42A03NW0021 63.240 MCARTHUR

INTRODUCTION

The property consists of eighteen claims, numbering P-37306 to P-37323 inclusive, located in the central section of McArthur township. It includes the southern part of the high outcrop exposure area referred to as "Serpentine Mountain" on the Redstone River area map number 35H, which was compiled by Dr. E. L. Bruce for the Ontario Department of Mines in 1926. From the west side of Serpentine Mountain the property, roughly rectangular in shape, extends in a southeasterly direction to and beyond Clear Creek a distance of about 40 chains.

Access may be achieved either by air transport or a motor road from South Porcupine lake, and Timmins, Ontario. By air the nearest possible landing is at Triple Lake Mine. This lake may only be used, however, following the spring logging drive by Wicks Lumber Company. A Branching motor road from the south connects the property with the old mine site. Motor transport is the recommended mode of travel over a fairly good sand and gravel road from Timmins, Ontario. The southern part of this road is privately serviced by Wicks Lumber Company and Feldman Lumber Company and it is necessary to obtain their permission to travel over this section of the road.

The writer is not aware of any government geological surveys having been done following Dr. E. L. Bruce's work in 1925 for the Ontario Department of Mines. He briefly outlines work performed by previous workers in his Geology report entitled "McArthur, Bartlett, Douglas and Geikie townships" Ontario Department of Mines, Annual Report Volume 35, Part 6, 1926.

The claims were staked in the early summer of 1952 following a reconnaissance geological survey made by the writer in the late spring of the same year. Detail geological mapping commenced in the late fall of 1952 by the writer and continued until snow conditions prevented same. Completion of the mapping was performed by the writer in the late spring of 1953.

The purpose of the geological mapping was to investigate the mineral possibilities of an ultrabasic belt trending in a northwesterly-southeasterly direction across and comprising a greater part of the property.

Pace and compass methods were employed in mapping at a scale of one inch to two hundred feet (1" = 200') along traverse lines spaced at a maximum of 100 feet apart along and between picket lines.

The claims were staked employing the chain and picket line method by G. T. Hurd and J. S. Small, whose respective license numbers were K-13021 and K-14339. Major control for staking was from a chained and picketed line cut by the writer for control for reconnaissance geological mapping, which extends east from the south end of the river

ASSESSMENT WORK

enlargement (Lou Lake) immediately west of "Serpentine Mountain" to Clear Creek. The west portion of this line was used and referred to as the east-west zero north base line. At 4500 feet east of Lou Lake on this base line a north-south line referred to as the north-south zero east or west base line was turned off south.

At 26+40 feet south along this latter base line an east-west line referred to as the 26+40 feet south base line was turned off at right angles to the east.

These three base lines served as claim boundaries for those claims lying adjacent to the said base lines, with claim corners located by the chain and picket method. Claims removed from these base lines were tied into same by the chain and picket method. Following staking, approximate north-south picket lines spaced not more than 400 feet apart in each claim were turned off, cut, chained and picketed. Each picket line was labelled as being so much east or west of the zero east base.

The purpose of the picket lines was for a geophysical survey which was completed in the fall of 1952, and for control purposes in locating rock exposures and topographical features during the detail geological survey.

The latter survey was intiated and completed by the writer and assistants, George Bretti and Basil Faulkner.

TOPOGRAPHY

Relief forms within the property consist of high to low gently rolling rock and sand hills with intervening low swamps.

The northwestern section of the property covers the southern and western part of "Serpentine Mountain", an elliptical shaped high rock exposure hills the average height of which is about 250 feet above Lou Lake to the west, and Clear Creek to the east. Rock exposures of ultra-basic types here stand out and apparently have resisted weathering and glacial action more than the surrounding rock types.

The southern side of "Serpentine Mountain" comprising the central section of the property slopes into lower ridges and hills of sand and gravel of some height formed by glacial deposits. Kettle lakes with decided difference in lake levels separated by narrow steep-sided winding esker-like ridges together with the sand hills are characteristic of this area. Rock exposures are almost non-existent in this sector. Immediately east and west of Clear Creek in the eastern section of the property, low gently rolling sand and gravel hills with fairly numerous rock exposures are separated by low swamps.

DESCRIPTION OF FORMATIONS

The following table summarizes the geological succession within the property:

Quaternary: Glacial deposits of sand and gravel, hummocky hills and ridges.

Precambrian:

Algoman: (1) Syenite-diorite and altered phases
(2) Syenite and porphyry dikes

Haileyburian: (1) Olivine-rich peridotite and/or dunite
(2) Peridotite and/or pyroxenite rich peridotite
(3) Amphibolatized peridotite (chicken track dikes)

Keewatin: (1) Tuffaceous banded acid to intermediate rock types
(2) Intermediate (Andesite) volcanic material with altered phases approaching amphibolite

Others

Carbonate-talc rock types

GEOLOGY

Keewatin:

Members of the Keewatin formation are confined to the southern part of the property and are represented by relatively fresh to highly altered acid to intermediate volcanic material with narrow interbedded light to grey-dark tuffaceous bands. The tuffaceous bands consist of aphanitic to fine grained material varying from whitish, light grey, to pale greenish, dark grey-black. Bedded nature is indicated and, in some exposures, a parting to distinct separation occurs between different laminae. Minute disseminations of pyrite are common in both cubs and irregular outlines in the tuff, particularly in the band immediately south of and in contact with the ultrabasics. Here rusty brown weathering of the tuffaceous material exists, with visible pyrite and pyrrhotite. A whitish sugary-like textured material was observed in one exposure and being similar to that occurring in iron formation it is thought to be perhaps a phase of the iron formation which outcrops east of Clear Creek southeast of the property.

The volcanic flow material shows varying degrees of alteration and recrystallization. An acid aphanitic fine grained type is considered as dacite and is associated with tuff and intermediate flows in the vicinity of the south side of the ultrabasic belt. In the relatively fresh looking andesite pillow and flow line structures are present, the pillows being poorly defined. In the more altered flows coarser ferromagnesian minerals are abundant with a preferred orientation. The amount of ferromagnesian

(hornblende) increases to a degree where the rock may be considered as amphibolite.

Quartz stringers occur within the volcanic belt, with narrow to wide whitish barren quartz, particularly along the south side of the property.

Haileyburian

The Haileyburian is represented by a rather wide elongated ultrabasic intrusive but with a small included gabbro to pyroxenite phase. It comprises a greater part of the property and lies north of a volcanic belt. The ultrabasic is considered as peridotite with the following phases:

1) an olivine-rich peridotite and/or dunite
2) a peridotite and/or pyroxene rich peridotite
3) an amphibolitized peridotite (chicken track)

All phases show varying degrees of serpentinization, with the first named being completely serpentinized.

Olivine rich peridotite and/or Dunite phase

The serpentinized olivine rich variety of peridotite has the typical whitish, soft weathering surface, and the fresh surface varies from a medium dark to dark green and for the most part is of unusually fine grain. A coarse grained type occurs immediately west of Clear Creek and extends west to line 20+00E, in claim P-37309.

A thin section of the latter type shows it to have consisted originally of about 93% olivine, and about 7 % pyroxene probably enstatite. Both primary mineral constituents have been completely altered. A volume percent calculation of the alteration products gave: mesh antigorite 62%, bastite 5%, isotropic serpentine 10%, carbonate 23% and opaque oxide - magnetite and possibly ilmenite 0.3%. The rock may therefore be classified as being a harzburgite with dunitic tendencies, which has been completely serpentinized and partially carbonatized. The mesh antigorite is psuedomorphic after olivine, crystals of which elongated in the direction of the "c" axis attain lengths up to 4.5 mm. The average were of a rounded nature with a cross section of about 1.02 mm. The presence of minor amounts of bastite is the only evidence of probable pyroxene, the bastite occurring with carbonate; isotropic serpentine, cloudy opaque material and opaque oxide as interstitial material to the psuedomorphic olivine outlines.

In the eastern section of the property, rock exposures with whitish to brownish soft weathering are distributed both as large outcrops and as narrow zones adjacent to and in contact with chicken track banded material. A thin section of the light brownish material shows it to consist of over 95% psuedomorphic olivine, the alteration constituents being, 65% mesh antigorite, 6% isotropic serpentine, 15% talc, 3% carbonate, 10% opaque oxide-magnetite, and less than 1% of brassy coloured sulphide-pyrite, and/or pyrrhotite.

The analysis corresponds to that of the previous thin section except that talc has partly taken the place of carbonate.

From these analyses and field evidence all those exposures where either the soft whitish to whitish brown weathering features were observed; these have been mapped and classified as olivine rich peridotite and/or dunite type of ultrabasic material.

An attempt was made to determine the structural relationship of this peridotite phase with the less olivine phases. The results show that the greatest concentrations appear to be confined to the south and west central part, and northeasterly part of the property. In the former sector a rather wide elongated (lens-like body) may be outlined with small lenses lying to the north and with a paralleling nature to the larger body. The latter body is characterized in having a reddish tinged fresh surface which is considered as being a form of reddish iron oxide stain.

In the eastern section the dunitic material has a more erratic distribution. Structurally it was seen to have a tendency to have contact like features with the chicken track material. Wherever the latter was observed, it was common to find this dunitic material adjacent to it.

Psuedo-fractures were observed on the surface of numerous exposures of the dunitic phase. These fracture-like structures when observed on fresh surfaces of the rock below the surficial weathering were seen to contain often minute short seams of serpentine, harsh to soft fibre-asbestos, and a chalky white material considered as carbonate. Often, however, these psuedo-fractures with a parallel nature appeared to be merely a surficial weathering feature and which does not extend into the fresh rock.

<u>Peridotite and/or Pyroxene rich Peridotite phase</u>

It is dark in colour, fine grained, and massive. Most of the outcrops have rectangular to irregular shaped structures on their weathering surface which vary from one inch up to one foot in cross-section. The rims of these structures usually weather higher than the interior and are of a softer, lighter coloured material. On fresh surfaces contacts between these structures are lacking and therefore they are considered as merely a peculiar weathering phenomena.

To these unusual weathering structures the writer assigned the term "embossed" chiefly for the purpose of making a distinction between the other phases of the ultrabasic peridotite.

In the western section of the property these appear to be an intermediate phase between the olivine rich peridotite (dunitic) and the embossed phase. It is characterized by; the presence of what appears to be remnants of the embossed surficial weathering structures; a lighter colour which approaches that of the dunitic phase. On a semi-polished surface of a specimen the hand lens shows that considerable rounded psuedomorphic outlines of olivine are present. This material occurring within the typical dark grey-green embossed rock type, is considered as a more olivine rich phase of the harsh, grey green embossed weathering type.

A thin section of the typical dark grey-green embossed weathering type from an exposure in claim P-37312 line 44+00E, at 40+00S, and 1+50'W,

shows it to consist of a mass of minute granular psuedomorphs after olivine, and possibly minor amounts of interstitial pyroxene. Both are completely altered with olivine altering to mesh and blade antigorite with considerable removal of iron to form abundant secondary magnetite and possibly spinel which rim and fill fractures of the psuedomorphs and which also occur as dust-like grains within the mesh structure. Pyroxene if present was altered to bastite which together with chlorite and carbonate occur as interstitial material to psuedomorphs of serpentine. The section consists essentially of serpentine, carbonate, and chlorite and because of the abundance of original olivine the rock is considered a peridotite rich in olivine.

Another thin section from claim P-37312, line 42+00E at 28+50'S, very similar to that previously examined except for the presence of a light and dark psuedo-banded nature, shows it to consist of mesh and blade antigorite-actinalite-tremalite, chlorite, carbonate, talc, and opaque oxide-magnetite. The light coloured portion was observed to consist chiefly of amphiboles with minor amounts of chlorite, serpentine and magnetite. The amphibole blades average 0.65 mm. with the largest being 0.13 mm. The amphiboles are probably the alteration products of former original pyroxene, which products have undergone slight alteration to serpentine-bastite, and chlorite. The dark dense portion of the section consists of mesh and bladed antigorite psuedomorphs after olivine, which average 0.13 mm. and the largest being about 0.45 mm. Olivine appears to be the only primary constituent in the dark portion of the slide. The presence of original olivine, and possibly pyroxene now altered to amphibole, allows a classification of the rock as peridotite with slight pyroxene rich tendencies.

This embossed, dark grey green, harsh weathering rock type is the predominant ultrabasic type within the property and has been observed by the writer during an earlier reconnaissance geological survey to outcrop in numerous places between the east side of the claim group and the west side of Clear Lake.

<u>Amphibolitized Peridotite (Chicken Track)</u>

This rock type is referred to as chicken track which occurs as dike like structures in the peridotite and/or pyroxene rich peridotite. These dike like structures are very numerous varying from two inches wide and two feet long up to ten feet wide and of considerable length. They consist of irregularly arranged short to long light and dark coloured minutely banded and psuedo-radiating coarse bladed material.

Dr. E. L. Bruce in his geology report on "McArthur, Bartlett, Douglas and Geikie townships", Ontario Department of Mines, Annual Report, Volume 35, Part 6, 1926, described similar dike-like structures immediately west of Clear Lake and which the writer has visited. He states that "A thin section of the rock shows that serpentine forms practically all of it and that the fibres consist of foils of serpentine at the centre and larger ones along the margin. They are no doubt formed after some original fibrous mineral"

Structural relations of these dike-like bands with the peridotite and/or pyroxene rich peridotite are such that both sharp and gradational features exist.

Amphibole-actinolite-tremalite has been shown to be present in the previous rock type and it may be assumed that these chicken track bands represent a pyroxene rich phase of the peridotite and/or pyroxene rich peridotite type, the pyroxene being altered to amphibole-actinolite-tremolite.

Gabbro, Pyroxenic Gabbro

A small exposure area of these rocks occurs in claim P-37310, line 30°00'E, at and in the vicinity of 3+00'S. Contacts with the dunitic peridotite immediately south were not observed due to overburden. However a pyroxenic increase appears to occur in the dunitic peridotite type in the direction of the gabbroic exposures.

A thin section of the fine grained gabbroic type shows it to consist primarily of irregular to bladed amphibole actinalite and irregular shaped laths of feldspar. The actinolite blades occur with a radeal fan like nature and with a branching bladed nature. In the absence of either of these the blades are intricately intergrown.

Feldspar occurs as interstitial material between the blades of amphibole and shows almost complete alteration to saussarite minerals; chiefly of the anomalous pale blue type - zoisite. Quartz is present with irregular outlines and has minute prismatic needle-like inclusions of apatite.

On the east side of the exposure area an outcrop occurs composed almost entirely of short to long blades of actinolite tremolite.

A similar exposure occurs in claim P-37318, near line 13+20'W, at 18+80' S.

Algoman

Syenite and porphyry dikes

These rock types occur in only a few widely distributed outcrops and are represented by: a fine grained, pinkish northwesterly trending dike cutting the altered volcanics in claim P-37310, along the south boundary; a whitish weathering feldspar porphyry outcrop in claim P-37318; a fine grained greyish-white coloured syenite dike in claim P-37309; a grey porphyry adjacent to the north edge of the peridotite cliff in claim P-37321; pinkish fine grained equigranular to porphyritic syenite exposures along the northeast side of the syenite-diorite intrusive exposure area.

Syenite-Diorite

Rock exposures varying from hornblende syenite, diorite, to basic andesitic types occur in three separated exposure areas trending in a north-

easterly direction in the eastern section of the property.

A thin section from an outcrop in the exposure area west of Clear Creek shows it to consist of types of amphiboles. One has high relief with good basal sections, high birefringence colours, and with an extinction angle of 18 to 28 degrees. The other has a lower relief, an extinction angle of 18 degrees, length slow, and is negative.

Both amphiboles show weak alteration to chlorite and bastite. Feldspar the other predominant mineral is saussaritized with some evidence of plageoclase twinning remaining. Minor amounts of secondary feldspar occurs which also shows saussaritization. Biotite occurs in minor amounts. Quartz may be both primary and secondary. Apatite inclusions in quartz suggest it being primary, while the bluish colour might suggest a later or secondary age of quartz.

Similar rock exposures west of Clear Lake which the writer visited were described by Dr. E. L. Bruce (see reference above) and he states "the coarse crystalline rock consists of abundant green amphibole in frayed out crystals parts of which are nearly opaque by alteration. Feldspar is abundant but much altered so that the crystals appear muddy and contain much sericite. Quartz is fairly abundant in the rock."

He has classified these exposures as amphibolite, but notes that they may originally have been andesites, diorites and phases thereof.

Others

Talc-Carbonate Altered Rock Types

A few widely separated talc-carbonate bearing rock exposures occur along a belt between the ultrabasic and volcanic belts.

A thin section of talc-carbonate bearing rock from an exposure in the northeast corner of claim P-37308 shows it to consist of 60% serpentine-Antigorite, 25% carbonate, 13% talc, 1.7% opaque oxide-magnetite, and less than 0.5% bra sy sulphide. The carbonate grains average 0.37 mm. and are associated with a felt-like mass of serpentine blades averaging 0.26 mm. by 0.06 mm. Carbonate vainlets cut the section. Antigorite shows alteration to talc which is associated with carbonate. The opaque minerals occur as minute disseminated dust-like grains throughout the section. Psuedomorphic outlines of olivine is suggested by the carbonate which has a rimming-like nature to the psuedomorphs. The rock would appear to have been a dunitic type which was serpentinized, with later carbonatization and steatitization.

Chicken track bearing exposures in claim P-37319 northwest along this belt show similar carbonatization and steatitization. This talc-carbonate alteration appears to have been effective along thw whole length of the south side of the ultrabasic belt, west of Clear Creek, since the dunitic exposures immediately west of Clear Creek near the contact with the volcanics have a soft brownish talcy weathering surface, and have zones which show stronger effects of carbonatization and steatitization.

One other exposure of marked carbonate-talc alteration occurs in claim P-37311 immediately south of the Algoman intrusive. A thin section shows it to consist of; 30% carbonate, 47% talc, 15% isotropic serpentine, 4% opaque oxide, 1% cloudy opaque material, and 1% brassy sulphide. Psuedomorphic outlines of original olivine are indicated by the rim habit of the carbonate around each psuedomorph with the interior part consisting of serpentine and talc. On the basis of these features the rock is believed originally to have been an olivine rich peridotite.

Quarternary

Pleistocene glacial deposits of sand and gravel are representative of the type of deposition during the recent times.

STRUCTURE

The dominant structural feature within the property is the general northwesterly trend of all formations this trend is indicated by:
(a) the strike and dip of the relatively fresh volcanic flows and interbedded tuffaceous bands, both of which have a strike varying from 280 to 330 degrees. Dips of the tuffaceous bands are vertical to steeply north and south, with the northerly dip being the more prevalant. The volcanic flow exposures with interbedded tuffaceous-sedimentary bands north of claim P-37321, about 600 feet, have strikes and dips similar to those south of the ultrabasic belt.
(b) the ultrabasic-peridotite belt lying between the above volcanic-tuff belts appears to parallel the contact of the southern volcanic belt, and in addition has within it northwesterly trending dunitic zones, chicken track bands, and embossed weathering structures.
(c) the Algoman intrusive bodies and dikes.
(d) the talc-carbonate alteration zone between the ultrabasic and volcanic belts.
(e) slight shear indications in claims P-37312, P-37313, P-37321, P-37319 P-37317, and P-37309, where either; talc carbonate schistose features, picrolite coated slip, spalling or schistose separation of the tuffaceous material, slip-like features between dunitic rock type and peridotite contact, and slip-like features between the Algoman intrusive and ultrabasic contact, occur having the northwesterly trend.

No other major structural features were observed within the property. However the presence of a belt of volcanic flows with interbedded tuffaceous bands occurring both immediately north and south of the ultrabasic permits a hypothesis of the regional structure.

It is as follows: the rock formations within the property lie along the steep northerly dipping north limb of a northwesterly trending anticline the axis of which lies south of the property.

A northwesterly trending anticline is suggested by Dr. E. L. Bruce as possibly crossing McArthur township.

If this is the truth it is feasible to assume that the ultrabasic peridotite may have been partially injected along and/or up the strike and dip of the volcanic material with either or both a pushing aside with folding and assimilation or removal of the volcanic material by the ultrabasic intrusive.

The Algoman intrusive body appears to cut across the ultrabasic belt although direct evidence of cutting or intruding of relationships were not observed.

MINERALIZATION

Mineralization of present economic importance appears to be lacking within the property. Only minor amounts of sulphide represented by pyrite and pyrrhotite were visible as very fine disseminations and specks in scattered occurrences both in the ultrabasic and volcanic belts. Some asbestos fibre was observed in places in the more olivine rich peridotite or the dunite variety of the ultrabasic belt.

Sulphide disseminations and specks were observed in claim P-37321, near the contact between a porphyry rock type and the ultrabasic peridotite and along the contacts between chicken track bands and the adjacent olivine rich peridotite or dunite type. Weak disseminations of sulphides appeared in some cases more abundant. Mineralization in the ultrabasics would appear to have developed as late deuteric phenomena associated with the serpentinization period. Pyrrhotite and pyrite were observed in the volcanic belt along the south side of the property associated chiefly within the tuffaceous banded material as short minutely narrow streaks parallel to the banded nature and as weak disseminations.

Evidence of previous interest in this volcanic belt is indicated by the presence of old strippings, trenches, and test pits. Two exposures in claim P-37310 have characteristics of a rock type typical to that seen in iron formation and it is possible the sulphide mineralizations observed here may be merely a phase of the iron formation type known to exist to the southeast of Clear Creek. No interesting values were obtained from assays in this belt.

Asbestos development in the area took place within the ultrabasic belt with short narrow seams up to 1/8" harsh to soft fibre observed in narrow zones within the serpentinized dunite phases. These zones are usually indicated by a characteristic parallel pseudo-fracture pattern, with the fractures weathering deep and filled not always but often with harsh to soft fibre. Sufficient amounts of fibre, however, do not appear to be present in economic amounts.

SUMMARY AND CONCLUSIONS

The property consisting of eighteen claims is located in the central

part of McArthur township. It may be reached either by air transport or motor road from South Porcupine, Ontario. The property was staked and picket lines cut in the fall of 1952, employing the chain and picket method. A geophysical and detail geological surveys were made, the latter by the writer at a scale of one inch to two hundred feet and employing the pace and compass method .

The purpose of the surveys was to investigate the economic mineral possibilities of an ultrabasic belt that comprises a major part of the property.

Rock exposures are abundant in the western and eastern part of the property with the central part covered by overburden.

The geological formations consist of: Keewatin narrow tuffaceous bands interbedded with altered volcanic flow material: Haileyburian ultrabasics of peridotite, and pyroxenic gabbro, the former subdivided into: olivine rich peridotite and/or dunite, peridotite and/or pyroxene rich peridotite, amphibolitized peridotite (chicken track band-like structures); Algoman intrusive masses of syenite-diorite; and syenite and porphyry dikes.

Minor amounts of asbestos fibre in narrow zones of the serpentinized olivine rich peridotite and/or dunite phases of the ultrabasic were observed but do not appear to be of economic value.

Sulphide mineralization of economic value does not appear to present either in the volcanic or ultrabasic belts.

The dominant structural feature is the general northwesterly trend of all formations which may be assumed to occur on the steep north limb of a northwesterly trending anticline the axis of which possibly lies south of the property.

REFERENCES

Geology Report of McArthur, Bartlett, Douglas, and Geikie townships by Dr. E. L. Bruce, Ontario Department of Mines, Annual Report 35H Part 6, 1926

"J.L.LaRocque"

JLL:jm

c.c. Dr. Eckhardt

42A03NW0021 63.240 MCARTHUR

INTRODUCTION

Eighteen claims were staked for the Dominion Gulf Company in McArthur township, Porcupine Mining Division, during the month of June, 1952. An aeromagnetic survey had delineated a magnetic anomaly trending northwesterly from Bartlett and Geikie townships, into McArthur township. This anomaly was studied in Bartlett and Geikie townships and found to be caused by iron formation and peridotite. Some nickel values were obtained in the peridotite in addition to minor amounts of asbestos fibre. Pyrite and pyrrhotite were common in the iron formation. It was anticipated that the magnetic anomaly in McArthur township might be caused by similar rock types, and that similar mineral occurrences might be found.

Geological mapping by J. A. LaRocque, a Company geologist, indicated that the claim group was underlain by Keewatin lavas and pyroclastics, Haileyburian peridotite and ultrabasic flows, and Algoman syenite. No major structural features could be determined. Mineralization in the area was sparse. Some very short asbestos fibre (1/16") was found in local fracture zones in the peridotite. Sulphide mineralization (pyrite and pyrrhotite) carrying small amounts of nickel and copper, was found to be associated with the lava, pyroclastic horizon for the most part, although some sulphides were found in the ultrabasics. Large parts of the area are covered by overburden. It was therefore proposed that a ground magnetometer survey by carried out, in order to trace the magnetic horizons from the known outcrop areas into the drift covered sections. It was anticipated that if any major structural features were present they could be defined in this manner.

An Askania Schmidt-type magnetic balance having a sensitivity of about 25 gammas per scale division was used in the survey. Basic coverage consisted of stations at intervals of 100 feet, on picket lines 400 feet apart. In anomalous areas, intermediate stations and picket lines were added. In all, a total of 2138 stations were observed on 29.30 miles of picket line.

The basic data were observed and reduced by a Dominion Gulf Company magnetometer crew, and then transmitted to the Toronto office of the Dominion Gulf Company for further processing and interpretation. The station values, isomagnetic contours and interpretation are shown on a map at a scale of 1 inch equals 200 feet, accompanying this report.

SUMMARY AND RECOMMENDATIONS

The magnetic data can be correlated with the available geological data. A hypothesis concerning the formation of a graben structure has been postulated.

It would appear that the rocks exposed on the claim group lie at the uppermost fringe of a peridotite sill and in general appear to be an injection type formation.

No further work on the property can be justified from this interpretation.

INTERPRETATION

The claim group may be divided into six magnetically distinguishable zones, three of which appear to be quite similar, although isolated from each other. The three similar zones are the anomalous areas in the northwest, northeast and south central portions of the area. The anomalous zones may be described as aggregates of intensely magnetic local anomalies which combine to present a somewhat "hashy" appearance to each anomaly zone. A certain amount of order may be seen within each anomaly zone. The local anomalies, in general, trend northwesterly providing a linear relationship within the major anomalies. This linear relationship, however, does not extend to the form of the overall anomalous zone, which in each of the three cases appears to be somewhat irregular in shape.

The southwestern portion of the property is characterized by a magnetically uniform zone of relatively low intensity. The zone lies in contact with two of the anomalous areas and trends northwesterly. A few minor anomalies occur within the zone and also trend generally northwesterly.

A similar zone envelopes the northeastern anomaly zone on two sides and separates it from the south central zone. The major part of this area trends northwesterly from the eastern boundary of the claim group to Clear Creek, where it bends and assumes a northeasterly trend around the northeastern anomaly zone. An isolated anomaly cuts this horizon near the eastern boundary of the claim group.

The central portion of the claim group is represented by a broad magnetic plateau containing several anomalies of intermediate intensity. This zone is quite different in character from any of the other sections in that the magnetic base level is relatively high but the local anomalies within the zone are broad, intermediate in intensity, and generally lacking in definitive trend indications. Any trends that are indicated, are not consistent. The zone as a whole, has a general appearance of deep burial, but in two locations sharp crowding of the contours indicates a shallow overburden. This is confirmed by rock outcrops in the vicinity of the crowded contours.

A comparison of the geology as mapped by Mr. LaRocque with the magnetic data, reveals that, in general , a good correlation exists between the lithological units and the magnetic expression. The highly anomalous zones correspond to rocks mapped as Haileyburian peridotites and ultrabasic flows, while the magnetically uniform horizons may be correlated with Keewatin lavas and pyroclastics or Algoman syenites. Some difficulty is encountered in the central magnetic plateau zone, however, where rock outcrops, although sparse, indicate that this region is also underlain by Haileyburian peridotites and ultrabasic flows.

In the highly anomalous zones, it is impossible to separate the magnetic effects of the peridotites from those of the ultrabasic flows. The linearity of the individual local anomalies within the large anomaly areas, suggests that the causative bodies are in the main concordant. This feature leads one to believe that the flow-type rocks provide the controlling structure, and that possibly the peridotite has been injected along interflow lines of weakness. It is interesting to note that the southern limit of the northwestern anomaly zone is remarkably linear, and trends a few degrees north of east, while a somewhat similar linear relationship exists along the northern edges of the northeastern and south central anomaly zones .

The magnetically uniform southwestern zone apparently represents the Keewatin lava and pyroclastic horizon. Although iron formation is known to occur in this horizon to the southeast, there is no evidence to indicate its presence within this claim group.

The second zone of uniform magnetics, between the northeastern and south central anomaly zones is underlain by syenitic rocks of Algoman age. Although Algoman granites are common in the general area, syenite is not. It is suggested that the entire eastern portion of the claim group was at one time composed of the peridotite - ultrabasic flow complex. The central portion was later intruded by a granitic magma which absorbed a large part of the ultrabasic complex, with the result that the magma on consolidation had the composition of a syenite. Further evidence for this hypothesis is the isolated magnetic anomaly in the syenitic band near the eastern boundary of the claim group, which can be correlated with peridotite outcrops. For some unknown reason, this small roof pendant was not assimilated by the granitic magma during the granitic intrusion.

The problem of the magnetic plateau area in the central portion of the claim group must now be considered. The magnetic data indicate that sharp contacts exists between this zone and the highly anomalous zones to the north and south, despite the fact that the known rock types in the three localities are identical. As previously indicated, the magnetic data in the plateau zone give an impression of depth, although the presence of rock outcrops in the zone apparently negate this hypothesis. A valid explanation of the data must incorporate all of the facts listed above.

A possible solution may be indicated by tracing a hypothetical sequence of geological events. It is suggested that the original rocks in the area were Keewatin lavas and pyroclastics. A lava series was intruded in Haileyburian time by a peridotite sill. This sill, of variable thickness, fingered out into the lavas near its fringes simulating an injection-type formation. During the folding and faulting of Algoman time, the whole became emplaced in a vertical position. Later faulting formed a graben, which dropped the central block vertically a few hundred feet. Erosion and glacial action peneplained the area baring the peridotite-lava injection formations to the northwest and south, but leaving a considerable thickness of lava in the central magnetic plateau. Thus the high magnetic base level in this zone is caused by peridotite at

depth. A few cupolas of peridotite were formed in this zone and may now be seen in rock outcrops, but the major peridotite mass in this section lies at much greater depth than the main mass either to the north or south.

It will be noted that the above hypothesis rejects the suggestion that the ultrabasic flows are of Haileyburian age. The author has been unable to find reference to any flow-type rocks in the Haileyburian period; these rocks all appear to be intrusives, intermediate to ultrabasic in composition. The injection of peridotite into the Keewatin-type flows would no doubt cause alteration and recrystallization of the flow rocks sufficient to render the determination of their original form an impossible task.

Based on the above hypothesis, the claim group would not appear to be well situated for economic mineral deposits. For nickel deposition, the base of an ultrabasic sill is generally recommended, while for asbestos, a series of fractures within such a sill offers the best opportunity. On this property, it would appear that the sill proper lies at some depth and that the exposed rock is merely the uppermost fringe of the intrusive. No major ore channels contemporaneous with ore emplacement are indicated by the magnetic data. In this regard, a few small sulphide occurrences have been noted on the property, but none of these have returned assays indicating commercial values.

It is therefore recommended that no further work be done on this property, and that the claims be allowed to lapse unless further geological evidence warrants a review of the situation.

REFERENCES

(1) Geology of MacArthur, Bartlett, Douglas and Geikie townships (Redstone river area), District of Timiskaming by E. L. Bruce, Thirty-fifth Annual Report of the Ontario Department of Mines, 1926, Vol. XXXV, Part VI, pages 37-56

(2) Associated Map to above Redstone river area by E. L. Bruce, Ontario Department of Mines Map No. 35L, scale 1" = 3/4 miles, 1926.

(3) Report on Reconnaissance Survey of Serpentine Mountain, MacArthur Twp., Base Map 42A/3N by W. A. Robinson, Dominion Gulf Company Report, Oct. 1951

(4) Reconnaissance Geology, North West Gowganda 42A/3N, Serpentine Mountain Area - MacArthur township by J. A. LaRocque, Dominion Gulf Company Report October , 1952

(5) Reconnaissance Geology, North West Gowganda 42A/3N, Serpentine Mt.- Clear Lake Area by J. A. LaRocque, Dominion Gulf Company Report - Nov. 1952

(6) Reconnaissance in MacArthur, Douglas, Fallon, Fripp, Bartlett, Geikie Twps., Base Map 42A/3N, N. W. Gowganda, Ontario, by G. Macaulay, Dominion Gulf Company Report, March 23, 1953

(7) Detail Geology and Topgraphy, MacArthur Group I claims by J. A. LaRocque Dominion Gulf Company Map, Scale: 1" = 200 feet, November 1952 (Mapping not completed)

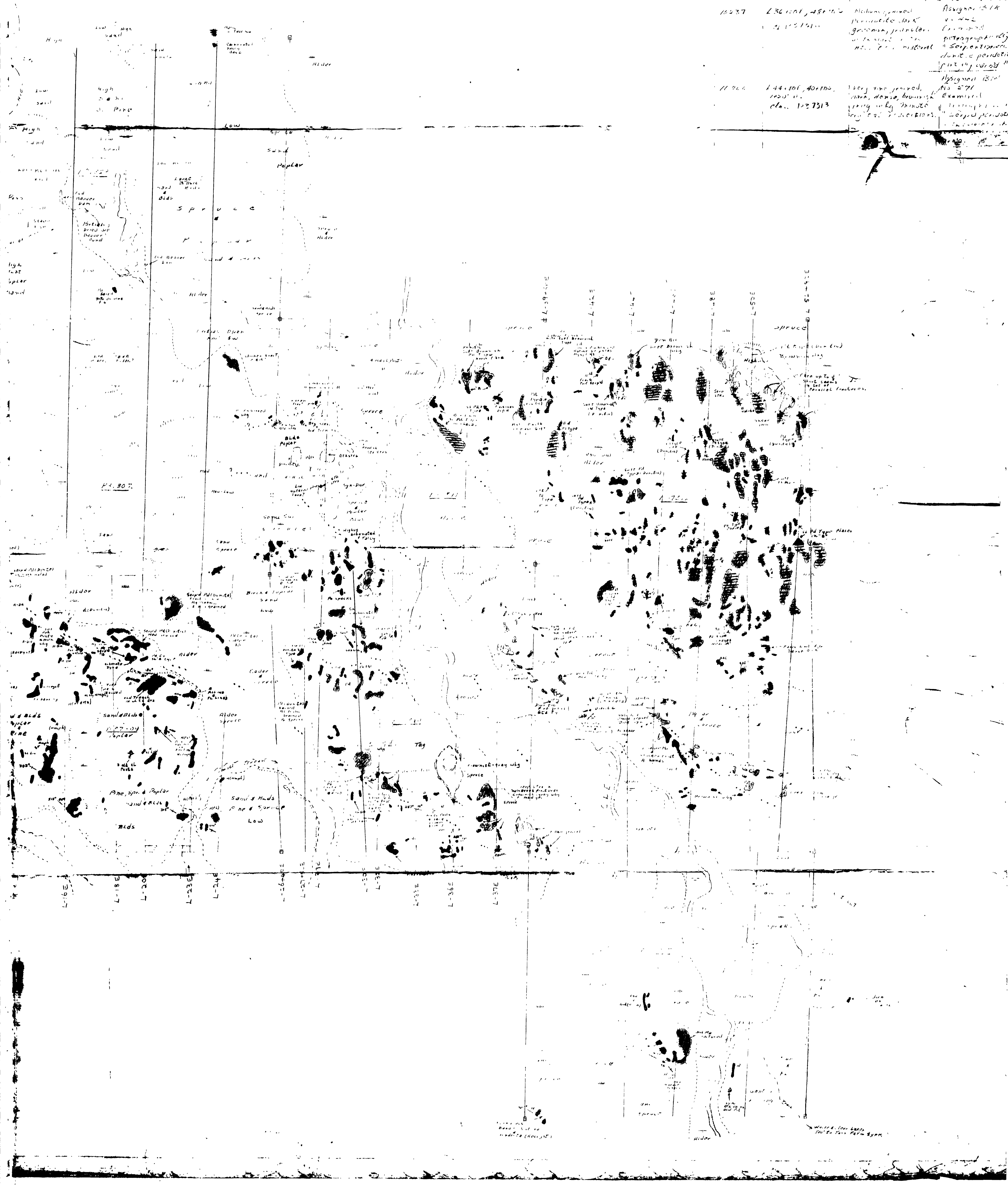
J. H. Ratcliffe

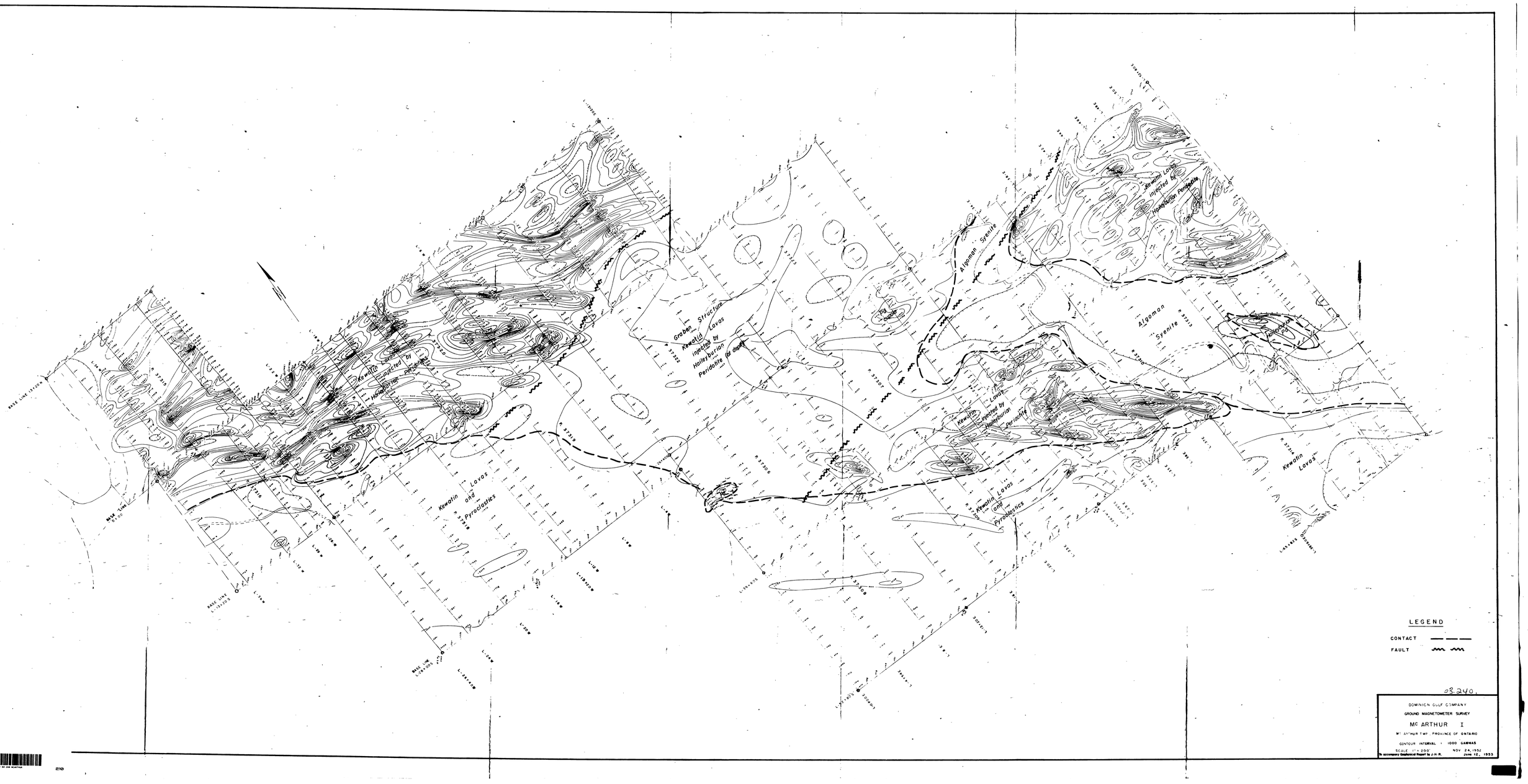
JHR:jm

BL - 13+00N
BL 0+00
L-34W
L-36W
LEGEND
HAILEYBURIAN
ULTRABASICS
Peridotite
Amphibolitiz
serpentinised
Olivine rich
dunite, serpentinized
(white weathering
Gabbro
Tuff
interbedded
(A), (A-Amph)
OTHERS
Carbonate
alteration types.
No
Type
Assay
Grab
Ni - None
Ni - 0.12%
Ni - 0.15
Cu - 0.03%
PRICE
ADAMS
ELDORADO
DOUGLAS
MUSGROVE
BARTLETT
GEIKIE
LOCATION
MAP
6 miles
MAPPING SYMBOLS
Lineation
Exposure
Geology
Terminal of picket line.
DOMINION GULF COMPANY
DETAIL GEOLOGY
IN
M^cARTHUR I
BASE MAP 42A/3N
N.W. GOWGANDA
ONTARIO
GEOLOGY BY - J.A. LAROCQUE
SCALE 1"-200'
DRAWN BY - J.A. LAROCQUE
DATE JUNE 15, 1953
TO ACCOMPANY GEOLOGICAL REPORT
BY - J.A. LAROCQUE
DATE JUNE 15, 1953
42A03NW0021 63.240 MCARTHUR
200

S P E C I M E N S

FIELD No.	LOCATION	DESCRIPTION	REMARKS
NWG JL 10248	L39+60E, 43+00S, 1+50'W Claim P31311	Medium grained, grey green, feldspar and amphibole phenocrystic [illegible] quartz eyes (Dioritic)	ASSIGNED B.I.R. No 435. Examined petrographically "Hornblende Diorite (altered)
10276	L31+00E, 32+50'S, 3+00'E, [illegible]	Peridotite, grey green, harsh wthg. fine grained, dense dark.	ASSIGNED B.I.R No. 436 Examined petrographically "pyroxene [illegible] peridotite" partially serp'd
11125	L30+00E, 41+00S, 0+25W claim P31310	Fine grained gabbroic, [illegible] granular [illegible]	Assigned BIR No 437 Examined petrographically [illegible] pyroxene gabbro"
11224	L18+00E, 41+00'S, 1+00'E claim P31[illegible]	Fine grained, dense dark green, brownish carbonate type of wthg. Peridotite	ASSIGNED BIR No 438 Examined petrographically "serp[illegible], talcitized, olivine rich peridotite (Dunite
		Typical serp'd chicken track	Assigned BIR No 439 Examined [illegible] "Serpentinized [illegible] chicken track)
16161	L24+[illegible], 34+[illegible], [illegible]'E, claim P37[illegible]1	Similar, fine grained, dark grey green, brownish [illegible]	Assigned BIR No 440 Examined Petrographically "Serp'd Dunite carbonate stained"
[illegible]293	L42+00E, 28+50'S cl P37312	Fine grained, dark dense, [illegible] brownish wthg	ASSIGNED BIR No 441 Examined petrographically "Serp'd dunite partially [illegible] carb'[illegible]"
16237	L36+00E, 48+[illegible] cl P37[illegible]	Medium grained peridotite dark greenish, granular [illegible] mineral	Assigned BIR No 442 Examined petrographically "Serpentinized dunite peridotite partially carb'd"
11266	L44+00E, 40+00S, 1+50' W. claim P37313	Very fine grained, dark, dense, brownish grey wthg. minute crystal [illegible]	Assigned BIR No 571 Examined petrographically "Serp'd peridotite [illegible]




Kewatin Lavas
injected by
Haileyburyan Peridotite
Algoman Syenite
Graben Structure
Kewatin Lavas
injected by
Haileyburyan
Peridotite (to depth)
Kewatin Lavas
injected by
Haileyburyan Peridotite
Kewatin Lavas
and
Pyroclastics
Kewatin Lavas
injected by
Haileyburyan
Peridotite
Kewatin Lavas
and
Pyroclastics
Algoman
Syenite
Kewatin
Lavas
BASE LINE 13+00 N
BASE LINE 0+00
BASE LINE L-12+00 S
BASE LINE L-24+00 S
L-24+00 W
L-20+00 W
L-16+00 W
L-12+00 W
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L-1988+00 E
L-1992+00 E
L-1996+00 E
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LEGEND
CONTACT
FAULT
03.240.
DOMINION GULF COMPANY
GROUND MAGNETOMETER SURVEY
MC ARTHUR I
MC ARTHUR TWP. PROVINCE OF ONTARIO
CONTOUR INTERVAL = 1000 GAMMAS
SCALE 1" = 200'
NOV. 24, 1952
June 12, 1953
To accompany Geophysical Report by J.H.R.