or as glassy, clear grains interlocked with the other constituents.

Porphyry dykes:

Dykes of quartz-felspar-porphyry are found cutting the granite, also, in the form of apophyses, cutting the volcanics at the boundary of the granite batholith.

A felspar-porphyry, distinguished by a greenish matrix and phenocrysts of a milky felspar, is found cutting the agglomerate in the north ends of lots 44 - 45 and lot 46, Range I, and in the north central portion of lot 55, Range II, Poularies Twp.

Diabase Dykes:

Two wide dykes of diabase are found cutting across large hills of granite to the east of the Macamic Road. The larger extends from the south-central part of lot 23, Range X, Destor Twp., in a direction N 45 W for 6000 ft. into the north-central part of lot 17, same range. Several hundred feet west of the north end of this dyke a second, smaller dyke trends in a similar direction for 2500 ft. into the north end of lot 15, Range X, Destor Twp.

Both dykes shew distinct chilled edges which grade into coarser-grained rock towards their centers. The smaller of the two dykes shews the diabase to have a distinct ophitic texture.

Numerous smaller dykes occur throughout the area, but are too narrow to shew successfully on the map.

## PLEISTOCENE AND RECENT DEPOSITS

These deposits include glacial sands and gravels, varved clays, and recent forest soils.

The low, flat-lying sections of the map-area, which constitute portions of the Abitibi Plain, are underlain by varved clays. This area extends westward from lot 9, Destor and Poularies Twps. Here the excavations of various creeks, as well as excavations for wells, have laid bare the varved clays, and have also shown the upper horizons to have been developed into a grey forest soil. The soil is in places mixed with more or less peaty material. Elsewhere the varved clays are overlain by sands and gravels.

Between the hills of granite and ridges of volcanics the draws are floored with sands and gravels. The same materials also occur as heavy aprons and well-defined trains in the lee of nearly every rock hill of the area.

Such Pleistocene features as eskers, drumlins, and kames are not found within the map-area. A single kettle occurs in a sand plain on the west side of the Macamic Road at the south end of lots 12 - 13, Range IX, Destor Twp. It is some 300 ft. wide by 500 ft. long, is flooded with clear water, and has no visible inlets or outlets.

The kettle-lake mentioned above lies on a relatively featureless sand plain which extends from the eastern base of the Destor Hills easterly to a series of strike-ridges some 500 ft. east of the Macamic Road. In Range VIII, Destor Twp., the mantle of sand rises gently towards the south, to culminate in a broad, low sand and gravel ridge which lies 800 ft. north of the southern boundary of the map-area.

West of the Macamic Road this ridge has been breached by an extensive pit from which sand and fine gravel are obtained. This same apron of sand extends east of the Macamic Road for the entire width of Range VIII, and easterly as far as lot 16, Destor Twp.

The sand plain to the north of the kettle, in Range IX, Destor Twp., extends N 70 - 75 E over the site of the major shear-zone, and for a width of between 1500 ft. and 2500 ft., to the west end of Lake Lois.

A heavy apron of gravel extends south from a series of low ridges of agglomerate just north of the Range IX - X line, lots 23 - 27, Destor Twp. At the south end of lot 26, Range X, Destor Twp. the southern edge of this apron has been opened for gravel, and here shews a depth, or both horizontal and torrentially cross-bedded gravels, of some 10 ft.

To the southeast of the extensive, bare rock-ridges of lot 49 - 57, Range IX, Destor Twp., the terrain is low, covered with heavy brush, and mantled with sand. This particular sand-plain extends beyond the limits of the map-sheet.

Beach terraces occur at various levels on the flanks of the Destor Hills and elsewhere. The boulders are mainly of grey granite, diorite, and granite-gneiss: those of the Destor Hills' beaches shew more boulders of the local volcanic rocks. These boulders tend to be somewhat angular in outline.

STRUCTURAL GEOLOGY

Folding:

The lavas form part of the north limb of a syncline, with axis lying south of the area. The average strike of the flows, across the entire map-area, lies between N 70 E and N 75 E. Dips are steeply south, frequently vertical, and rarely steeply north. Variations in strike do occur, associated with dragging along the major shear of the area. Strikes of the axial planes of such drag-folds lie between S 28 W and S 35 W, plunges 80 S on an average.

Small-scale drag-folding is found with the shearing in the very south end of lots 33 -34, Range IX, Duparquet Twp. where it occurs in rhyolite. Here the axial-planes indicate movement of the north wall to the east relative to the south wall.

Somewhat larger-scale drags, still less than one foot in size, occur in the center of lots 27 - 28, Range X, Destor Twp., on the Lyndhurst ground. Here the average strike of the axial-planes is again S 28 W, with a plunge to the south of 80°. These drags are interesting in that they enclose small crescentic stringers and veins of quartz.

Local gentle rolls in the volcanics occur at the south end of lot 36, Range I, Poularies Twp., where the swing is from N 70 E to S 80 E. This roll occurs in tuff. A second, larger deviation from regional strike is found in pillowed andesites some 1500 ft. south of Lake Lois in lots 60 - 61, Range X, Destor Twp., Here the volcanics are steeply overturned to the north. Both rolls appear to be related to movement along the major shear-zone, and the axis of these minor folds in each case indicate a relative movement of north block towards the east.

Faulting:

A major zone of intense shearing crosses the east and central parts of the map-area in a direction S 65 - 70 W. At the eastern border of the map the shear-zone underlies the site of Lake Lois, and outcrops of pyroclastics on the three small islands, and one either side of the outlet of the lake in lot 55, Range I, Poularies Twp., are highly sheared. The rock of these islands is now a sericite-rich schist.

The major shear-zone underlies a belt of low ground and sand-plain. The few outcrops of pyroclastics and andesites which do occur within this belt all shew evidence of intense shearing. The pyroclastics are represented by sericite schists, and the andesites by chlorite-rich schists. The two most widely-separated outcrops which lie across the strike of the shear-zone are 1500 ft. apart. Since both of these outcrops are sheared, the width of the shear-zone leaves the map-area in lots 50 - 62, Range IX, Duparquet Twp. However, the zone, further towards the west, again swings into the area mapped during the previous season. A portion of the northern edge of the shear is found in the south end of lot 33 - 34, Range IX, Duparquet Twp.

Here the rock is a rhyolite, a very fine-grained, greenish-grey flow, with a whitish weathered surface. The rock is cut by a closely-spaced (4 in. - 6 in.) set of small shears which strike S 83 E and dip vertically. These give the rock a banded appearance. The shears are up to  $\frac{1}{2}$  in. wide, and in every case the schistosity shews movement of N wall towards the east, relative to the south wall. The shears have weathered out to varying depths, and the sheared rock is fissile and faintly coloured a yellowish-green.

To the north of the above-mentioned site, about 100 ft. distant, the shearing becomes more closely-spaced, and the banding reverts to a

series of 1/8 in. - 1/4 in. spaced uneven fine cracks which locally shew dragging between shears. The strike of these is N 35 E, with the dips being vertical.

Further to the northeast the individual shears become scattered and discontinuous. The average strike is N 86 W, and all cases still shew relative movement of north wall towards the east.

At the south end of lots 40 - 41, Range IX, Duparquet Twp., there is a strong shear which lies in rhyolite which has been granulated, carbonatized and epidotized. It contains fine pyrite as well as heavy, somewhat discontinuous quartz veins which strike N 85 E and dip vertically, within the shear which appears to dip about 85°S.

A strong subsidiary shear, which parallels the major shear-zone, cuts rhyolite about 1/3 the way up lots 50 - 51, Range IX, Duparquet Twp.,. The rhyolite is highly sheared, very fissile, and weathers to a rich chocolate-brown colour. Considerable fine pyrite is found throughout this zone, which has been trenched.

An area of six outcrops of tuff and fine agglomerate straddles the high-tension line in the south-central portions of lots 1 - 3, Range IX, Destor Twp. All six outcrops have been sheared, and now weather out to granular, carbonatized material. A very little fine pyrite also occurs within these outcrops.

The major shear-zone cuts a further outcrop of tuff and agglomerate which straddles the Macamic Road in the northern 1/3 of lots 12 - 13, Range IX, Destor Twp. Here the shearing is not so pronounced, except on the weathered surface of the western 1/3 of the outcrop. The remainder of the outcrop has been glacially polished to a smooth, slippery, greenish surface.

On the Lyndhurst Mining Co., Ltd. ground, in lots 26 - 28,

Range X, Destor Twp., the tuff is again well sheared. Here the surface appears to be made up of narrow ( $\frac{1}{2}$  in. - 1 in.) lenticles of very fine-grained to glassy material, separated by narrow (1/10 in. maximum) zones of schistose rock. The material appears to be sericite, with some talc or chlorite. The shearing strikes N 70 E and dips between  $65^{\circ}$  and  $75^{\circ}$  S. There is no visible mineralization.

Farther to north of east the rock is sheared, and shows slaty parting. Some sericite has been developed.

The pyroclastics of this portion of the shear-zone are, on the whole, considerably knotted and schisted. Fine pyrite and occasional massive chalcopyrite occur, and where such is the case, the knotted rock weathers to a dark, greasy surface.

The most easterly appearance of the shear-zone occurs within the fine pyroclastic rocks which line the shore of a peninsula on the south shore of Lake Lois. Similar, highly-sheared, rocks occur on three small islands within the lake.

North of the extreme western end of Lake Lois the pyroclastics are again highly sheared, in places knotted, and carbonatized.

Younger faults of small displacement strike, on an average, about N 25 E across the andesites of the south-central part of the map-area. These are particularly striking in the Destor Hills of Range VIII, Destor Twp., to the west of the Macamic Road. Here, the western flanks of the Hills are fault-line scarps, all more-or-less parallel to one another, and striking N 25 E. Flows of massive andesite are truncated in several places by these younger faults, but the displaced parts were not found in every case. In all cases the dips are steep, and in one case the fault was subsequently invaded by diabase. This dyke lies in lots 55 - 56, Range VIII, Destor Twp.

To the east of the Macamic Road, in the neighbourhood of Lake Lavoie, the west side of such faults has been displaced south relative to the east side. Farther to the east the reverse appears to be true.

The peridotite plug, which has already been discussed, is bounded on the northeast and southwest by faults which trend N 45 - 50 W. No clue exists to aid in determining the relative age of these faults.

## ECONOMIC GEOLOGY

Most of the prospecting in the map-area has been done in Range IX, Duparquet Twp., and in Ranges IX and X, Destor Twp., to the east of the Macamic Road. To date, nothing has been produced economically.

Prospecting and developing has been undertaken along both the main shear-zone and along the subsidiary shears mentioned as lying to the west of the main zone in Range IX, Duparquet Twp.

Mineralization within the shear-zone consists chiefly of carbonatization and pyritization. The pyrite for the most part is very fine, though locally cubic pyrite up to  $\frac{1}{2}$  in. edge is found. Chalcopyrite also occurs, but the extent of such mineralization appears to be very slight.

Properties:

1. Lyndhurst Mining Co., Ltd.,

This company holds a large block of ground to the east of the Macamic Road. The portion in Destor Twp. consists of eighty-three claims which lie in Range X and extend from the Macamic Road some 29,000 ft. to the east. The remaining northeasterly portion lies in Poularies Twp. and consists of the southern halves of lots 35 - 46 (incl), Range I. The property comprises four groups of claims which are progressively staggered to the northeast, thus straddling the major shear-zone. The property is thus largely drift-covered.

Eleven short drill-holes have been put down on the property on claim 3 (c.6510) and claim 4 (c.6510). Four holes have also been put down on the claims just east of the Macamic Road. All fifteen holes intersect tuff and agglomerate.

An outcrop of mineralized pyroclastics in the central part of claim 3 (c.6509) has been trenched along its eastern boundary.

At the eastern end of this outcrop the matrix of the pyroclastic appears to be an andesite. The fragments become coarser, with long axis parallel to the strike. Where trenched, the matrix is very knotty and contains a great deal of pyrite in the form of fine to medium-sized cubes. Along the west wall of the trench the mineralized sections are very vuggy, due to the ready weathering of the pyrite. The surface of the outcrop, where pyritized, is very dark brown and rusty-looking.

Considerable quartz also occurs, and this in two ways: (1) apparently replacing certain fragments of the pyroclastic (at least, some of the quartz has the outlines of fragments; other masses are larger and knotted, but elongated parallel to the strike); (2) both are cut by a series of fine quartz stringers which strike parallel to the strike of flow-cleavage, i.e. S 28 W.

Elsewhere on the outcrop the matrix is represented by a talc-chlorite schist. Pyrite occurs not only in the schistose matrix, but in the fragments as well. This is particularly the case along the south and central portions of the outcrop .

A small flat outcrop some 1200 ft. N 75 W of the above outcrop has also been trenched. Here, also, the pyroclastics are knotted, and the rock weathers to a very dark colour. The fresh rock is schisted, is dark-green to greyish-black in colour.

In the northern parts of lots 35 - 36, Range X, Destor Twp., i.e. in claims 3 and 4 (c.6510), considerable development has been done. Towards the SW corner of claim 4, just south of a wagon-road which crosses the claims, the outcrop has been drilled, also deeply trenched. The company's plan states that this trench cuts chalcopyrite of ore-grade (5% copper).

The southern 2/3's of this outcrop is of pyroclastic which strikes

N 75 E and contains occasional narrow quartz stringers. The northern 1/3 is an agglomerate which contains fragments of tuff or glassy rhyolite in an andesitic matrix, striking N 75 E, and dipping 78° S. This material is knotted and schisted, and contains fine to coarse cubic pyrite and massive chalcopyrite. A number of stringers of quartz parallel the formation, and appear to be replacements. Narrow cavity-fillings of quartz strike across the formation, striking S 28 - 35 W, dipping 65 - 75 W. The important chalcopyrite mineralization occurs in the andesitic matrix of the agglomerate.

From hundred feet west of north, across the wagon road, an outcrop of similar material occurs. The southern half of this outcrop is crossed by a wide (2 in. - 2½ in.) vein of milky quartz which strikes N 65 E and dips vertically. The western edge has been deeply trenched, and shews pyrite and massive chalcopyrite in a knotted, andesitic matrix. The northern half is bounded on the east by a fault, which has shifted the andesitic agglomerate north on the east block. To the west of the fault the rock is a whitish-weathering pyroclastic or tuff.

To the north again, some 100 - 200 ft. is a large area of scattered outcrops of similar agglomerate. A number of trenches have been cut where the matrix becomes quite andesitic in appearance. The rock is schisted to give a dark-green to black slate-like rock. Important mineralization is confined to the andesitic agglomerate, and consists of fine pyrite, and chalcopyrite in small masses. Quartz stringers parallel the strike of the formation, N 70 E; also strike S 35 W across the formation. Mineralization within the southern part of this area, which boasts a greater percentage of fragments and less of matrix, is relatively slight, being confined to fine pyrite.

A flooded shaft is located in the east-central part of claim 3

(c.6510), where it has been sunk on a narrow zone of shearing. This shear appears in a trench lying 200 ft. S 45 W of the shaft, is some 7 ft. wide and is mineralized with fine pyrite, quartz, and some massive chalcopyrite. D.D.H.3 cuts this zone, and assays shew low copper values, 2.7% over 3 ft. and 2.49% over 6 ft. D.D.H.6, lying 150 ft. S W of the trench, shews 1.3% cu. over 25.8 ft.. D.D.H.7, 100 ft. father S W, assays 0.46% over 5.0 ft., 0.95% over 1.9 ft., and 0.86% over 0.9 ft.

## 2. Richard Group:

This group of claims lies to the west of the Macamic Road in the area corresponding to Range IX, Destor Twp. A large outcrop, occuring in Claims 1 and 2 (c.7437) straddles the contact between andesite to the south and rhyolite to the north. The outcrop has been trenched, and on Claim 2 there is a shallow shaft which has been sunk in sheared rhyolite.

The sheared rhyolite has been carbonatized, and locally weathers to a rich chocolate-brown. Mineralization consists of fine pyrite disseminated through the schisted rhyolite, which strikes N 70 E and dip 65° S.