010

PROJECTS SECTION

2.335

REPORT ON GEOLOGICAL SURVEY

BRISTOL-GODFREY #6 GROUP, GODFREY #7 GROUP

BRISTOL, CARSCALLAN, GODFREY AND TURNBULL TOWNSHIPS.

INTRODUCTION:

In the summer of 1969 and a portion of the summer of 1970, a geological survey was completed on one hundred and fifty (150) claims in the Townships of Bristol, Carscallan, Godfrey and Turnbull. The covering dates of the field work include June 13 to August 30, 1969 and June 23 to July 24, 1970. Mapping in 1969 was accomplished by students J. Smith and D. R. Alexander, completion in 1970 by B. M. Laine and D. R. Alexander. The claims mapped include numbers:

94825-94833 incl; 94977-94981 incl; 95496-95501 incl; 95553-95558 incl; 96443-96453 incl; 99246-99248 incl; 100431-100436 incl; 100781-100807 incl; 100862-100875 incl; and 215773 in Godfrey Township.

98885 and 98886 in Carscallan Township.

99243-99245 incl; 100754-100771 incl; 100826-100843 incl; 100852-100861 incl; 100876-100879 incl. and 100893-100896 in Bristol Township.

and 214350; 214847 and 215697 in Turnbull Township.

LOCATION AND ACCESS:

The Godfrey #7 Group, which consists of twenty claims, is located in mid western Godfrey Township. Access is via the Genex road which joins Highway 576 approximately fifteen miles west of Timmins. The one hundred and five claims of the Bristol-Godfrey #6 Group is located in the southwest corner of Godfrey Township, the northwest corner of Bristol Township, Northeast portion of Carscallan and the southeast portion of Turnbull Township. Access to the Bristol-Godfrey #6 Group is mainly by helicopter to South Godfrey Lake or Thunder Creek, or via swamp trail to the above locations from the Genex mine or Highway 101 respectively.

PREVIOUS WORK:

The geological map of Godfrey Township was compiled in 1954 by the Ontario Department of Mines. The Township was mapped in the field seasons of 1951 and 1952 by Nelson Hogg. Similarly, the Ontario Department of Mines geological map of Bristol Township was compiled in 1957, through field work in the summers of 1953, 1954 and 1955 by S. A. Ferguson.

Broulan Reef Mines Limited performed an electromagnetic survey in the Keeley Lake area in 1955. Eight holes were drilled on the basis of this information encountering rhyolite and andesite with trace values of gold. Copper Man Mines Limited worked around South Godfrey Lake in the fall of 1959 performing resistivity and geomagnetic surveys. Mespi Mines (Cu Kam Porcupine Mines) did a large amount of work in the Godfrey #7 area in 1965. This included geological, induced polarization, electromagnetic and resistivity surveys with a follow up drilling programme. Some minor occurrences of sulphides (pyrite and pyrrhotite) were encountered in the four holes drilled. Mespi Mines also conducted electromagnetic surveys in northwest Bristol in 1966. Three holes were drilled encountering some sulphides and graphite. Hollinger Mines acquired the property in 1968 and to date, geomagnetic, electromagnetic and geological surveys have been conducted.

There is no previous record of geochemical surveys undertaken in this area.

TOPOGRAPHY:

The Godfrey #7 area is largely outcrop and gravel ridges bordered in the southwest by Keeley and Godfrey Lakes. This area is generally dry land with stands of spruce, jackpine and poplar. In the southeast, however, the area is largely cedar swamp. The Bristol-Godfrey #6 area is almost completely cedar swamp with only scattered outcrops and gravel ridges. Several swamp fed lakes and creeks may be found in the vicinity.

GENERAL GEOLOGY

The surface geology consists of five broad fromations.

5. Quartz Diabase of the Keewanawan type
4. Rhyolitic intrusive of probable Keewatin type
3. Andesitic intrusive of probable Keewatin type
2. Rhyolite extrusive of Keewatin type
1. Andesitic extrusive of Keewatin type.

The andesitic extrusive is considered to be the oldest rock type in the area. Stratigraphically, it can be found dipping under the rhyolitic volcanics although the number of individual units is not known. The andesite is found in both massive and pillowed varieties.

The massive andesite is found close to the contacts with the rhyolite. It may represent a change from the pillowed type, near the contact with the overlaying rhyolite. At the intersection of the 32 North base line and the Godfrey-Turnbull Township line, it was noticed that there was some segregation of mafic and nonmafic constituents, near the rhyolite-andesite contact. This may also be a contact effect caused by the superimposition of the rhyolitic volcanics.

Further south, in Bristol Township, and away from the rhyolite-andesite contact, a few outcrops of pillowed andesite are found. Pillows are well defined with selvage zones composed largely of epidote.

Locally, some mineralization is found in the pillow margins, in the form of pyrite and chalcopyrite. On cross line 36 South at 4600 feet west, the pillowed andesite is highly carbonatized. The north zone of the outcrop is almost completely coarse grained carbonate while further south, carbonate is confined to concentrations of ankerite. Pillows are trending almost north-south and topping eastwards which is inconsistent with schistosity values taken elsewhere. The andesite itself, is fine grained and dark in colour, weathering orangish.

The rhyolitic extrusives may be subdivided into: rhyolite tuff, rhyolite breccia, massive rhyolite, quartz porphyry rhyolite and amygdaloidal rhyolite.

The rhyolite tuff member consists of fragments less than one inch in size, in a massive to porphyritic rhyolite matrix. On the basis of fragment and matrix type the tuff may be divided into three groups, separated spatially as well as mineralogically.

At the south of the Bristol-Godfrey #6 grid the tuff consists of very siliceous fragments in a coarse quartz porphyry matrix. The rhyolite is greenish in colour weathering grey with angular bleached white patches representing the fragments. In the area of the Bristol-Godfrey Township line the tuff contains small angular fragments in a near rhyolite matrix. The fragments here are siliceous and locally exhibit flow banding. On the Genex Road at cross line 190 north the tuff consists of both siliceous and clay fragments in a matrix of massive rhyolite. The fragments here are well defined and often subrounded to lenticular in shape.

Rhyolite breccias are very rare occurrences and are often too small to be represented on the mapped scale. Two distinct breccia types may be recognized through a similar criteria applied to the tuff. In the southern portion of Godfrey Township, small brecciascan be found which consist of very siliceous, subrounded, quartz porphyry fragments in a massive to quartz porphyry matrix. The fragments are much larger than those found in the tuffs and may reach up to a foot across. Northwards, in Godfrey #7, a few breccias may be found composed of very siliceous angular fragments in a matrix of massive, carbonatized rhyolite. The fragments are commonly in the three to four inch range, bleached white on the weathered surface and surrounded by ankerite.

The massive rhyolite is very silica rich normally and contains very minor to no quartz phenocrysts, appearing to represent a gradation into the quartz porphyry rhyolite. Columnar jointing is commonly found, although inconsistent trends can provide no conclusive interpretation. The fresh surface has a complete range of colours from dark grey to light grey to locally pinkish or beige. Weathering is almost universally white due to the increased silica content, although rusty patches are found, due to the presence of ankerite.

The rhyolite quartz porphyry is the dominant rock in the area, and may possess up to twenty percent quartz phenocrysts. There is a large variance of phenocryst size found throughout the area, although essentially the rock changes very little. It is characterized by quartz phenocrysts in a greyish matrix which weathers white to locally rusty in the presence of ankerite.

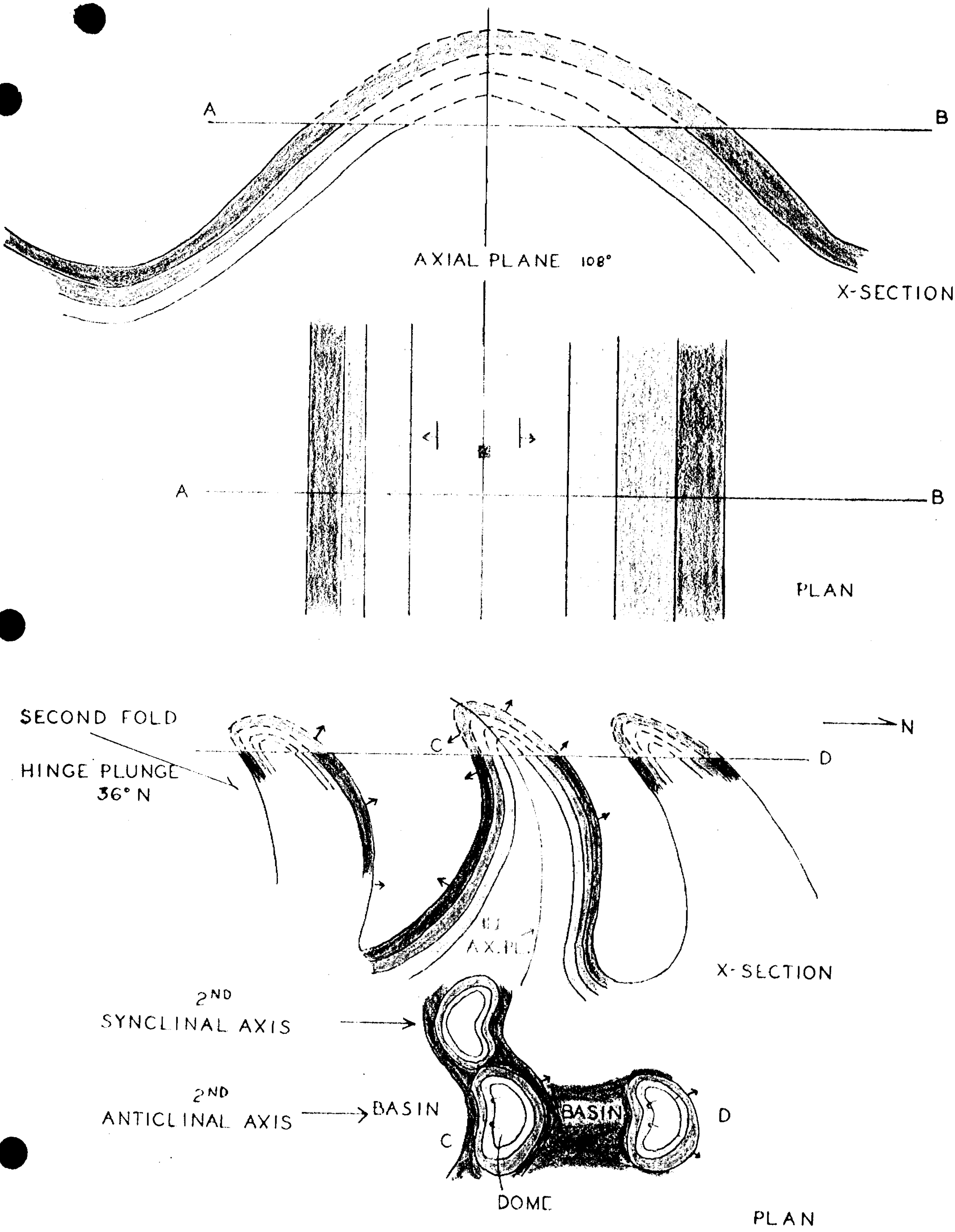
In southwest Godfrey and part of Turnbull Township there are a few localities of amygdaloidal rhyolite. These occurrences are too small to be represented on the mapped scale. The rhyolite consists of small lens shaped openings filled with silica in a massive rhyolite matrix. Often the rhyolite is permeated with ankerite yielding a somewhat porphyritic appearance.

The andesitic intrusive is confined mainly to a series of small dykes in the northern portion of Bristol. The andesite is normally fine grained but individual quartz and feldspar phenocrysts can be depicted in the larger dykes. Trends on the dykes are generally confined to a northeasterly or northwesterly direction. The andesite is green in colour, weathering rusty due to the presence of carbonate. Often near the contact with these andesitic dykes, the rhyolites appear identical on hand specimen criteria, with exception to the presence of quartz phenocrysts. This phenomena is due to the contact metamorphic effects during intrusion.

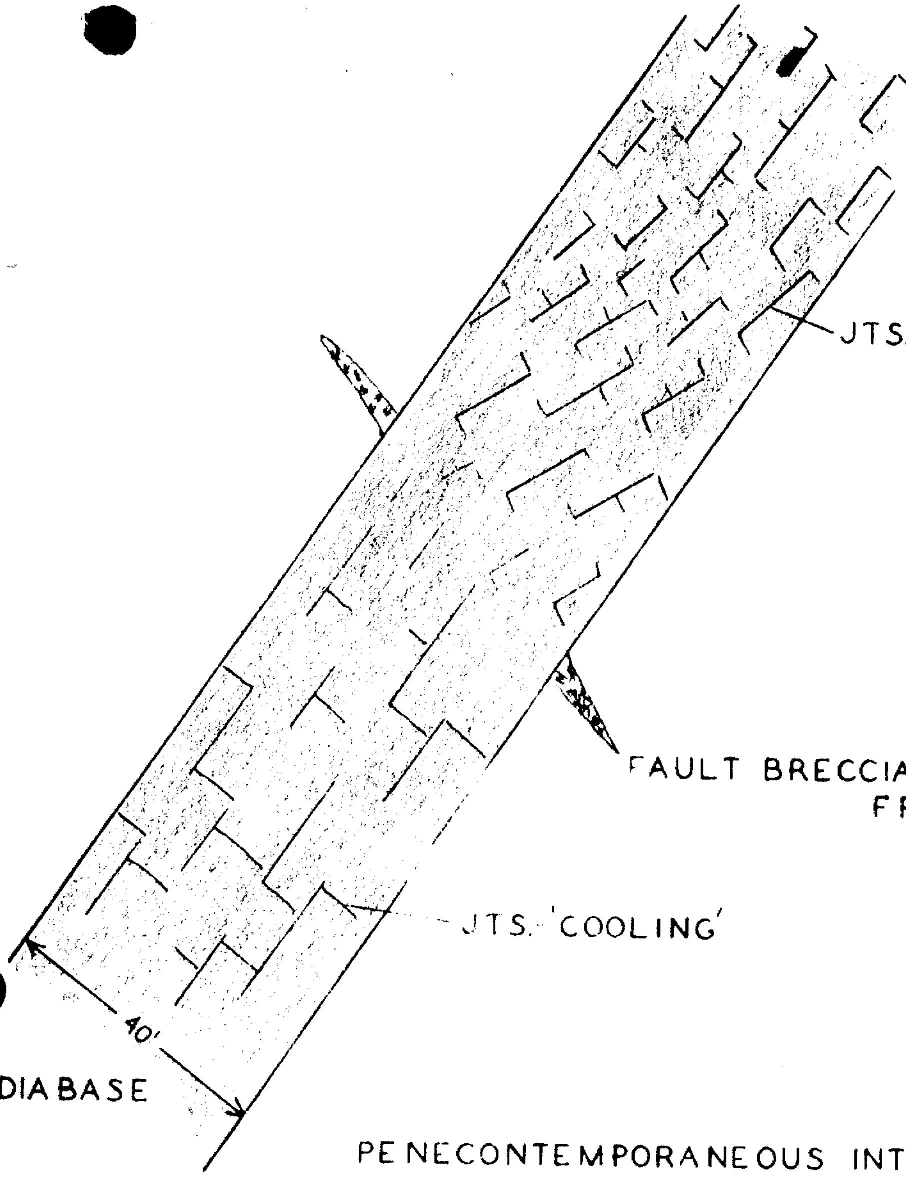
The rhyolitic intrusive has been found in both surface exposures and subsurface drilling. The ryholite is essentially a coarse grained quartz-feldspar porphyry with a siliceous matrix. Phenocrysts are approximately one eighth inches in size and compose around twenty-five percent of the rock. It is light grey in colour, the pitted weathered surface being white. The rhyolite intrusive is associated with the rhyolite flows and is never seen intruding the andesite. Since no crosscutting relationships are noted in field observations, the relative ages of the two intrusives is not known. The andesitic intrusive may also be described locally as a quartz-feldspar porphyry although the percentage of mafic constituents separates it from the rhyolite.

IDEALIZED STRUCTURE OF BRISTOL - GODFREY

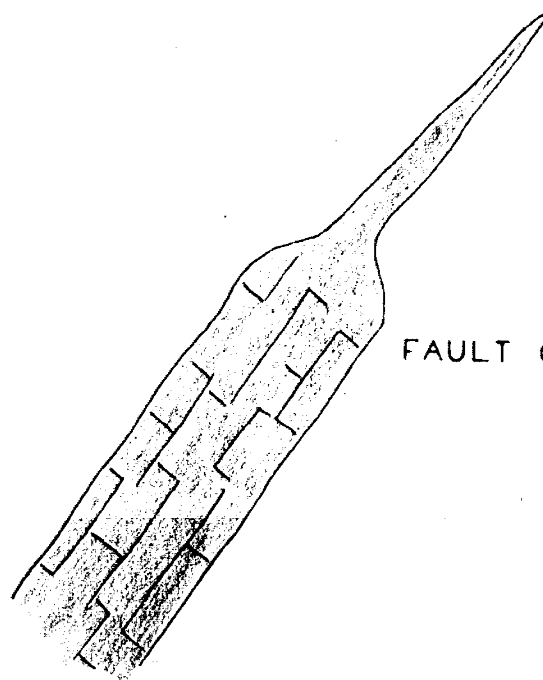
FIG. 1



STRUCTURE IN DIABASE FIG. 2



PENECONTEMPORANEOUS INTRUSION AND FAULTING



FAULT CONTROL OF INTRUSION

The Keewanawan quartz diabase dykes are very common in the area, exhibiting a general north-south trend. Compositionally the diabase contains greenish feldspar phenocrysts, pyroxene, magnetite and usually fine disseminations of pyrite. Feldspars may reach up to three quarters of an inch, in the coarse dyke centers. Colour varies from near black at the chill margins to dark green at the dykes centers, weathering a rusty colour. The dykes possess two well defined sets of joints; on paralleling the direction of flow and one paralleling the direction of cooling.

STRUCTURE

Structurally, the mapped area lies in an east-west fold axis which has been refolded in a north-south direction. This implies that the outcrop pattern will reflect a basin and dome type structure. There is also the possibility from this type of structure, that the beds on the south limb of the east-west anticlinal structure will be overturned. (Fig. 1) This is identical to saying that the north limb of an east-west striking syncline will be overturned by the second phase of folding.

Evidence for overturning is noted by pillow determinations from Hogg (1) in midwest Godfrey Township and by fragmental horizons from subsurface drilling in Bristol. There are also top determinations in areas removed from the preceeding, where fragmental and pillowed horizons are not overturned.

(1) "Ontario Department of Mines Preliminary Map 1954-4", by Nelson Hogg.

The Schistosity is much less affected by the second phase of folding than the primary structures, such as pillows. This it is presumed that the schistosity is most likely an axial planar cleavage and pencontemporaneous with the first phase of folding.

The first phase of folding has an axial plane trend of approximately east-west (108°) and appears to be more of a regional feature. A few outcrops in southern Godfrey Township (cross line 8 west) give a more exacting picture of the type of folding, by minor structures on outcrop scale.

The second phase of folding is much more local than the first regional phase. The major effect of the second phase of folding appears to a slight rotation and steepening of the schistosity accompanied by overturning of certain horizons described previously. Thus the second phase of folding appears to have been a more open and gentle type of folding. Determinations on minor structures show an axial plane trend of 150 degrees dipping 85 degrees east with the hinge line trending 150 degrees and plunging 36 degrees north.

There is most definitely a phase of faulting previous to the diasbasic intrusions, as evidenced by their consistent north-south trends and pinching out along smaller fractures. A second local faulting regime may be penecontemporaneous or after the diabasic intrusions as shown by offsets of jointing and the associated fault breccia - (Fig. 2)

The structural - depositional history of the area appears to proceed as:

Erosion and Glacial Deposition. (Pleistocone).
Quartz Diabase and penecontemporaneous faulting.
Faulting in north-south direction.
Second phase of folding (striking 150°).
Rhyolitic intrusive.

Andesitic intrusive.

First phase of folding (striking 108°).

Rhyolite extrusive - 3 Separate members on basis of Tuff.

Andesitic extrusive.

ECONOMIC GEOLOGY

Mineralization is rarely encountered in the rhyolite, although local scatterings may be found in the andesitic members. In the pillowed andesite of northwestern Bristol Township, minor amounts of pyrite and chalcopyrite are found concentrated in the pillow selvages. This is refracted by a geochemical anomaly in that area, although it is not of economic value. Just south of South Godfrey Lake, an andesitic dyke containing pyrite is geochemically anomalous in copper, zinc and mercury. It is part of a large north-east-southwest trending geochemical high in that area.

The geochemical anomaly south of South Godfrey Lake may prompt further investigation due to the associated geomagnetic trends in that area. Similarly, the geochemical trends of anomalous populations in Godfrey #7 are reflected in the geomagnetic and electromagnetic work.

Previous work on the property was mainly concentrated on the possibility of economic gold deposits. Re-examination of some of these older properties may be suggested where drill holes have encountered sulphides, without any assays for base metals being taken.

Dale R. Alexander
Mar. 2/71

REPORT ON GEOCHEMICAL SURVEY

BRISTOL-GODFREY #6 GROUP, GODFREY #7 GROUP

BRISTOL, CARSCALLEN, GODFREY AND TURNBULL TOWNSHIPS

INTRODUCTION:

In the summer of 1969 and a portion of the summer of 1970 a geochemical survey was conducted in conjunction with a geological survey on one hundred and fifty (150) claims in the Townships of Bristol, Carscallen, Godfrey and Turnbull. The covering dates of the survey include June 13 to August 30, 1969 and June 23 to July 24, 1970. Sampling was carried out by Numerous individuals including D. R. Alexander, C. P. Giles, B. M. Laine, A. C. Oliver and J. Smith. The claims traversed, although not necessarily sampled due to regions of no outcrop include numbers:

94825-94833 incl; 94977-94981 incl; 95496-95501 incl; 95553-95558 incl; 96443-96453 incl; 99246-99248 incl; 100431-100436 incl; 100781-100807 incl; 100862-100875 incl; and 215773 in Godfrey Township.

98885 and 98886 in Carscallen Township.

99243-99245 incl; 100754-100771 incl; 100826-100843 incl; 100852-100861 incl; 100876-100879 incl. and 100893-100896 in Bristol Township.

and 214350; 214847 and 215697 in Turnbull Township.

LOCATION AND ACCESS:

The Godfrey #7 Group, which consists of twenty claims, is located in mid western Godfrey Township. Access is via the Genex road which joins Highway 576 approximately fifteen miles west of Timmins. The one hundred and five claims of the Bristol-Godfrey #6 Group is located in the southwest corner of Godfrey Township, the northwest corner of Bristol Township, Northeast portion of Carscallan and the southeast portion of Turnbull Township. Access to the Bristol-Godfrey #6 Group is mainly by helicopter to South Godfrey Lake or Thunder Creek, or via swamp trail to the above locations from the Genex mine or Highway 101 respectively.

PREVIOUS WORK:

The geological map of Godfrey Township was compiled in 1954 by the Ontario Department of Mines. The Township was mapped in the field seasons of 1951 and 1952 by Nelson Hogg. Similarly, the Ontario Department of Mines geological map of Bristol Township was compiled in 1957, through field work in the summers of 1953, 1954 and 1955 by S. A. Ferguson.

Broulan Reef Mines Limited performed an electromagnetic survey in the Keeley Lake area in 1955. Eight holes were drilled on the basis of this information encountering rhyolite and andesite with trace values of gold. Copper Man Mines Limited worked around South Godfrey Lake in the fall of 1959 performing resistivity and geomagnetic surveys. Mespi Mines (Cu Kam Porcupine Mines) did a large amount of work in the Godfrey #7 area in 1965. This included geological, induced polarization, electromagnetic and resistivity surveys with a follow up drilling programm. Some minor occurrences of sulphides (pyrite and pyrrhotite) were encountered in the four holes drilled. Mespi Mines also conducted electromagnetic surveys in northwest Bristol in 1966. Three holes were drilled encountering some sulphides and graphite. Hollinger Mines acquired the property in 1968 and to date, geomagnetic, electromagnetic and geological surveys have been conducted.

There is no previous record of geochemical surveys undertaken in this area.

TOPOGRAPHY:

The Godfrey #7 area is largely outcrop and gravel ridges bordered in the southwest by Keeley and Godfrey Lakes. This area is generally dry land with stands of spruce, jackpine and poplar. In the southeast, however, the area is largely cedar swamp. The Bristol-Godfrey #6 area is almost completely cedar swamp with only scattered outcrops and gravel ridges. Several swamp fed lakes and creeks may be found in the vicinity.

GEOCHEMISTRY OF GODFREY #7 GROUP

GENERAL GEOCHEMISTRY

Five hundred and twenty-nine geochemical samples were collected from bedrock across the property, and located on a grid system. The method consisted of chip sampling at various intervals along the bedrock exposures. Of the five hundred and twenty-nine samples taken four hundred and ninety-two were from rhyolite exposures while the remainder were taken from andesite exposures. Only samples of the fresh surface were retained avoiding the possibility of contamination from the weathered surface. Soil and stream sampling programms were not conducted due to the extremely poor drainage and great depths of glacial overburden in the area.

Most of the assaying was completed by the Barringer Research Company, although some of the assays were received from the assay department of Hollinger Mines. Assays represent the metal content of the total rock sample received. Both companies used an atomic absorption unit (AA), recording the values in parts per million, with exception to the mercury values recorded in parts per billion. The samples were decomposed by the addition of hot nitric and hydrochloric acids. Interpretations are based upon the assays for copper, zinc and mercury. The data was assessed by subdividing each of the rock types found into a specific number of populations.

Population contouring is accomplished by first choosing a convenient class interval for each element assayed. The logarithm of this class interval is then plotted against the logarithm of the cumulative frequency percent. Each population, represented by a straight line, is separated by the intersections of adjacent straight lines. Each value is then affixed to its appropriate population on the grid system and an attempt to contour the resulting configuration is sought.

COPPER

Only one population is recognized in both the andesite and rhyolite members in Godfrey #7. A large number of values are confined to the first two class intervals. (0-20 ppm) which may indicate background regions. The higher copper values are noted on the plan, to try and establish some rough trend.

ZINC

Analysis of the data from zinc assays revealed three populations in the rhyolites and two populations in the andesitic intrusives of Godfrey #7.

The populations in the rhyolite are divided at 70 and 120 parts per million, with 57 per cent of the values in the lower population, 26 per cent of the values between 70 and 120 parts per million and the remaining 17 per cent of the values greater than 120 parts per million. The andesitic intrusive shows only two populations, the division being 78 parts per million. The lower population contains 65 per cent of the values, all less than 78 parts per million and the remaining 35 per cent of the values greater than 78 parts per million.

It is interesting to note that the andesitic intrusives have a distinct geochemical trend parallel to the dyke margins which has no effect whatsoever on the surrounding rhyolite. Thus it may be assumed that the andesitic intrusions cannot account for any of the anomalous populations in the rhyolite. The diabase dykes also do not show any geochemical trends associated with their intrusive contacts. Thus the anomalous geochemical values in zinc are probably associated with a metamorphic or some separate mineralizing event.

MERCURY

Two distinct populations may be distinguished in both the rhyolite and the andesite from assessment of the mercury data. The population separation in the rhyolite is a 65 parts per billion, 67 per cent in the lower population and the remaining 33 per cent anomalous. The population separation in the andesite is not well defined since the lower population only spans two class intervals. Forty per cent of the values are less than 40 parts per billion with the remaining 60 per cent anomalous values.

As evidenced in the zinc contouring, the intrusives have no effect on the surrounding rhyolites as far as geochemical trends are concerned.

CONCLUSIONS

The main purpose of population contouring is to establish a geochemical trend, relating the high and low assays with respect to one another. All maps were compared with one another to establish a trend consistent for all elements assayed. This may possibly be used in evaluating geophysical anomalies associated with anomalous geochemical horizons.

Upon contouring of the assays, the trends appear to reflect stratoform occurrences when compared with the structural make-up of the area. Thus the populations may reflect the depositional history, in that each population may be related to a coinciding structural-metamorphic event in the area. The lesser number of populations found in the andesitic intrusive may show that the intrusions are later than one structural event, namely the first phase of folding. The resulting strataform trends probably represent mobilization of elements in strata by these structural-metamorphic events.

In groundwater surveys it is generally noted that zinc is a more mobile element than copper which is in turn more mobile than mercury in acid waters. However, in bedrock situations mercury is highly mobile, while zinc shows moderate dispersion and copper shows very little dispersion in acidic rocks. By combining the two preceeding statements, we may project that the more mobile elements will express a greater number of populations. This further explains the presence of three populations in the zinc assays while there are two in the mercury and only one population in the copper assays.

BIBLIOGRAPHY

Ginzburg, I. I. - "Principles of Geochemical Prospecting" pp. 86-88; pp. 195.

Dale R. Alexander

HOLLINGER MINES LIMITED

TIMMINS, ONTARIO

March 2/71

X

GEOCHEMISTRY OF BRISTOL-GODFREY #6 GROUP

GENERAL GEOCHEMISTRY

Two hundred and ninety geochemical samples were collected from bedrock across the property, and located on a grid system. The method consisted of chip sampling at various intervals along the bedrock exposures. Of the two hundred and ninety geochemical samples taken two hundred and sixty-one were rhyolite, the remainder being taken from andesitic exposure either extrusive or intrusive. Only samples of the fresh surface were retained avoiding the possibility of contamination from the weathered surface. Soil and stream sampling programms were not conducted due to the extremely poor drainage and great depths of glacial overburden in the area.

Most of the assaying was completed by the Barringer Research Company, although some of the assays were received through the assay department of Hollinger Mines Limited. Assays represent the metal content of the total rock sample received. Both companies used an atomic absorption unit (AA) recording the values in parts per million, with exception to the mercury values recorded in parts per billion. The samples were decomposed by the addition of hot nitric and hydrochloric acids. Interpretations are based upon the assays for copper, zinc and mercury. The data was assessed by subdividing each of the rock types found into a specific number of populations.

Population contouring is accomplished by first choosing a convenient class interval for each element assayed. The logarithm of this class interval is then plotted against the logarithm of the cumulative frequency percent. Each population, represented by a straight line, is separated by the intersections of adjacent straight lines. Each value is then affixed to its appropriate population on the grid system and an attempt to contour the resulting configuration is sought.

COPPER

Only one population is recognized in both the andesite and rhyolite members in Bristol-Godfrey #6. The straight line, however, is not as well defined in the andesite; a slight break is noted at 85 parts per million. The break is due to no values recorded in two class intervals (90-110 ppm), such that this may still be considered as one population. A large number of values are confined to the first two class intervals (0-20 ppm) which may indicate background regions. The higher copper values are noted on the plan, to try and establish some rough trend.

ZINC

Results similar to those in Godfrey #7 are found from the data in Bristol-Godfrey #6. Three populations are distinguished in the rhyolites and two populations in the andesitic exposures.

The populations in the rhyolite are separated at 50 and 82 parts per million, with 56 percent of the values less than 50 parts per million, 26 percent between 50 and 82 parts per million and the remaining 18 percent greater than 82 parts per million. The andesite shows only two populations, the division being at 80 parts per million.

Seventy-two percent of the values are less than 80 parts per million while 28 percent are greater than 80 parts per million.

The effects of the andesitic intrusives on the surrounding rhyolites mentioned in the Godfrey #7 report is best evidenced in the Bristol-Godfrey #6 Group. The andesitic dykes show a distinct geochemical trend parallel to the dyke margins which has no contact effects whatsoever on the adjacent rhyolites. Thus, it follows, that the andesitic intrusions cannot account for any of the anomalous populations in the rhyolite. The diabase dykes, also do not show any geochemical trends associated with their intrusive contacts. Thus the anomalous geochemical values in zinc are probably associated with a metamorphic or some separate mineralizing event.

MERCURY

Two distinct populations may be distinguished in both the rhyolite and the andesite from assessment of the mercury data. The population separation in the rhyolite is at 29 parts per billion, 63 percent in the lower population and the remaining 37 percent anomalous. The population separation in the andesite is very poorly defined but two separate lines may be distinguished. Seventy-five percent of the values are less than 41 parts per billion, the remaining 25 percent are greater than 41 parts per billion.

As evidenced in the zinc contouring, the intrusives have no effect on the surrounding rhyolites as far as geochemical trends are concerned. In south Bristol-Godfrey #6 all mercury assays were determined in parts per million showing all values as nil.

CONCLUSIONS

The main purpose of population contouring is to establish a geochemical trend, relating the high and low assays with respect to one another. All maps were compared with one another to establish a trend consistent for all elements assayed. This may possibly be used in evaluating geophysical anomalies associated with anomalous geochemical horizons.

Upon contouring of the assays, the trends appear to reflect stratoform occurrences when compared with the structural make-up of the area. Thus the populations may reflect the depositional history, in that each population may be related to a coinciding structural-metamorphic event in the area. The lesser number of populations found in the andesitic intrusive may show that the intrusions are later than one structural event, namely the first phase of folding. The resulting strataform trends probably represent mobilization of elements in strata by these structural-metamorphic events.

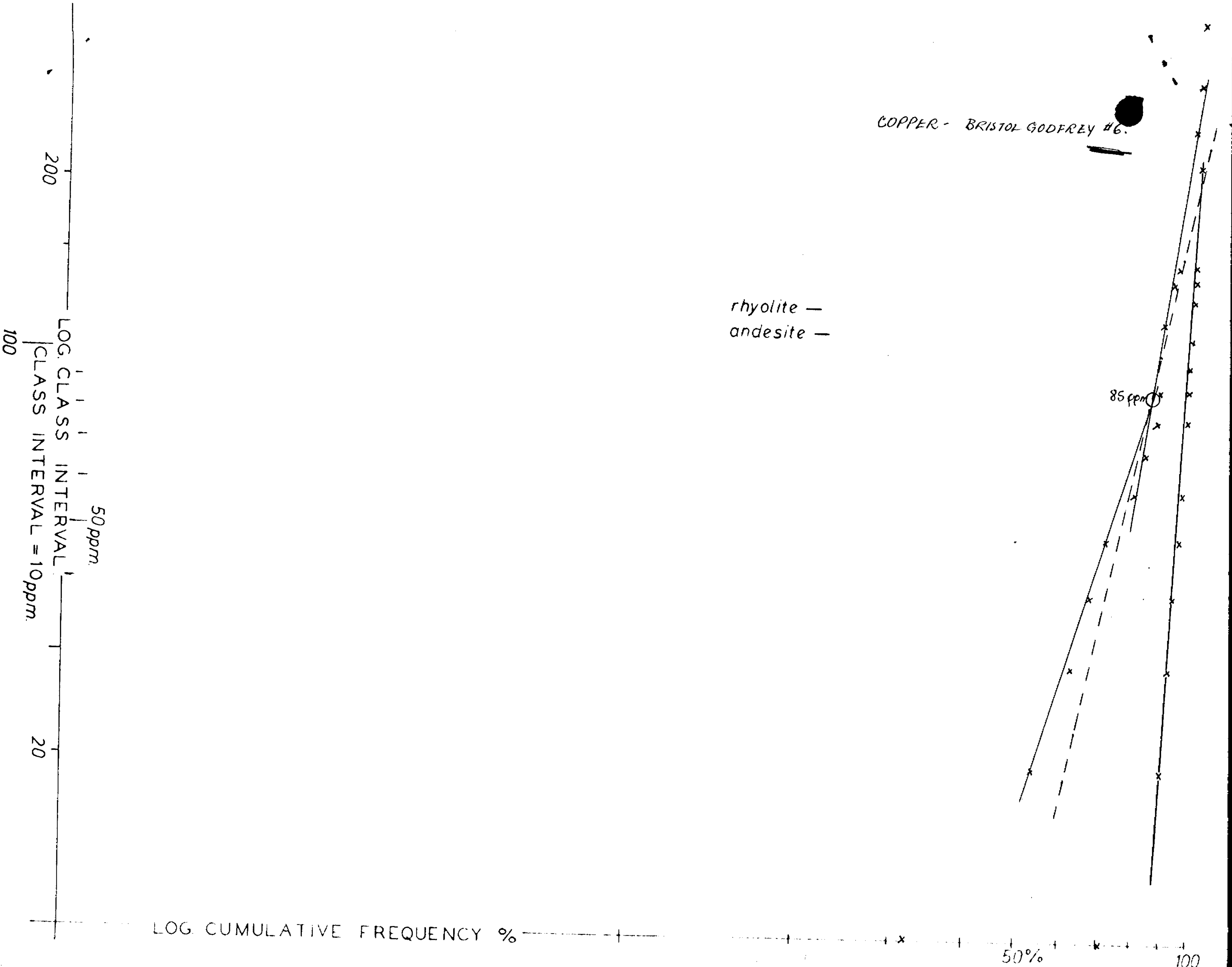
In groundwater surveys it is generally noted that zinc is a more mobile element than copper which is in turn more mobile than mercury in acid waters. However, in bedrock situations mercury is highly mobile, while zinc shows moderate dispersion and copper shows very little dispersion in acidic rocks. By combining the two preceeding statements, we may project that the more mobile elements will express a greater number of populations. This further explains the presence of three populations in the zinc assays while there are two in the mercury and only one population in the copper assays.

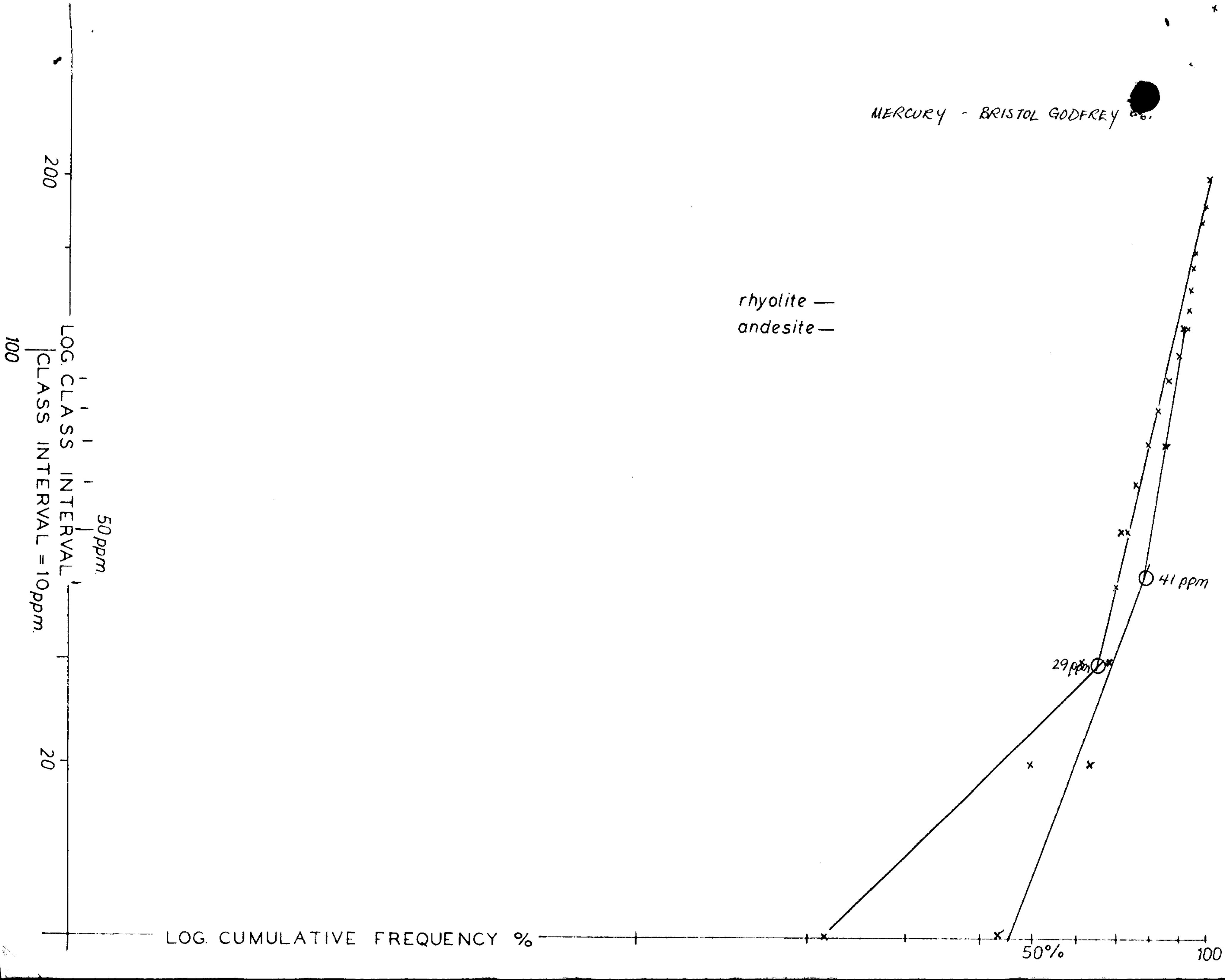
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO

Dale R. Alexander
March 2/71

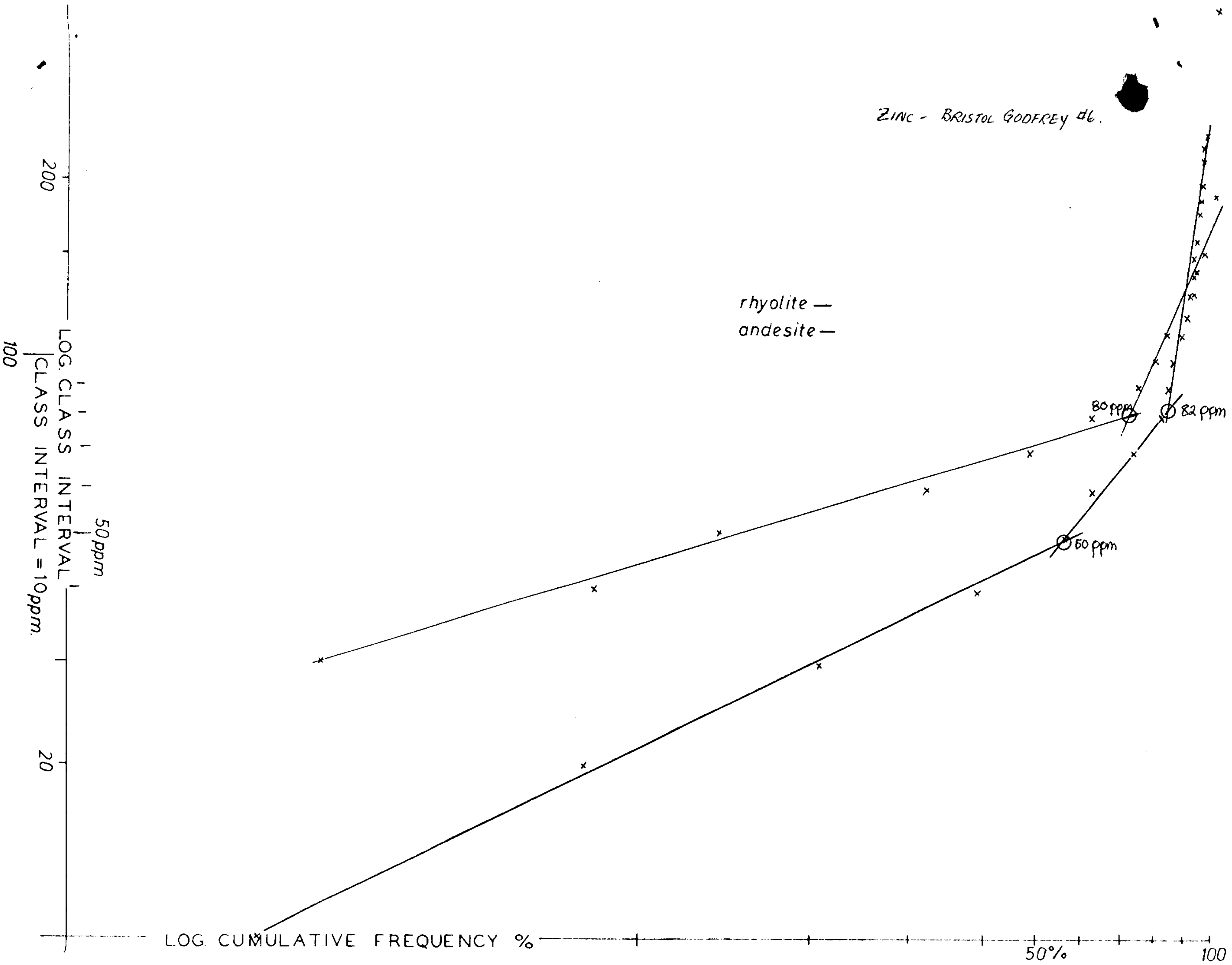
BIBLIOGRAPHY

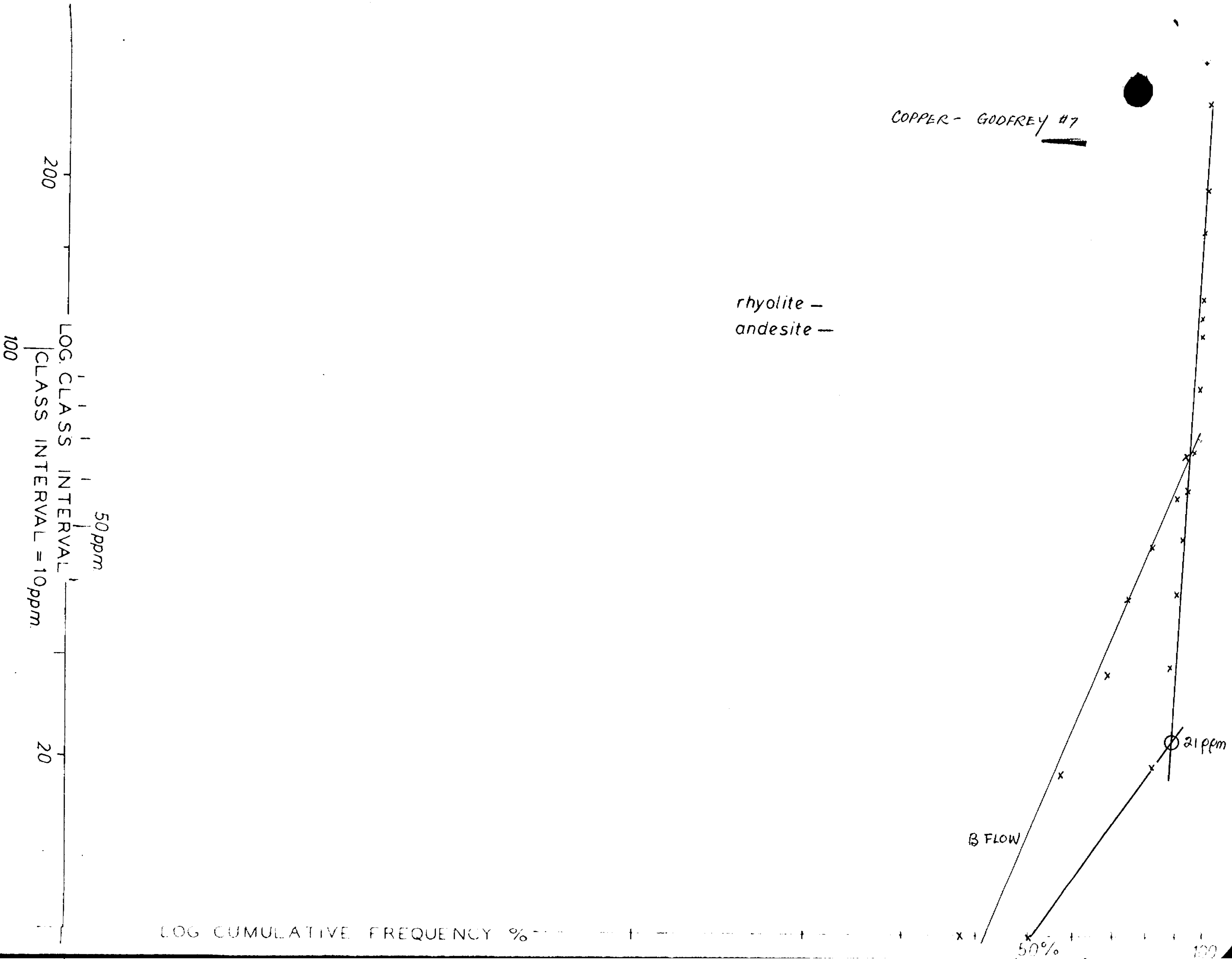
Ginzburg, I. I. - "Principles of Geochemical Prospecting" pp. 86-88; pp. 195.

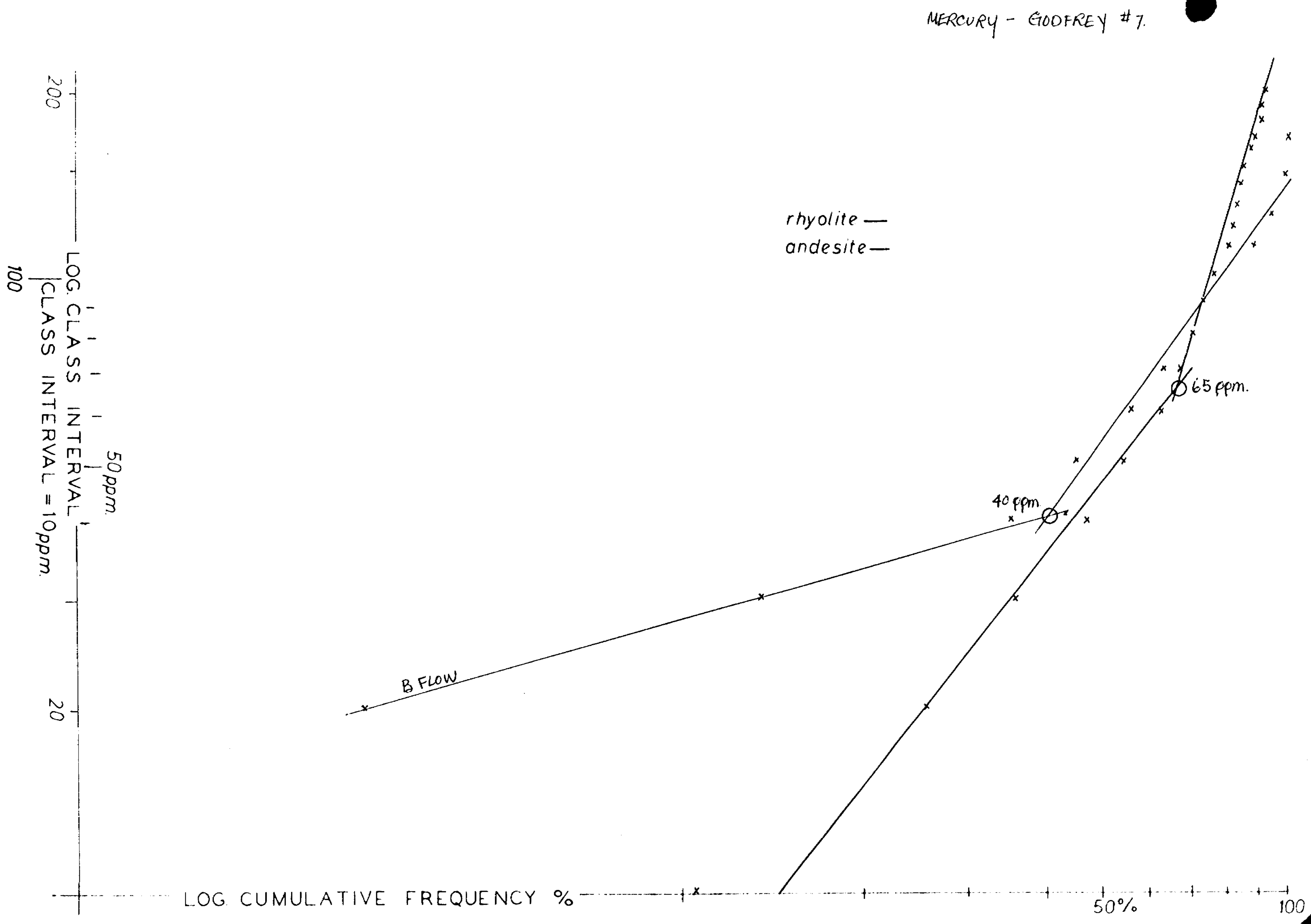

COPPER - BRISTOL GODFREY #6.
rhyolite —
andesite —
85 ppm
200
100
50ppm.
20
LOG. CLASS INTERVAL
CLASS INTERVAL = 10ppm.
LOG CUMULATIVE FREQUENCY %
50%
100

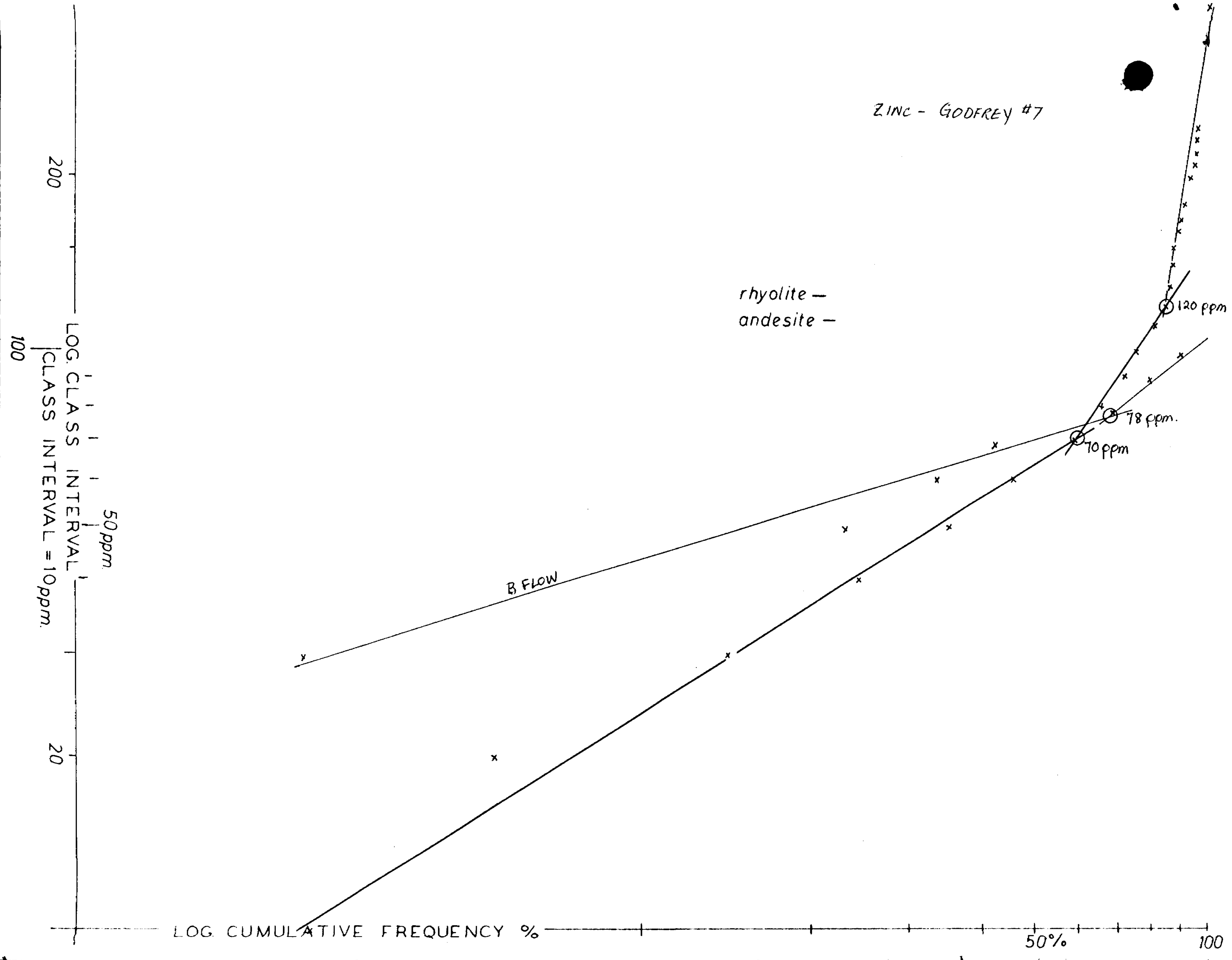


MERCURY - BRISTOL GODFREY
rhyolite —
andesite —
41 ppm
29 ppm
200
100
50 ppm
20
LOG. CLASS INTERVAL
CLASS INTERVAL = 10 ppm.
LOG. CUMULATIVE FREQUENCY %
50%
100


ZINC - BRISTOL GODFREY #6.
rhyolite —
andesite —
80 ppm
82 ppm
60 ppm
LOG. CLASS INTERVAL
CLASS INTERVAL = 10 ppm.
200
100
50 ppm
20
LOG. CUMULATIVE FREQUENCY %
50%
100


COPPER - GODFREY #7
rhyolite —
andesite —
B FLOW
21 ppm
LOG. CLASS INTERVAL
CLASS INTERVAL = 10ppm
200
100
50ppm
20
LOG CUMULATIVE FREQUENCY %
50%
100


MERCURY - GODFREY #7.
rhyolite —
andesite —
65 ppm.
40 ppm.
B FLOW
200
100
50 ppm.
20
LOG. CLASS INTERVAL
CLASS INTERVAL = 10 ppm.
LOG CUMULATIVE FREQUENCY %
50%
100


ZINC - GODFREY #7
rhyolite —
andesite —
120 ppm
78 ppm.
70 ppm
B FLOW
200
100
50 ppm
20
LOG. CLASS INTERVAL
CLASS INTERVAL = 10 ppm.
LOG. CUMULATIVE FREQUENCY %
50%
100

2.335

GEOCHEMICAL [illegible]

42A12SE0422 2.335 GODFREY

900

SAMPLING DATA

Sampling dates June 13/69 to July 24/70

Samplers D.R. Alexander
C.P. Giles B.M. Laine
A.C. Oliver J. Smith

Type of Sample Bedrock Chip Sample (NATURE OF MATERIAL)

Average Sample Weight 2 grams assayed initial sample up to approx. 6 oz.

Method of Collection Chipping the bedrock surface avoiding weathered material

Soil Horizon Sampled

Horizon Development

Sample Depth

Terrain

Drainage Development

Estimated Range of Overburden Thickness 100' not applicable

SAMPLE PREPARATION

(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis -100 Mesh

General The sample is first crushed and pulverized to -100 Mesh. After crushing the residue is thoroughly mixed by tumbling. A 2 gram weight is extracted and placed in a test tube.

ANALYSIS DATA

PROJECTS SECTION

Analysis dates July 1969 to Aug.10/70

Analyst(s) Barringer Research
Hollinger Mines Limited

ANALYTICAL METHODS

Values expressed in: per cent ☐ p.p.m. ☒ p.p.b. ☐

(Cu) Pb, (Zn) Ni, Co, Ag, Mo, As. - - - - - - (circle)

Others Hg

Field Analysis (tests)
Extraction Method
Analytical Method
Reagents Used

Field Laboratory Analysis
No. (tests)
Extraction Method
Analytical Method
Reagents Used

Commercial Laboratory (Cu, Zn, Hg tests)
Name of Laboratory Barringer Research
Extraction Method Hot HNO_3 + HCl
Analytical Method Atomic Absorption
Reagents Used not applicable

General The .2 gram sample is treated with 1½ mls HNO_3 in a hot water bath for ½ hour. Then ½ ml of HCl is added for 2 hours. Shake sample and assay.

COMMENTS

Both Hollinger Mines Limited and Barringer Research perform commercial assaying using the same methods; i.e., atomic absorption.

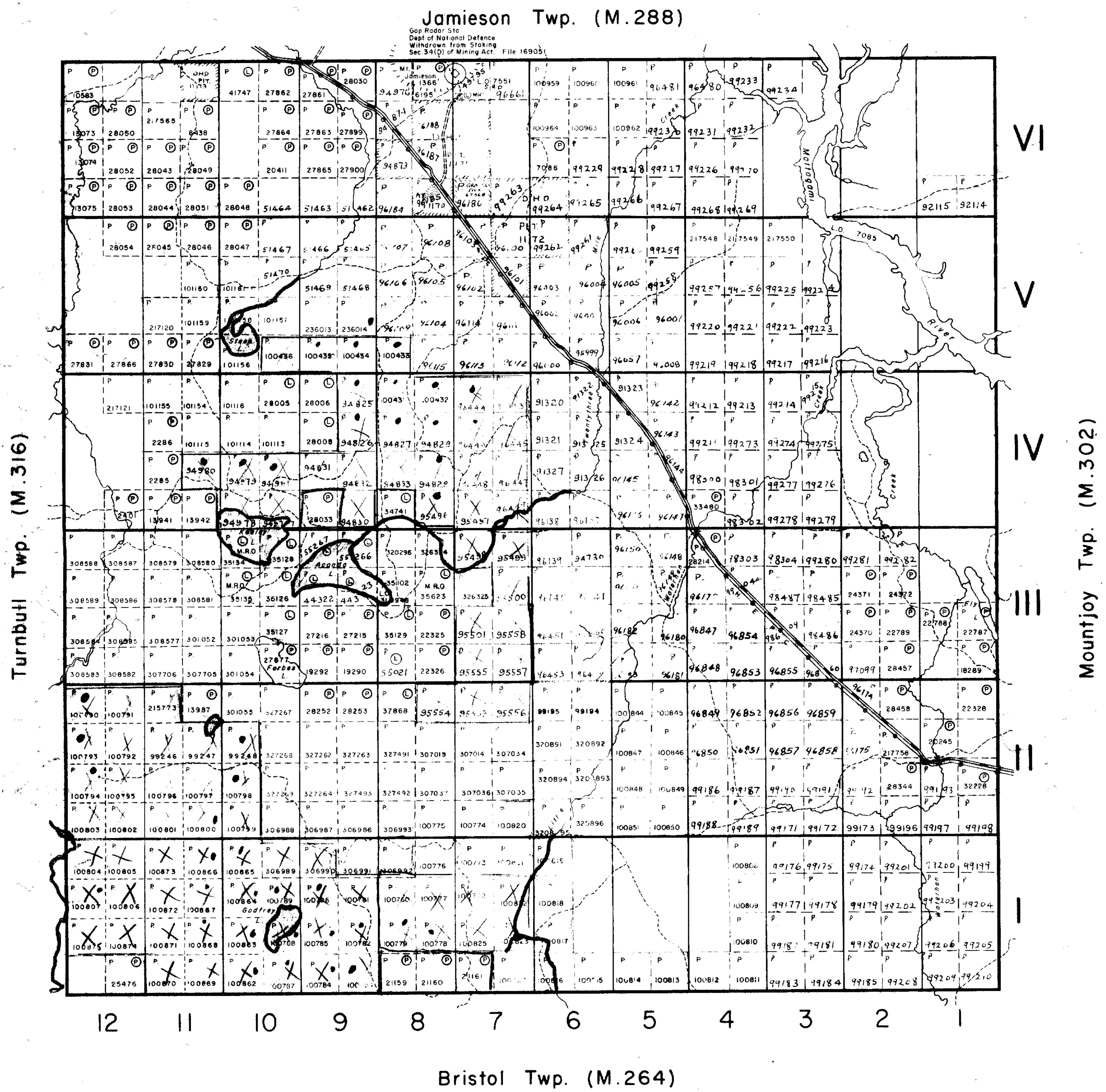
Recorded holder of claims Hollinger Mines Limited

Township or Area Bristol and Godfrey Townships

Numbers of claims from which samples taken Turnbull P.214350. Bristol P.100754,55,58,59,60, 67, 68(no Hg); P.100826-830 incl.(no Hg); P.100834(noHg) and P.100856,857, 877, 878, 879. Godfrey P.94825-29 incl; P.94833; P.94979-981 incl; P.95496; P.96444, 446; P.99248; P.100431-436 incl; P.100782, 783, 785, 786, 787, 788, 789, 790, 793, 798; P.100807; P.100862; P.100864-867 incl.

Date Oct. 13, 1971.

Signed Dale R. Alexander
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO



THE TOWNSHIP OF

Claim Map

GODFREY

DISTRICT OF COCHRANE

PORCUPINE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	Ⓟ
CROWN LAND SALE	C.S.
LEASES	Ⓛ
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C.

NOTES

400' surface rights reservation around all lakes and rivers.

Flooding rights on either side of the Mattagami to H.E.P.C.

X : [illegible]

• : Geochemical

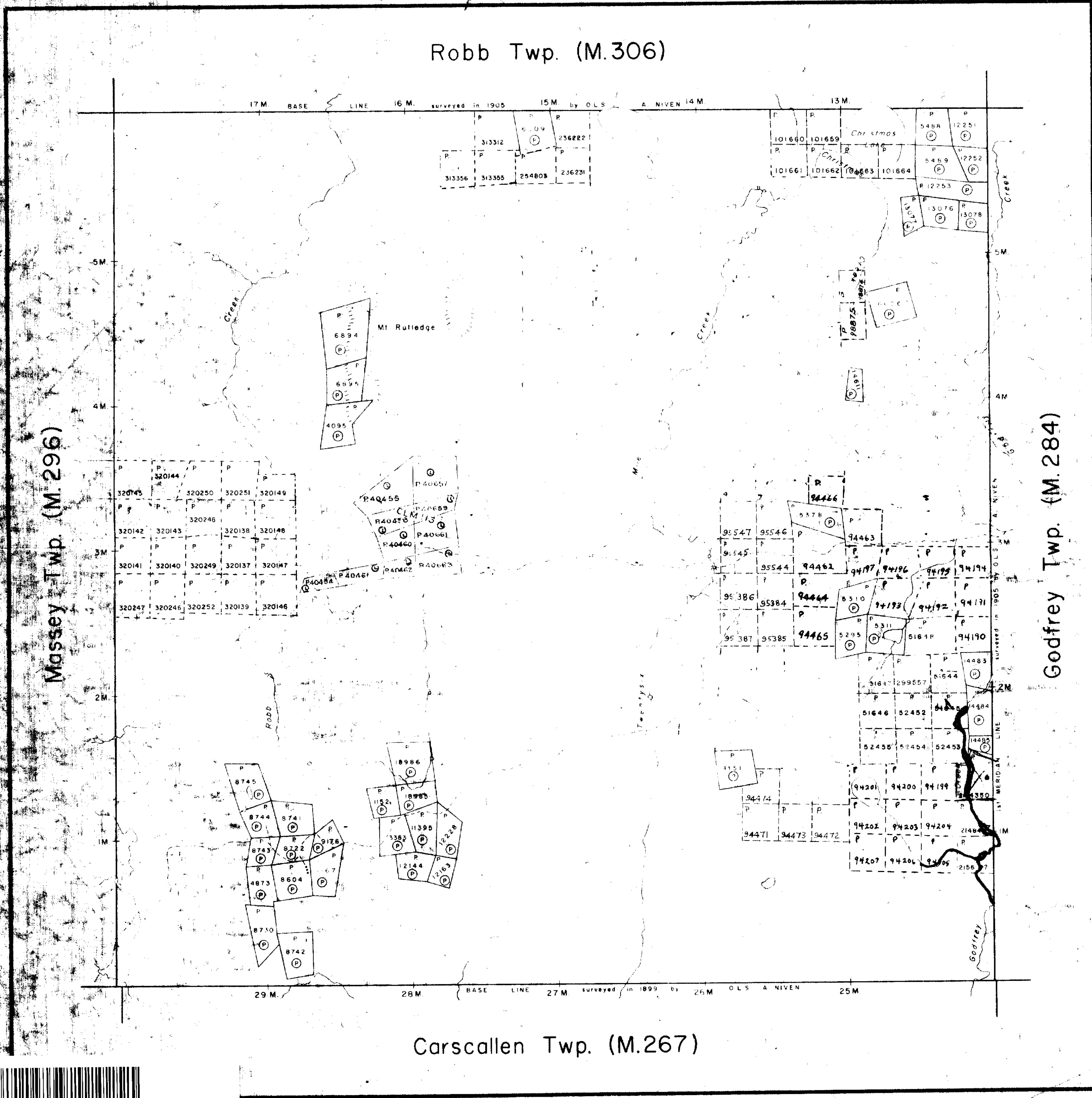
PLAN NO. M.284

ONTARIO DEPARTMENT OF MINES AND NORTHERN AFFAIRS

M.284

42A12SE0422 2.335 GODFREY

200



THE TOWNSHIP OF

Claim Map

TURNBULL

DISTRICT OF COCHRANE

PORCUPINE MINING DIVISION

SCALE: 1-INCH 40 CHAINS

LEGEND

PATENTED LAND	Ⓟ
CROWN LAND SALE	C.S.
LEASES	Ⓛ
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	⚒
CANCELLED	C

NOTES

400' Surface Rights Reservation around all lakes and rivers.

X = Geological

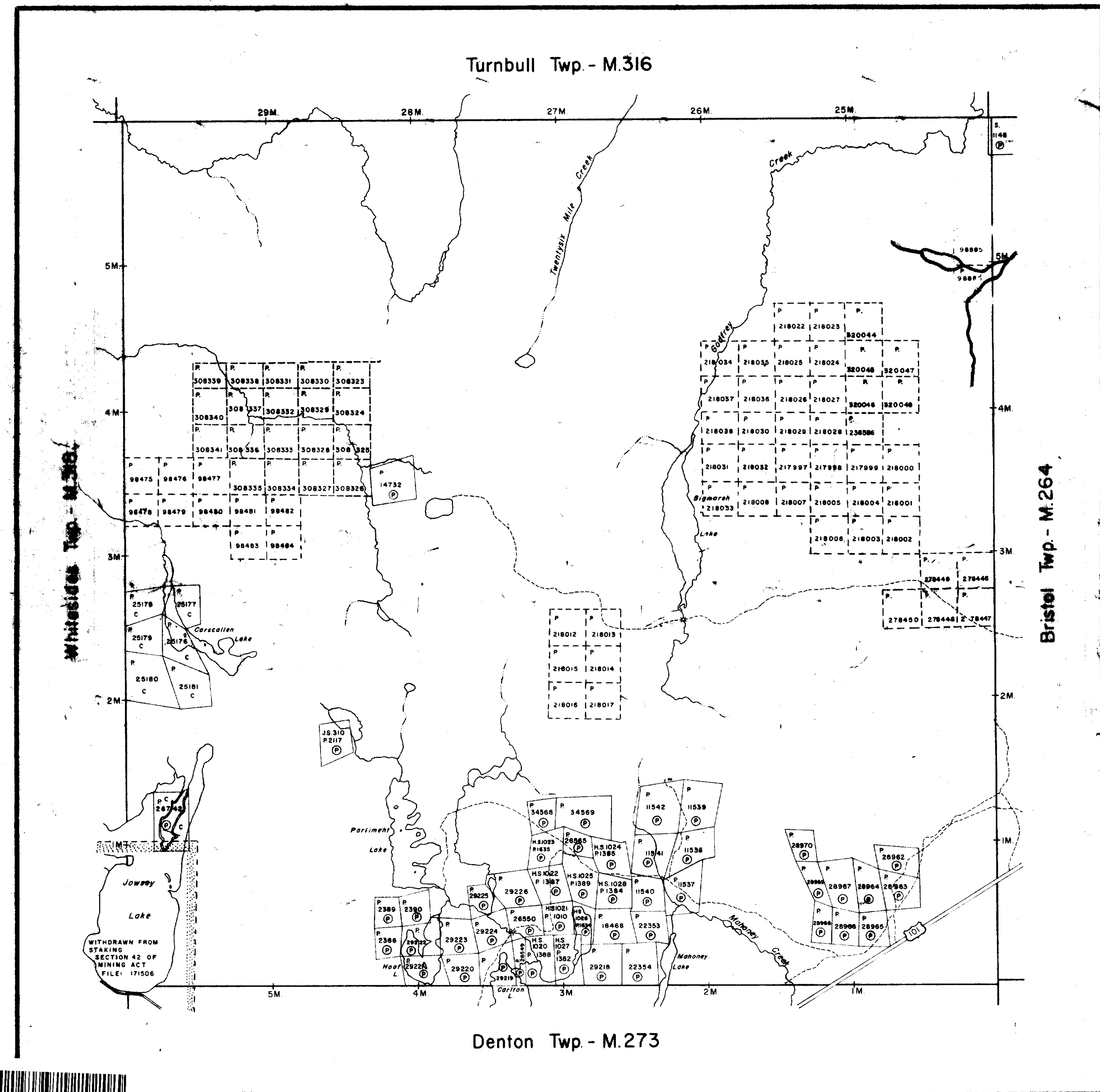
• = Geochemical

PLAN NO. M-316

ONTARIO DEPARTMENT OF MINES AND NORTHERN AFFAIRS

42A12SE0422 2.335 GODFREY

210



THE TOWNSHIP OF

Claim Map

CARSCALLEN

DISTRICT OF COCHRANE

PORCUPINE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	P
CROWN LAND SALE	C.S.
LEASES	L
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C.

NOTES

400' Surface Rights Reservation around all lakes and rivers.

Geological = X

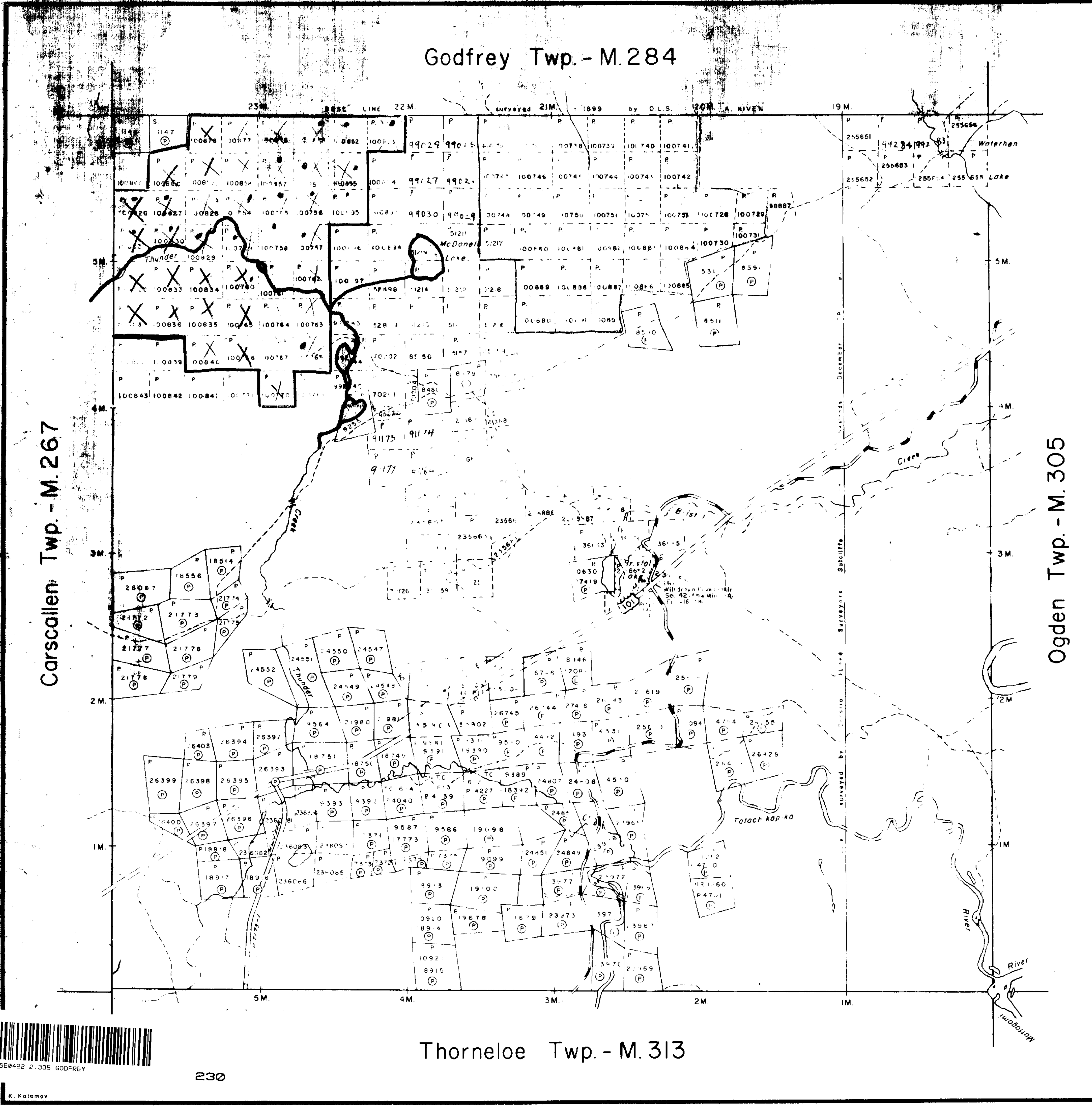
Geochemical = •

PLAN NO. M.267

ONTARIO DEPARTMENT OF MINES AND NORTHERN AFFAIRS

42A12SE0422 2.335 GODFREY

220



THE TOWNSHIP
Claim OF Map

BRISTOL

DISTRICT OF
COCHRANE

PORCUPINE
MINING DIVISION

SCALE: 1-INCH 40 CHAINS

LEGEND

PATENTED LAND
CROWN LAND SALE
LEASES
LOCATED LAND
LICENSE OF OCCUPATION
MINING RIGHTS ONLY
SURFACE RIGHTS ONLY
ROADS
IMPROVED ROADS
KING'S HIGHWAYS
RAILWAYS
POWER LINES
MARSH OR MUSKEG
MINES
CANCELLED

NOTES

400' Surface Rights Reservation around all Lakes and Rivers.

X = Geological

• : Geochemical

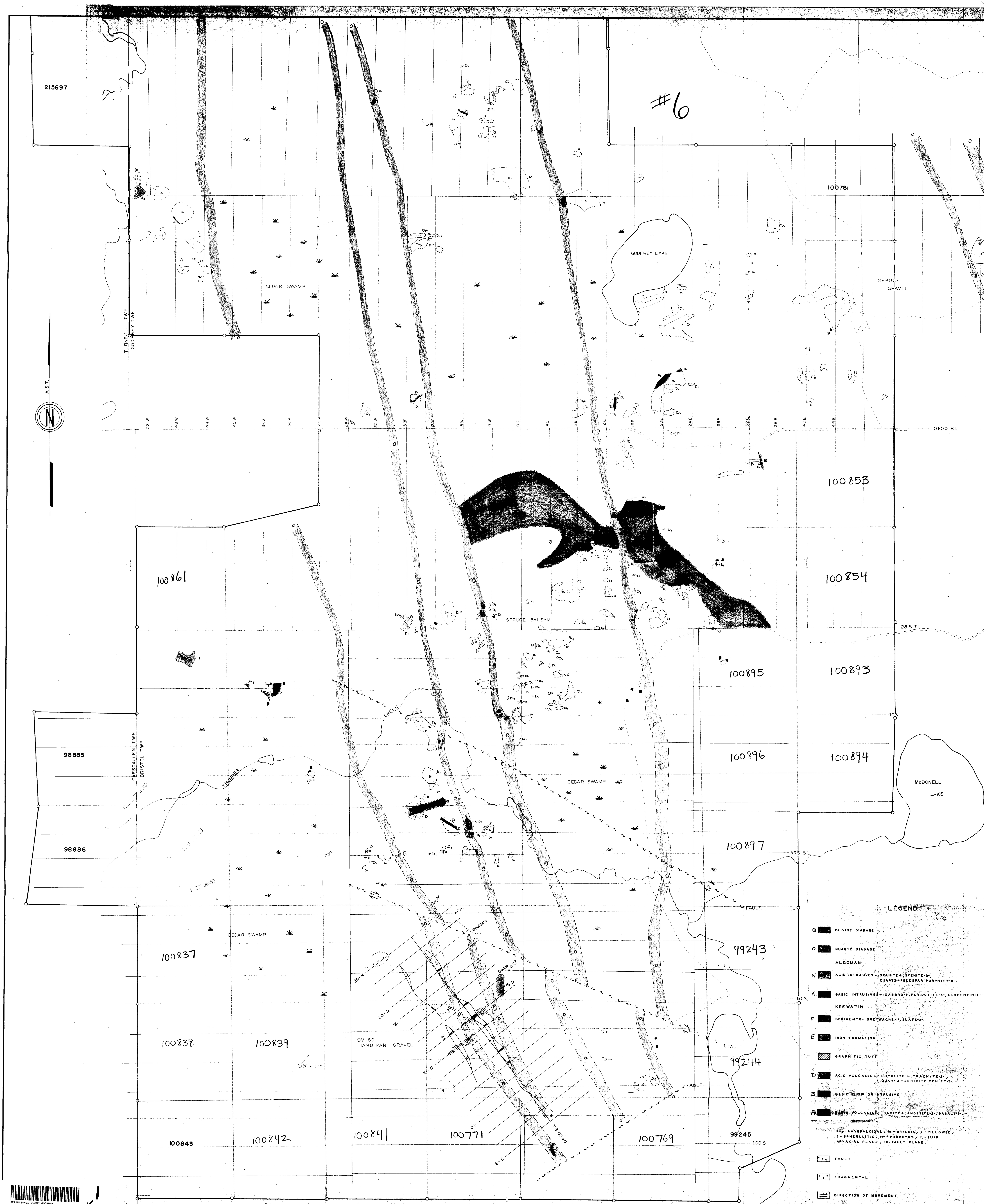
PLAN NO. M-264

ONTARIO
DEPARTMENT OF MINES
AND NORTHERN AFFAIRS

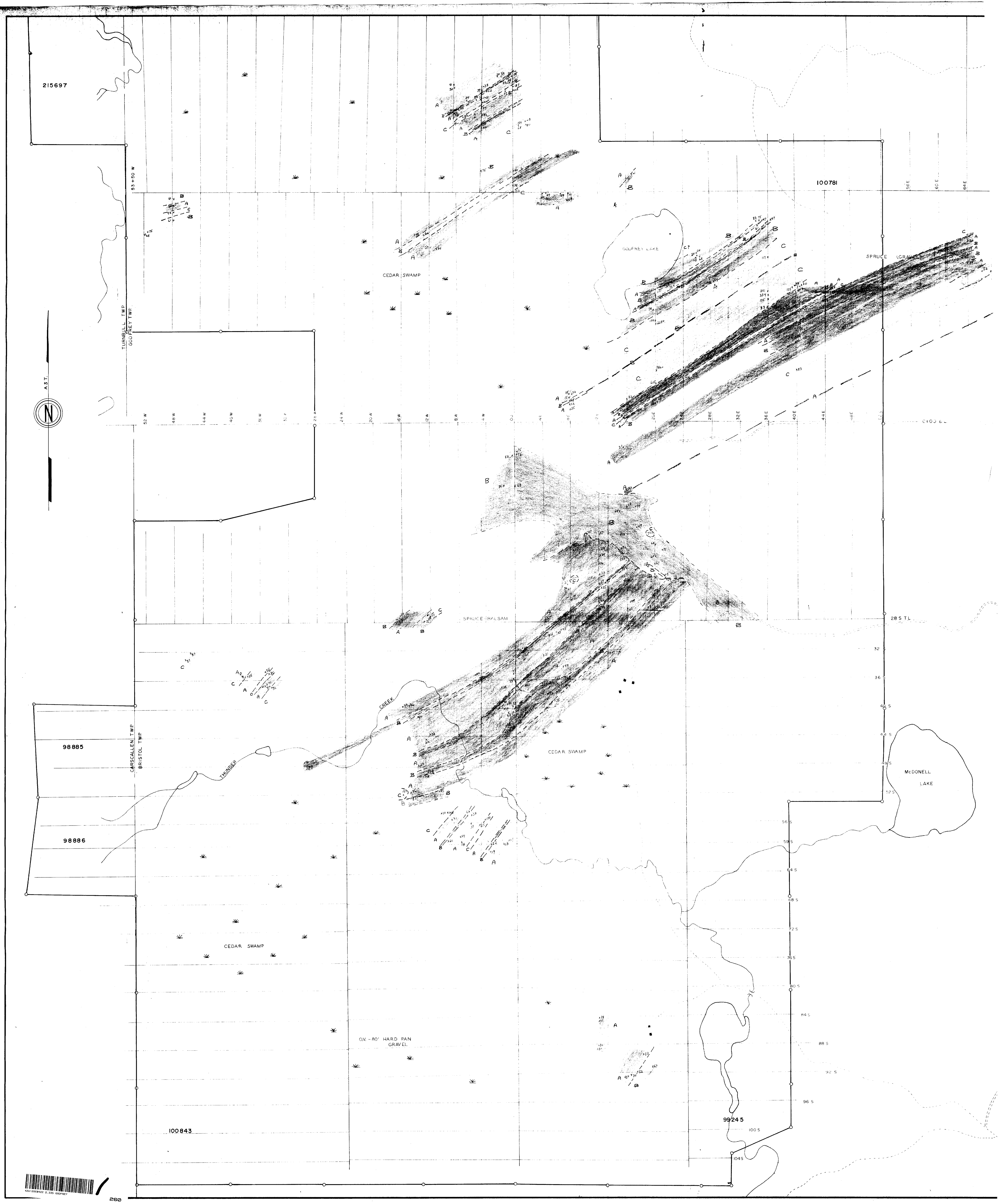
42A12SE0422 2.335 GODFREY

230

K. Kolomov


#6
215697
100781
GODFREY LAKE
CEDAR SWAMP
SPRUCE GRAVEL
TURNBULL TWP
GODFREY TWP
0+00 BL
100853
100854
100861
SPRUCE-BALSAM
28 S TL
100895
100893
100896
100894
98885
98886
CARSCALLEN TWP
BRISTOL TWP
THUNDER CREEK
CEDAR SWAMP
McDONELL LAKE
100897
59S BL
FAULT
CEDAR SWAMP
100237
99243
80 S
100838
100839
OV-80' HARD PAN GRAVEL
99244
FAULT
100843
100842
100841
100771
100769
99245
100 S
LEGEND
Q OLIVINE DIABASE
O QUARTZ DIABASE
ALGOMAN
N ACID INTRUSIVES - GRANITE-1-, SYENITE-2-, QUARTZ-FELDSPAR PORPHYRY-8-.
K BASIC INTRUSIVES - GABBRO-1-, PERIDOTITE-5-, SERPENTINITE-6-.
KEEWATIN
F SEDIMENTS - GREYWACKE-1-, SLATE-2-.
E IRON FORMATION
GRAPHITIC TUFF
D ACID VOLCANICS - RHYOLITE-1-, TRACHYTE-2-, QUARTZ-SERICITE SCHIST-3-.
B BASIC FLOW OR INTRUSIVE
A BASIC VOLCANICS - DACITE-1-, ANDESITE-2-, BASALT-3-.
amg - AMYGDALOIDAL, br - BRECCIA, p - PILLOWED,
s - SPHERULITIC, prn - PORPHYRY, t - TUFF
AP - AXIAL PLANE, FP - FAULT PLANE.
FAULT
FRAGMENTAL
DIRECTION OF MOVEMENT
240


215697
100781
GODFREY LAKE
SPRUCE (GRAVEL)
CEDAR SWAMP
TURNBULL TWP
GODFREY TWP
53+50 W
A.S.T.
N
0+00 B.L.
SPRUCE-BALSAM
28 S T.L.
B
CARSCALLEN TWP
BRISTOL TWP
98885
98886
THUNDER
CREEK
CEDAR SWAMP
McDONELL LAKE
40 S
60 S
80 S
CEDAR SWAMP
O.V. - 80' HARD PAN GRAVEL
100843
99245
100 S
250



215697
100781
GODFREY LAKE
CEDAR SWAMP
SPRUCE (GRAVEL)
TURNBULL TWP
GODFREY TWP
53+50 W
SPRUCE-BALSAM
28 S T.L.
CREEK
THUNDER
CEDAR SWAMP
98885
98886
CARSCALLEN TWP
BRISTOL TWP
McDONELL LAKE
CEDAR SWAMP
O.V. - 80' HARD PAN GRAVEL
100843
99245

280

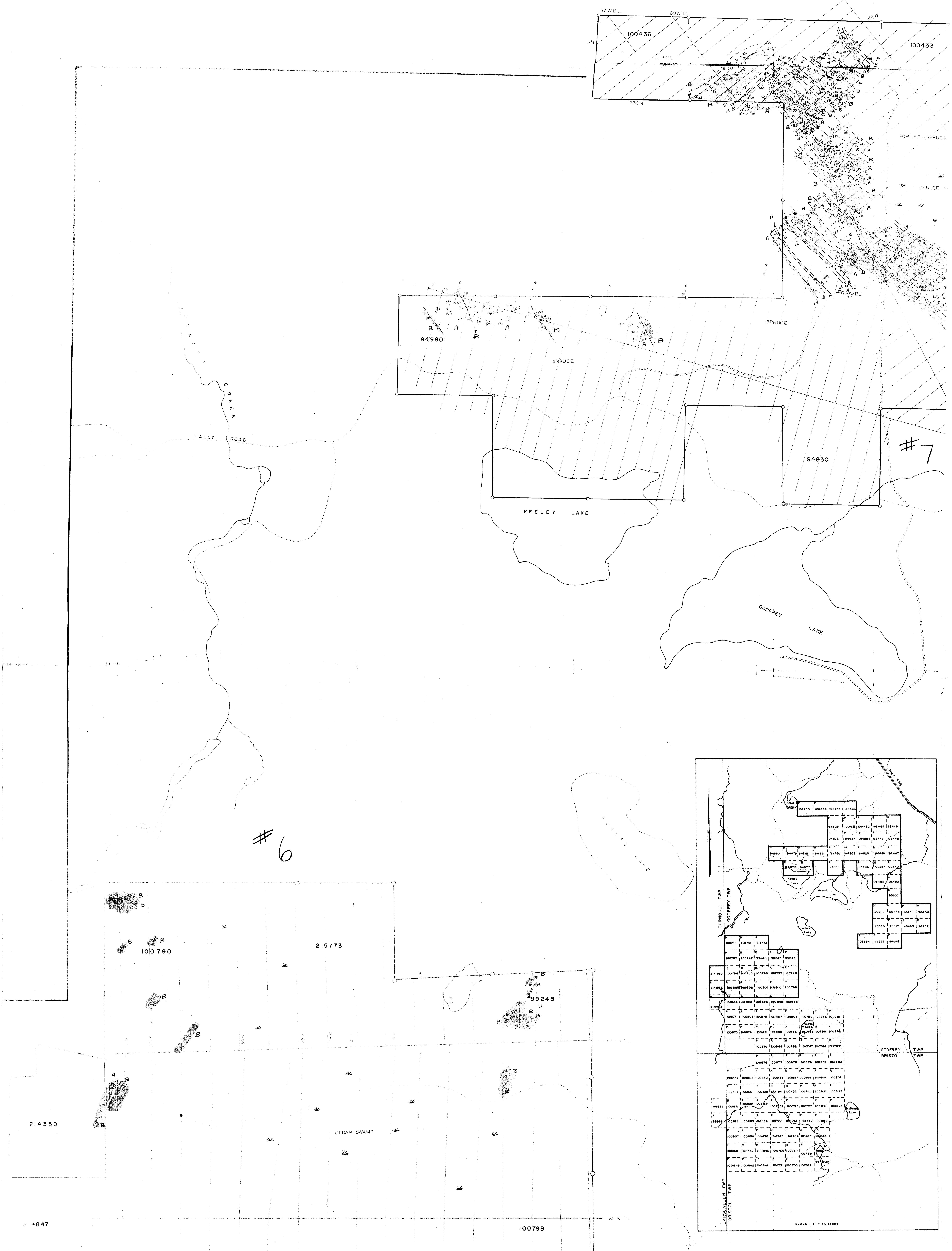
#6
215697
100866
100865
100867
100807
53+50 W
100864
100868
100781
GODFREY LAKE
100788
100785
100782
SPRUCE GRAVEL
CEDAR SWAMP
TURNBULL TWP
GODFREY TWP
100862
100787
100783
0+00 B.L.
100878
100879
100857
100856
100858
SPRUCE - BALSAM
28 S T.L.
NO HG VALUES
CREEK
THUNDER
98885
98886
CARSCALLEN TWP
BRISTOL TWP
CEDAR SWAMP
McDONELL LAKE
98245
100843
270


2ND PHASE OF FOLDING
ANTICLINAL (FROM DIPS)
1ST PHASE OF FOLDING
ANTICLINAL
100436
J. PINE
GRAVEL
100433
POPLAR - SPRUCE
SPRUCE SWAMP
J. PINE
GRAVEL
94980
SPRUCE
SPRUCE
#7
94830
KEELEY LAKE
GODFREY LAKE
GODFREY CREEK
FORBES LAKE
LEGEND
OLIVINE DIABASE
QUARTZ DIABASE
ALGOMAN
ACID INTRUSIVES - GRANITE-1-, SYENITE-2-,
QUARTZ-FELDSPAR PORPHYRY-8-.
BASIC INTRUSIVES - GABBRO-1-, PERIDOTITE-5-, SERPENTINITE-6-.
KEEWATIN
SEDIMENTS - GREYWACKE-1-, SLATE-2-.
IRON FORMATION
GRAPHITIC TUFF
ACID VOLCANICS - RHYOLITE-1-, TRACHYTE-2-,
QUARTZ-SERICITE SCHIST-3-.
BASIC FLOW OR INTRUSIVE
BASIC VOLCANICS - DACITE-1-, ANDESITE-2-, BASALT-3-.
amg. - AMYGDALOIDAL, br. - BRECCIA, p. - PILLOWED,
s. - SPHERULITIC, por. - PORPHYRY, t. - TUFF
AP - AXIAL PLANE, FP - FAULT PLANE.
FAULT
FRAGMENTAL
DIRECTION OF MOVEMENT
#6
100790
215773
99248
214350
214847
CEDAR SWAMP
100799
TURNBULL TWP
GODFREY TWP
BRISTOL TWP
CARSCALLEN TWP
280

67 W.B.L.
60W.T.L.
100436
J. PINE
GRAVEL
230N
220N
100433
POPLAR-SPRUCE
SPRUCE SWAMP
J. PINE
GRAVEL
94980
SPRUCE
SPRUCE
94830
100790
215773
99248
CEDAR SWAMP
100799
TURNBULL TWP
GODFREY TWP
GODFREY TWP
BRISTOL TWP
CARSCALLEN TWP
BRISTOL TWP

290


67 W.B.L.
60W T.L.
100436
J. PINE
GRAVEL
230N
94980
100790
215773
99248
214350
CEDAR SWAMP
214847
100799
300


67WBL
60WTL
100436
PINE
100433
230N
POPLAR - SPRUCE
SPRUCE
94980
SPRUCE
CREEK
LALLY ROAD
94830
#7
KEELEY LAKE
GODFREY LAKE
#6
215773
100790
99248
214350
CEDAR SWAMP
4847
100799
TURNBULL TWP
GODFREY TWP
Keeley Lake
GODFREY TWP
BRISTOL TWP
CARSCALLEN TWP
BRISTOL TWP
SCALE: 1" = 40 chains

310


#6
100781
LAKE
SPRUCE
GRAVEL
LITTLE WATERHEN CREEK
0+00 B.L.
GODFREY TWP
BRISTOL TWP
100853
100854
28 S TL.
100895
100893
40 S
100896
100894
McDONELL
LAKE
100897
59 S B.L.
FAULT
99243
80 S
99244
99245
100 S
769
TURNBULL TWP
GODFREY TWP
Hwy 576
Keeley Lake
Aconda Lake
Forbes Lake
McDonell Lake
CARSCALLEN TWP
BRISTOL TWP
LEGEND
Q OLIVINE DIABASE
O QUARTZ DIABASE
ALGOMAN
N ACID INTRUSIVES - GRANITE-1, SYENITE-2, QUARTZ-FELDSPAR PORPHYRY-8.
K BASIC INTRUSIVES - GABBRO-1, PERIDOTITE-5, SERPENTINITE-6.
KEEWATIN
F SEDIMENTS - GREYWACKE-1, SLATE-2.
E IRON FORMATION
GRAPHITIC TUFF
D ACID VOLCANICS - RHYOLITE-1, TRACHYTE-2, QUARTZ-SERICITE SCHIST-3.
B BASIC FLOW OR INTRUSIVE
A BASIC VOLCANICS - DACITE-1, ANDESITE-2, BASALT-3.
FAULT
FRAGMENTAL
DIRECTION OF MOVEMENT
HOLLINGER MINES LTD.
NORTH - WEST BRISTOL SHEET
GEOLOGY
SCALE 1" INCH TO 400 FEET
BRISTOL - GODFREY GROUP
Dan R. Alexander
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO
2335


HOLLINGER MINES LTD
NORTH-WEST BRISTOL SHEET
GEOCHEMISTRY
CU
SCALE 1" INCH TO 400 FEET
BRISTOL - GODFREY GROUP
ONE POPULATION
HIGHEST VALUES
Dale R. Alexander
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO
100781
SPRUCE (GRAVEL)
0+00 BL
28 S T.L.
40 S
McDONELL LAKE
80 S
100 S
99245
LITTLE WATERHEN CREEK
GODFREY TWP
BRISTOL TWP
TURNBULL TWP
GODFREY TWP
CARSCALLEN TWP
BRISTOL TWP
Hwy 576
SCALE 1" = 40 chains

2.335

14

HOLLINGER MINES LTD.
NORTH-WEST BRISTOL SHEET
GEOCHEMISTRY
ZN
SCALE 1" INCH TO 400 FEET
BRISTOL-GODFREY GROUP
POPULATIONS
C >80 >82
B <80 50-82
A <50
ANDESITE | RHYOLITE
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO
100781
SPRUCE (GRAVEL)
LITTLE WATERHEN CREEK
GODFREY TWP
BRISTOL TWP
28 S TL
McDONELL LAKE
99245
TURNBULL TWP
GODFREY TWP
CARSCALLEN TWP
BRISTOL TWP
Keeley Lake
Forbes Lake
SCALE 1" = 40 chains
D.335


#6
GODFREY LAKE
SPRUCE GRAVEL
100781
100788
100785
100782
100787
100783
100862
100878
100879
100857
100856
0864
1865
LITTLE WATERHEN
GODFREY TWP
BRISTOL TWP
0+00 B.L.
28 S TL
McDONELL LAKE
CEDAR SWAMP
HG VALUES
99245
TURNBULL TWP
GODFREY TWP
CARSCALLEN TWP
BRISTOL TWP
SCALE: 1" = 40 chains
HOLLINGER MINES LTD.
NORTH-WEST BRISTOL
GEOCHEMISTRY
HG
SCALE 1" INCH TO 400 FEET
BRISTOL-GODFREY GR
POPULATIONS
B >41 >29
A <41 <29
ANDESITE | RHYOLITE
2.335

100433
POPLAR - SPRUCE
SPRUCE SWAMP
J. PINE GRAVEL
J. PINE GRAVEL
#7
CEDAR SWAMP
94830
GODFREY
LAKE
96452
95554
Hwy 576
GODFREY TWP
BRISTOL TWP
SCALE 1" = 40 chains
GEOLOGY
WEST SHEET
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO
2.335

100433
POPLAR-SPRUCE
SPRUCE SWAMP
J. PINE
J. PINE GRAVEL
CEDAR SWAMP
94830
96452
95554
58S BL
GODFREY TWP
BRISTOL TWP
HOLLINGER MINES LTD
GODFREY GROUPS
GODFREY TWP ONT
GEOCHEMISTRY
CU
WEST SHEET
1 POPULATION
HIGHEST VALUES
Dale R. Alexander
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO
2335


100433
POPLAR - SPRUCE
SPRUCE SWAMP
PINE
GRAVEL
95554
96452
N
GODFREY GROUPS
GEOCHEMISTRY
ZN
WEST SHEET
POPULATIONS
C >78 >120
B <78 70-120
A <70
ANDESITE
RHYOLITE
HOLLINGER MINES LIMITED
TIMMINS, ONTARIO
2.335

GODFREY GRO

GODFREY TWP ONT

GEOCHEMISTRY

HG

WEST SHEET

POPULATIONS

B >40 [ ] >65

A <40 [ ] <65

ANDESITE | RHYOLITE

Dale R Alexander

HOLLINGER MINES LIMITED

TIMMINS, ONTARIO

2.335