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Ministry of Natural Resources

Hon. James A.C. Auld
Minister

Dr. J.K. Reynolds
Deputy Minister

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PREFACE

This report, summarizing the activities of Regional and Resident Geologists for the year 1978, is an account of mining and exploration activities in Ontario prepared from information collected and filed in 1978. For the convenience of the reader, listings of new additions to the Assessment Files records, and reports of government survey and university sponsored projects are provided.

Regional and Resident Geologists are located in various centres of the Province to provide geoscience information and advice to the public on the geology and mineral deposits of Ontario. Each Regional and Resident Geologist maintains a library of published and unpublished reports including publications of the Ontario Geological Survey, other government agencies, records of exploration activity submitted for assessment work credit, company prospectuses and reports from the files of the Ontario Securities Commission, reports of property visits made by the Regional or Resident Geologist and other staff geologists, and information received directly from company and individuals.

The office of the Eastern Regional Geologist intensified its industrial minerals program, examining a number of industrial mineral commodities in 1978. A detailed study of silica with respect to its market potential in the glass and foundry industries, was completed. A selective diamond drilling program delineated silica resources in the Kingston-Smiths Falls-Arnprior areas.

In the Algonquin Region, the Mineral Resources Co-ordinator suggests that the potential of phosphate deposits has not been evaluated, citing the lack of studies carried out with respect to the possibility of mining both phosphate and uranium in overlapping deposits. Phosphate and uranium mineralization occurs in the marbles of Renfrew County and in the area extending from Cardiff Township to Somerville Township.

From his studies of the silver-bearing carbonate veins in the sediments of the Cobalt Embayment, the Kirkland Lake Resident Geologist postulates that silver may have originated from polymetallic sulphide deposits in the Early Precambrian basement rocks, and was remobilized as a result of thermal metamorphism related to the intrusion of the Nipissing Diabase. Silver-bearing veins associated with the diabase may be considered "pathfinders", indicating the presence of silver-bearing sulphide deposits in the Precambrian basement.

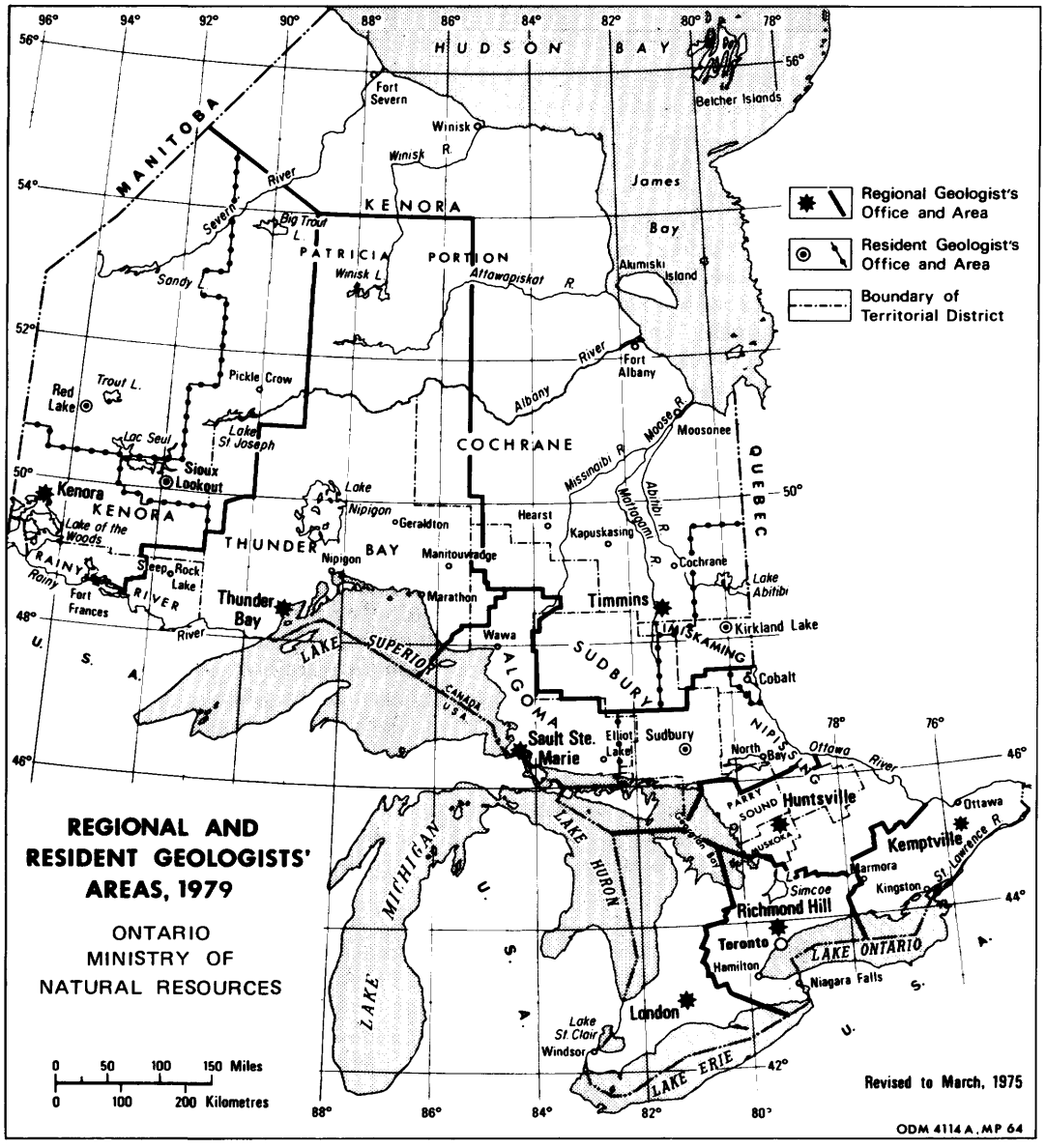
Uranium occurrences worthy of further investigation are described by the Regional Geologist at Sault Ste. Marie. Areas warranting exploration are Larson Township and the region lying north of the Montreal River and east of the Algoma Central Railway, and Vankoughnet Township, where uranium occurrences are found within a major fault zone.

Information on cobalt occurrences compiled from data contained in the Assessment Files is provided by the Regional Geologist of the North Central Region.

In the region covered by the Sioux Lookout Resident Geologist, exploration is warranted for the following: tantalum-bearing pegmatites in the Roadhouse River area; copper-molybdenite mineralization within pegmatite dikes in the Gullwing area; and gold-uranium mineralization in the Bamaji Lake area, where the mineralization may occur within stratabound uranium-rich units.

Within the area covered by the Regional Geologist at Kenora, exploration attention is directed to Halkirk Township, where chalcopyrite mineralization occurs within stratigraphic units of quartz-sericite-biotite schist intercalated with mafic metavolcanic rocks. Uranium, associated with magnetite, occurs in siliceous rocks at their contact with iron-rich mafic metavolcanic rocks of the Vermilion Bay volcanic belt. It is suggested that exploration with a magnetometer should be concentrated along the iron-rich horizon within the mafic metavolcanic rocks.

At the time of publication of this report several staff resignations and transfers occurred. Dr. W. O. Karvinen resigned as Resident Geologist at Sudbury and L. A. Tihor resigned his Regional Geologist's post at Timmins. Dr. P. A. Palonen was transferred to London as Chief Geologist, Petroleum Resources Laboratory.



REGIONAL GEOLOGISTS' OFFICES		ADDRESS	TELEPHONE
Northwestern Region	– R.C. Beard	808 Robertson St., Kenora, P9N 3X7	(807) 468-3111
North Central Region	– K.G. Fenwick	435 James St.S., Thunder Bay, P7C 5G6	(807) 475-1331
Northern Region	– L.A. Tihor	60 Wilson Ave., Timmins, P4N 3W2	(705) 267-1401
Northeastern Region	– P.E. Giblin	875 Queen St.E., Sault Ste. Marie, P6A 2B3	(705) 942-1414
Algonquin Region	– J.R. Trusler	Box 9000, Huntsville, P0A 1K0	(705) 789-9611
Eastern Region	– M.A.Klugman	South Boundary Road, Kemptville, K0G 1J0	(613) 258-3413
Central Region	– M. Narain	10670 Yonge St., Richmond Hill, L4C 3C9	(416) 884-9203
Southwestern Region	– R.G. Bryant	1106 Dearness Drive, London, N6E 1N9	(519) 681-5350

RESIDENT GEOLOGISTS' OFFICES			
Red Lake	– L.O. Koskitalo	Ontario Govt. Bldg., Box 860, Red Lake, P0V 2M0	(807) 727-2252
Sioux Lookout	– Vacant	Box 1089, Sioux Lookout, P0V 2T0	(807) 737-1291
Kirkland Lake	– H.L. Lovell	4 Government Rd.E., Kirkland Lake, P2N 1A2	(705) 567-5242
Sudbury	– Vacant	1112 The Kingsway, Sudbury, P3B 2E5	(705) 566-2580

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LIST OF PUBLICATIONS (back pocket)

1978 Report of Northwestern Regional Geologist and Kenora Resident Geologist

R.C. Beard[1] and S. Rivett[2]

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INTRODUCTION

Staffing of the Kenora office in 1978 consisted of R. Beard, Regional Geologist, S. Rivett, Resource Geologist, and S. Clancy, secretary. One student technician was employed through the summer under the Experience '78 program.

[1]Regional Geologist, Ontario Ministry of Natural Resources, Provincial Building, 808 Robertson Street, Kenora, P9N 3X9.
[2]Resource Geologist.

REGIONAL GEOLOGIST'S ACTIVITIES

The prime function of the Regional Geologist's office, as in past years, was to provide a professional-technical advisory service and a technical library to the mining public, to encourage and assist mineral exploration in the District. Due to the reduced level of exploration activity in the District over the past year, this public service aspect of the program was somewhat reduced over previous years.

In order to collect the geotechnical data and develop the professional expertise required of the program, numerous field investigations, including mine visits, property examinations, and other field studies were carried out by the Kenora geological staff. As part of the program, the following producing mines in the Northwestern Region were visited: Dickenson Mines Limited; Campbell Red Lake Mines Limited; Mattabi Mines Limited; Sturgeon Lake Mines Limited (Falconbridge Copper Limited and NBU Mines Limited); Tantalum Mining Corporation (Bernic Lake, Manitoba); Universal Granite Company Limited; Rush Bay Quarries Limited. The properties of Maybrun Mines Limited and Consolidated Canadian Faraday Limited, both recently having terminated production, were also visited, as was Goldlund Mines Limited, currently undergoing underground sampling and development in Echo Township, north of Dryden. In addition, several properties undergoing active exploration and a number of other inactive mineral showings were also examined and reported upon.

In order to ensure that the land base available for mineral exploration was not reduced unnecessarily, and that other Government policies, procedures, and programs did not conflict unnecessarily with minerals objectives, the office staff continued to take an active role in resource planning and management. Geological and mineral resource components were prepared for input into a number of planning and management documents including four lake management plans. Other Ministry planning and management documents were also reviewed for consistency with mineral resource objectives, including

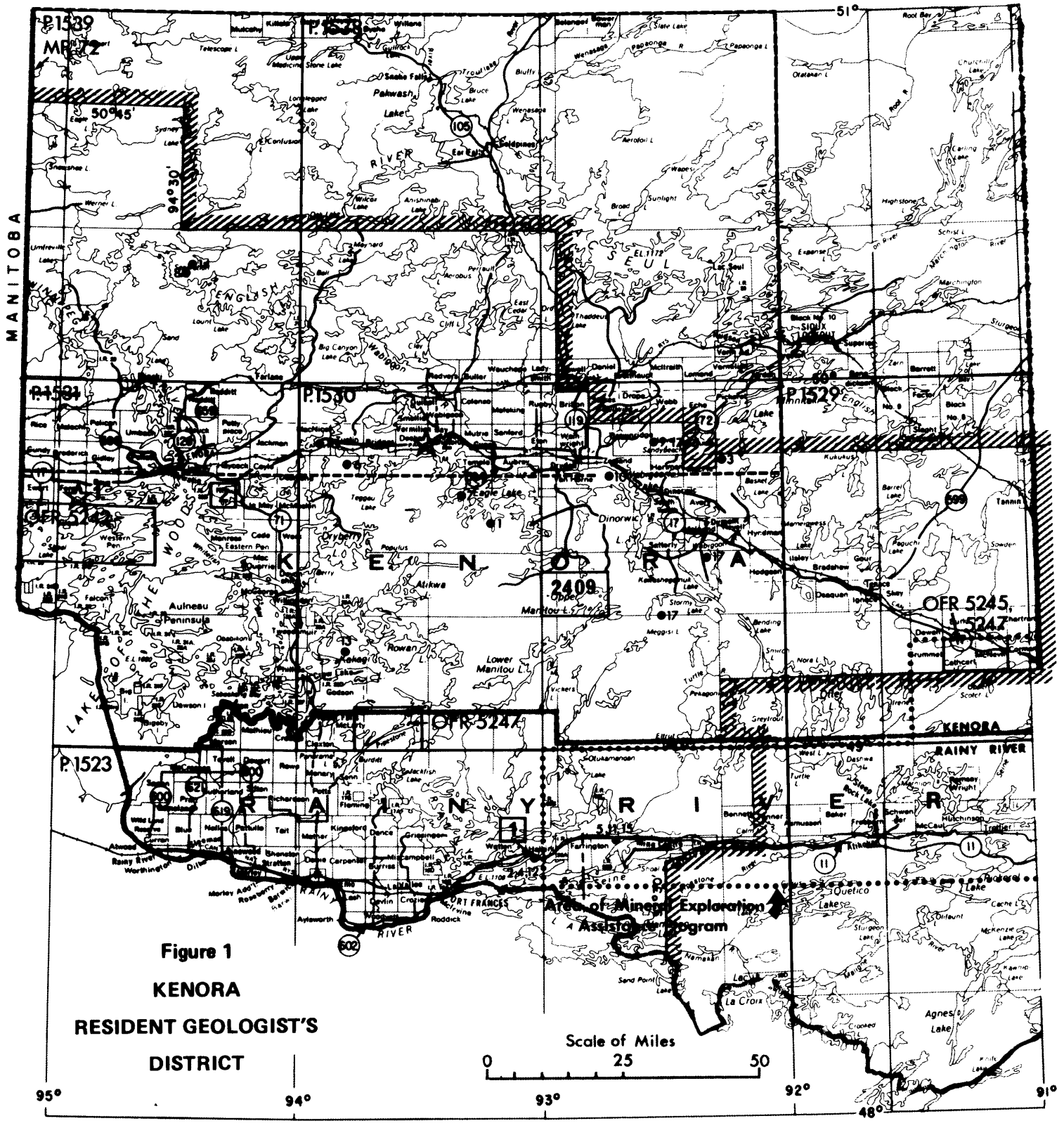

Figure 1

KENORA

RESIDENT GEOLOGIST'S

DISTRICT

EXPLANATION

☆ Producing quarries
1. Rush Bay Quarries Ltd.
2. Universal Granite Company Ltd.

● Exploration activity in 1978 (keyed to Table 2).

[1] Property visit described in report.

——— Map or report issued by the Ontario
- - - - Geological Survey in 1978 (Keyed to Table 1).
P. - Preliminary Map
2409 - Coloured Map
OFR - Open File Report
MP - Miscellaneous Paper

▨ Boundary of Resident Geologist's District.

15 lake management plans and 56 timber cutting and scarification plans. In addition to the above, the Regional Geologist co-ordinated a major mineral resource data gathering program for the West Patricia Land Use Plan.

In addition to serving on the usual Ministry technical committees, the Regional Geologist also served on the Northwestern Ontario Strategic Land Use Planning Committee, a committee to investigate the feasibility of a Provincial core storage and retrieval system, the West Patricia Land Use Planning Committee, and a committee to investigate the Ministry's role with regard to abandoned mining properties.

Assistance was provided to the Ontario Geological Survey field staff, including assistance with field trips in the Werner Lake and Atikwa Lake areas, the Vermilion Bay area, and the Dryden area.

A study, related to the utilization of peat as an energy source, was undertaken during the year which involved discussions with the Minnesota Department of Natural Resources regarding its current $1.5 million peat program.

A program initiated the previous year to investigate old mining sites as to their suitability as historical mining sites or museums, was continued. One area has now been selected to receive more intensive study because of its historical significance.

As part of the Northwestern Ontario Strategic Land Use Plan, aggregate consumption figures for northwestern Ontario over the past five years were compiled in order to forecast future sand and gravel requirements for the Region.

As part of the public information program, information on the geology, mineral resources, and mining activities in the Region was provided to the general public through lectures, field trips, and media articles. These included lectures and field trips for three Junior Rangers groups and six student groups.

MINING ACTIVITY

As in the previous year, no metal production was noted from any mining properties in the Kenora Mining Division in 1978, nor were any major properties under active development.

Sale of mine and mill equipment at the recently closed Consolidated Canadian Faraday Property at Werner Lake continued during the year. Mining and milling equipment at the Maybrun Mine, operated until recently by Sheridan Geophysics Limited, was also offered for sale during 1978.

Railroad ballast was quarried at both the White and the Hawk Lake Quarry during 1978. The Universal Granite Company Limited quarried large granite blocks for tombstones at their quarry near Vermilion Bay, and Rush Bay Quarries Limited produced ornamental facing stone.

Peat moss, for horticultural purposes, was harvested in the Rainy River area by Arctic Peat Moss Corporation Limited.

EXPLORATION ACTIVITY

Exploration activity in the Kenora Mining Division proceeded at a slow pace during 1978, in which only 808 claims were recorded, compared to 1,495 claims in 1977. Work filed for assessment credit in 1978, mostly on claims staked the previous year, was about equal to the previous year, but should show a marked decline next year, due to reduced staking.

Exploration for base metals continued at approximately the same level as the previous year. Exploration for uranium showed a significant decrease whereas exploration for gold deposits showed a moderate increase. Of special significance was the interest displayed in lithium and tungsten deposits in the vicinity of Dryden.

Geographically most of the exploration work carried out was in the northeastern part of the Kenora Mining Division, in the vicinity of Dryden, extending northward into the Sioux Lookout Resident Geologist's District. In terms of base metal interest, this reflects a continuing trend, noted over the past several years, with major companies moving progressively eastward from the Manitoba border toward Thunder Bay.

Although no significant discoveries were reported from any of the programs carried out during the year, a number of the programs are ongoing.

Base Metal Exploration

In 1978, as in the previous year, most of the exploration activity directed toward base metals was centred in the Dryden area. A number of integrated surveys were completed in 1978 in the vicinity of Eagle Lake, Wabigoon Lake, and Dinorwic Lake. Numerous conductive zones were tested by drilling but results were reportedly rather discouraging.

Major programs were also noted east of Dryden, both west and south of Sandybeach Lake. Evidence of other integrated programs were noted in the Rex Lake area north of Kenora, the area east of Ignace, in the Separation Lake-Oak Lake area north of Kenora, in the Dogpaw Lake area east of Sioux Narrows, and in the Off Lake-Burditt Lake area south of Nestor Falls.

The major companies engaged in the programs noted above include Amoco Canada Petroleum Company Limited, Beth Canada Limited, Gulf Minerals Limited, Hollinger Mines Limited, Hudson Bay Exploration and Development Company Limited, Hudbay Mining Limited,

Mattagami Lake Mines Limited, Noranda Mines Limited, Selco Mining Corporation Limited, and Sherritt Gordon Mines Limited.

The discovery, by the Minnesota Department of Natural Resources, of base metals sulfides in a felsic volcanic environment south of Rainy River, Ontario, also stimulated some activity in this latter area.

Some activity, predominantly diamond drilling, was again noted in the Watten-Halkirk-Farrington Townships area east of Fort Frances.

Uranium Exploration

With the recent discovery of a number of large high-grade uranium deposits in western Canada, interest in the metamorphic-type uranium deposits of the Kenora area fell off considerably in 1978. Some ground follow-up work of anomalies revealed by the 1977 Federal-Provincial airborne radiometric surveys was carried out in 1978, but few of these programs reached the drilling stage.

Detailed airborne radiometric surveys were flown along the Sydney Lake cataclastic zone, followed by ground investigations of unknown extent. Several radiometric anomalies in this area, examined in 1977 by the Kenora staff, are described by Beard (1978). Airborne radiometric surveys were also noted in the vicinity of Aerobus Lake.

Gold Exploration

With the price of gold holding relatively steady at well over $200.00 (U.S.) throughout 1978, a number of gold deposits in the District were re-examined and re-evaluated.

At Shoal Lake west of Kenora, Pelican Mines Limited continued diamond drilling on the Arsenic Zone of the former Electrum Lake GML property. This new drilling reportedly gave "only low values in all but one (hole) which returned 0.33 oz. gold per ton across 5.7 ft." (Northern Miner, Feb. 9, 1978). The drilling failed to enlarge on the drilling of the 1950s.

In the same general area, staking and other activity was also noted at several properties including the old Crown Point Mine.

Somewhat further south of Shoal Lake, results of the diamond drilling by Cominco Limited on a low-grade gold occurrence at Gold Mountain were reported. The best of two intersections were 0.14 oz. Au/5 feet and 0.12 oz. Au/2 feet with the rest of the assays reportedly less than 0.05 oz. Au (Regional Geologists's Files, Ontario Ministry of Natural Resources, Kenora).

In the immediate vicinity of Kenora, the Pine Portage Mine was examined by the Kenora staff in 1974 and 1978, and grab sampling at and near the showing gave very encouraging results (0.26 to 12.20 oz. Au/ton) (on assay Geoscience Laboratories, Ministry of Natural Resources). This showing, described elsewhere in this report, came to the attention of several companies in 1978 and was consequently staked and sampled.

In the Dryden area, the Tabor and the Van Houten Mines were both restaked, and further to the east, in Avery Township, additional trenching and sampling on the L. Pidgeon gold occurrence (Beard 1977) was carried out.

In the Rowan Lake-Kakagi Lake area east of Sioux Narrows-Nestor Falls, staking and/or prospecting was noted at several locations, both by major companies and individuals.

In the Mine Centre area, Ed-Vic Explorations Limited drilled two holes on the old Stellar gold deposit, and geophysical surveys are continuing into 1979. Drilling was also commenced on the Young gold claim by G. Armstrong. Additional staking was also noted in the vicinity of the Olive and the Cone properties.

Lithium and Tantalum Exploration

A renewed interest in lithium and tantalum resulted in the re-examination of a number of occurrences in the area north and east of Dryden. All of the previously discovered occurrences were restaked, and re-examined by several major companies. These deposits have been briefly described by Breaks *et al.* (1975; 1978).

Trenching and sampling of several tungsten occurrences in Zealand and Brownridge Townships, were carried out during the year. Although sampling by at least one major company indicated only marginal grade/width combinations, interest in these occurrences continues.

Farther to the east, the Mavis Lake lithium deposit was restaked and resampled. In addition to lithium values in the range of 2.5 percent Li, minor amounts of tantalum were also reported (R. Fairservice, personal communication). One grab sample analyzed by the Geoscience Laboratory of the Ministry of Natural Resources gave 2.24 percent lithium, 34 ppm cesium, and $<$ 100 ppm tantalum.

RECOMMENDATIONS FOR EXPLORATION

Base Metals

Drilling in 1978 by G. Armstrong and Belacoma Mines Limited on the old Mironsky-Phelps Dodge property in Halkirk Township confirmed and extended a zone of known copper mineralization. At this property, chalcopyrite and pyrrhotite are contained in a strati-

graphic unit or units consisting of quartz-sericite-biotite schist (siliceous metasediment or tuff) in a mafic volcanic (?) environment. The property is described in detail below. The schistose, chalcopyrite-bearing horizons are relatively narrow (up to 100 feet) easily eroded, and may be more extensive along strike than indicated by Harris (1974) due to lack of outcrop. Although grades on the Armstrong-Belacoma property seldom exceed 1.5 percent Cu over mineable widths, (G. Armstrong, personal communication) the south margin of the Grassy Portage Bay gabbro sill (?) south and west of the property as far west as Goose Island, should be prospected and explored for possible higher grade sections.

Uranium

At the Hawk Lake (Byberg) uranium showing in Jackman Township, uranium mineralization is closely associated with masses and stringers of coarse magnetite in a highly siliceous granitoid mobilizate, at the contact with very iron-rich, locally magnetic mafic metavolcanics or metatuffs (Beard 1977; Satterly 1955). Approximately 4 miles to the east, in MacNichol Township, uranium mineralization at the Richard Lake (New Campbell Island) deposit is also associated with coarse magnetite in pegmatites intruded into mafic metavolcanics (Pryslak 1976). Other similar small occurrences have also been reported between these two deposits (property owners, personal communication).

Other authors have recently suggested that for certain types of "pegmatite" or metamorphic uranium deposits, the uranium is often associated with rocks which have been derived by anatectic processes (Baldwin 1970; Berning *et al.* 1976; Hauseau 1977; Mawdsley 1957; Ruzicka 1974; Sibbald 1977; Stewart 1977). It has been further suggested (Beard 1977) that some deposits of this type may be stratigraphically controlled.

It is here suggested that the magnetite in the Byberg and Richard Lake deposits represents relic volcanogenic iron, and hence the uranium mineralization is stratigraphically controlled. It is not certain if the uranium is syngenetic and was originally concentrated in the iron-rich horizon, then reconcentrated in place by partial remelting, or if the magnetite simply acted as a chemical precipitant, collecting and concentrating uranium from the granitoid mobilizate intruded into the partially remelted iron-rich horizon.

A similar situation is described by R. I. Graugh (1978) at Camp Smith, New York, where uranium mineralization is contained in "iron oxide . . . . sulphide-rich horizons . . . . originally deposited in the distal, volcanogenic, massive sulphide environment." "During the metamorphic process the uranium was concentrated into possible economic deposits." Similar situations have also been described in Sweden by P. M. Adamek (1975) and in Labrador by S. S. Gandhi (1977).

It is therefore suggested that uranium exploration in the Vermilion Bay volcanic belt be carried out using this model. The 4 miles between the Byberg and the Richard Lake deposits should be examined closely, utilizing magnetometer surveys to concentrate the search along the iron-rich horizon in the volcanics.

PROPERTY EXAMINATIONS

In 1978, the following mining properties or mineral occurrences were examined by the Kenora staff:

Base metals:
- Rafter Lake occurrence, Laval Tp.
- Mironsky occurrence, Halkirk Tp.
- Kenbridge Mine, Atikwa Lake area
- Longe occurrence, Shoal Lake area
- Setting Net Lake occurrences, Favourable Lake area
- Belacoma Mines Ltd. occurrences, Halkirk Tp.
- Consolidated Canadian Faraday, Ltd., Werner Lake area

Uranium:
- Pine Road occurrence, Bridges Tp.
- Treelined Lake occurrence, Separation Lake area
- Numerous occurrences in the Vermilion Bay area
- Numerous occurrences in the Favourable Lake area

Gold:
- Pine Portage occurrence, Kirkup Tp.

Other:
- Mavis Lake lithium occurrence, Brownridge Tp.
- Medicine Lake pegmatite occurrence, Tustin Tp.
- Cobble Lake pegmatite occurrence, Bridges Tp.
- Pidgeon-Petrunka tungsten occurrence, Zealand and Brownridge Tp.
- Labyrinth Lake soapstone occurrences, Shoal Lake area

Mironsky (Armstrong-Belacoma Mines Limited) Copper Occurrence

This property is situated in Halkirk Township (Figure 1, Property visit 1), about 18 miles east of Fort Frances. The claim group straddles Highway 11, one mile south of the railway overpass. Copper mineralization was first discovered on the property by M. Hupchuk in 1963 during highway construction. The ground was staked by A. Mironsky and optioned to Phelps Dodge Corporation of Canada Limited. This company put down eight diamond drill holes on the property for a total footage

of 3,030 feet.

Based on the results of this drilling, F. R. Harris (1974) estimated approximately 300,000 tons of material grading 0.8 percent Cu to a depth of 300 feet. Phelps Dodge dropped its option on the property in 1963.

The northern part of the property was restaked by G. Armstrong in 1976 and the southern part of the property was restaked by Belacoma Mines Limited in 1977. Additional claims were also added to the group in 1978.

In the spring of 1978, G. Armstrong and Belacoma Mines Limited jointly carried out a diamond drilling program to confirm the Phelps Dodge results and attempt to extend the mineralized zone. A total of 11 holes were completed on the claim group during 1978.

At the time of writing, diamond drill logs were not available on all the drill holes; however the following assay results have been reported (G. Armstrong, personal communication) D.D.H. B-3, 2.00 percent Cu/10 feet or (1.48 percent Cu/25 feet); B-4, 0.77 percent Cu/28 feet; B-8, 0.89 percent Cu/50 feet; B-11, 0.50 percent Cu/30 feet.

Results of this drilling would appear to have increased the tonnage outlined in the earlier work by Phelps Dodge Corporation (Canada) Limited.

Chalcopyrite and pyrrhotite occurs as fine blebs and disseminations in a fine-grained siliceous quartz-feldspar-biotite schist, bounded on each side by medium-grained hornblende gabbros. Although these gabbros were mapped as intrusives by Harris (1974) they may in fact represent course mafic flows. The mafic rock is very talcy and chloritic at the contact with the mineralized siliceous unit, for a width of about 20 feet. The mineralized siliceous intersections in the drilling range from 30 feet to 100 feet thick. It is not certain whether the mineralization occurs in one unit or horizon, or whether it occurs in a number of parallel or *en echelon* lenses within the gabbros.

Pine Portage Occurrence

This property (Figure 1, Property visit 2) is situated 10 miles southeast of Kenora near the north shore of Bigstone Bay, Lake of the Woods. It was first worked in the early 1880s. A mill was erected at the site and a shaft sunk to 100 feet with 110 feet of drifting on the 35-foot level (Regional Geologist's Files, Ontario Ministry of Natural Resources, Kenora). No significant production was ever reported from the property.

The property was dewatered and examined by Dome Mines in the 1930s, and during the period 1968-1970, approximately 1,000 feet of diamond drilling was carried out. Details of this earlier work are unknown.

The property was examined on several occasions over the past three years by the Kenora staff. Grab samples were taken in each instance and were assayed by the Geoscience Laboratories of the Ontario Ministry of Natural Resources. Results are as follows:

	Au	Ag
1974 - quartz vein material from shaft area.	12.20 oz/ton	28.86 oz/ton
- quartz from dump	0.26 oz/ton	0.66 oz/ton
1978 - quartz vein material from shaft area	0.40 oz/ton	2.28 oz/ton
- quartz vein material from outcrop beside Hwy. 17, approx. 1,000 feet NE of shaft	0.11 oz/ton	0.21 oz/ton

The gold mineralization is contained in a quartz-filled shear zone in amphibolitic mafic volcanics, approximately 150 feet west of the contact with a large granitic mass. The mineralized zone strikes 170 degrees approximately parallel to the granite contact, and dips 70 degrees east. The mineralized quartz-filled shear zone reportedly ranges from 3½ to 7 feet wide in the underground workings but is up to 15 feet wide locally, at surface. The quartz-vein material contains conspicuous pyrite, chalcopyrite, galena, and sphalerite, but no visible gold has been noted. Native silver and copper have also been reported in the earlier reports.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

The following projects were carried out by the Precambrian Geology Section, Ontario Geological Survey.

The Savant Lake-Crow Lake Special Project, initiated in 1976, continued in 1978. A regional study of the stratigraphy, structure, and economic geology of the Archean metavolcanic-metasedimentary belts between Savant Lake and Crow Lake is jointly directed by N. F. Trowell and C. E. Blackburn, and involved both compilation of past geological work and selective field mapping. Blackburn investigated the Populus-Mulcahy Lake and the Harris-Pickwick Lake areas. G. R. Edwards investigated the Crow Lake-Sioux Narrows area (Trowell, Blackburn, Edwards, and Bartlett 1978).

Geologists from the Mineral Deposits Section carried out field investigations in the Kenora Mining Division in 1978: D. G. Innes, nickel in the Werner Lake and Fort Frances area; P. J. Whittaker, chromium in the Werner Lake, Populus Lake and Fort Frances areas; M. A. Vos, industrial minerals in the Dryden area; J. A. Robertson, uranium in the Vermilion Bay area and A. C. Colvine, sulphides in the Werner Lake and Fort Frances areas.

R. Barlow and D. Wadge of the Geophysics Section conducted detailed helicopter radiometric surveys along the Sydney Lake cataclastic zone and in the Vermilion

Bay area.

NORTHERN ONTARIO ENGINEERING GEOLOGY TERRAIN STUDY (NOETS)

Geo-analysis Limited of Ottawa carried out an engineering geology terrain evaluation for the Engineering and Terrain Geology Section, Ontario Geological Survey, of the following NTS quadrangles, entirely or partially within the Kenora Mining Division: 52C, 52D, 52E, 52F, and 52G. Basic engineering terrain maps at a scale of 1:100 000 showing type of ground cover, topography, landforms, and drainage, accompanied by comprehensive technical reports, are scheduled for release in 1979. A derivative map, also at a scale of 1:100 000 is to accompany each technical report.

RESEARCH BY OTHER AGENCIES

University Theses

Geological theses, related to the Kenora Mining Division believed to be in progress during 1978, are as follows:

Ph.D. Theses

1. B. Brown (University of Manitoba) completed his investigations of the deformational history of the eastern portion of the Lake of the Woods "greenstone" belt.
2. C. Gower (McMaster University) continued his investigation of the Winnipeg River area near Kenora.

M.Sc. Theses

1. R. Bald (University of Manitoba) continued her investigations into the origin of granitic rocks in Gundy Township.
2. G. Breakhouse (McMaster University) commenced mapping and trace element analysis and age dating of rocks from the Cedar-Clay Lakes and Minaki-Redditt areas.
3. G. E. McMaster (McMaster University) completed his thesis concerning the geochemistry of volcanic rocks and quartz porphyries of the Washeibemaga Lake area.
4. D. G. Menzies (University of Manitoba) completed his thesis entitled "Deformation of the Metavolcanic Rocks Around the Eastern Nose of the Aulneau Batholith, District of Kenora, Ontario Canada."
5. H. K. Paulsen (Lakehead University) worked on the structural analysis of the Eastern Rice Bay Dome, Rainy Lake.
6. R. H. Sutcliffe (University of Toronto) continued his investigation of the Rainy Lake Batholith Complex.
7. M. Wolff (McMaster University) completed his thesis on the geochronology of the Stephen Lake pluton and associated felsic volcanic rocks.

B.Sc. Theses

1. G. Gorzynski (University of Toronto) completed his thesis entitled "Petrology and Metamorphism of the Thunder Lake Sediments."
2. K. Osadetz (University of Toronto) is studying the structural geology of the Stephen Lake area east of Sioux Narrows.
3. D. Quindon (Queen's University) investigated felsic volcanics near Church Lake, south of Dyment.

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TABLE 1 MAPS AND REPORTS PERTAINING TO THE KENORA MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

MISCELLANEOUS PAPERS
- MP 72
- MP 76
- MP 78
- MP 82

MISCELLANEOUS PUBLICATIONS
- ONTARIO MINERAL REVIEW 1976-1977
- ROCKS AND MINERALS INFORMATION 1978

OPEN FILE REPORTS
- OFR 5242
- OFR 5245
- OFR 5247
- OFR 5251
- OFR 5254

COLOURED MAPS
- Map 2409

PRELIMINARY MAPS
- P. 1523
- P. 1529
- P. 1530
- P. 1531
- P. 1538
- P. 1539
- P. 1570
- P. 1971

TABLE 2 **Exploration activity in 1978.**

The following is a list of individuals and companies known to be engaged in exploration within the Kenora Mining Division in 1978, and the type of work undertaken.~~in each case.~~ The numbers correspond to the numbered areas on Figure 1.

	Individual or Company	Activity
1.	Amoco Petroleum Co.	Diamond drilling in the Osbourne Bay area.
2.	Armstrong, G.	Diamond drilling in Halkirk Township.
3.	Beth Canada	Air electromagnetic survey in the Keikewabik Lake area.
4.	Cousineau, R.	Diamond drilling in Halkirk Township.
5.	Ed-Vic Explorations Ltd.	Diamond drilling and ground geophysics in the Grassy Lake area.
6.	Fairservice, R.	Ground radiometric, geophysical and geological surveys in the Silvery Lake area.
7.	Gulf Minerals Canada Ltd.	Diamond drilling in the Garnet Bay, Buchan Bay, and Temple Township areas.
8.	Hale, R.	Trenching in the Treelined Lake area.
9.	Hollinger Mines Ltd.	Diamond drilling in Brownridge and Laval Townships.
10.	Hudbay Mining Ltd.	Diamond drilling in the Contact Bay and Butler Lake areas.
11.	Lafreniere, A.E.	Ground geophysical surveys in the Grassy Lake area.
12.	Lakatos, S.	Diamond drilling in Halkirk Township.
13.	Mattagami Lake Mines Ltd.	Ground geophysical surveys in the Dogpaw Lake area.
14.	Perkins, G.	Trenching in the Treelined Lake area.
15.	Pitkanen, R.W.	Ground geophysical surveys in the Grassy Lake area.
16.	Rollmac Exploration Corp.	Geological survey and trenching in MacNichol Township.
17.	Selco Mining Corp. Ltd.	Ground geophysical surveys in the Laval Township and the Kawashegamuk Lake and Wapageisi Lake areas; diamond drilling in Laval Township, Tabor Lake and Kawashegamuk Lake areas.

TABLE 3 Assessment work and other information received in 1978.

Abbreviations

Air	- Airborne	Geol	- Geological Survey	Pros	- Prospectus
Assess	- Assessment Work	Geochem	- Geochemical Survey	Rad	- Radiometric Survey
Au	- Gold	IP	- Induced Polarization Survey	Res	- Resistivity Survey
BM	- Basemetals	Mag	- Magnetometer Survey	SA	- Sampling
5 DDH (620)	- 5 Diamond Drill holes totalling 620'	MEAP	- Mineral Expl. Assistance Program Report	Tr	- Trenching
EM	- Electromagnetic Survey			U	- Uranium

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Bridges Twp.	52F/13 SE	Anschutz Uranium Corp.	U	Assess	Geol	1976	2.2451	Z-1
		Fairservice, R.	U	Assess	Geol,Rad, Mag	1976	2.2506	X-4
				Assess	1 DDH (124)	1977		X-5
Brownridge Twp.	52F/15 SE	Hollinger Mines Ltd.	BM	Assess	Geol	1977	2.2523	N-1
				Assess	5 DDH (2013)	1978		N-3
		Selco Mining Corp. Ltd.	BM	Assess	EM, Mag	1977	2.2530	M-1
				Assess	EM, Mag	1977	2.2660	M-2
				Assess	EM, Mag	1977	2.2660	M-4
Buchan Bay	52F/11 NE	Gulf Minerals Canada Ltd.	BM	Assess	2 DDH (777)	1978		X-1
		Sukava, A.	BM	Assess	Air EM	1977	2.2772	Q-2
Butler Lake	52F/10 NE	Hudson's Bay Oil & Gas Co. Ltd.	BM	Assess	Air EM	1977	2.2489	H-1
		Hudbay Mining Ltd.	BM	Other	2 DDH (241 m)	1978		I-1
				Other	Geol, Air EM	1977/8		I-2
Contact Bay	52F/10 NW	Hudson's Bay Oil & Gas Co. Ltd.	BM	Assess	Air EM	1977	2.2489	II-1
		Hudbay Mining Ltd.		Other	4 DDH (430 m)	1978		JJ-1
				Other	Geol, Air EM	1977/78		JJ-2
Dogpaw Lake	52F/5 SW	Mattagami Lake Mines Ltd.	BM	Assess	EM, Mag	1978	2.2724	KK-1
Ewart Twp.	52E/11 NE	Pelican Mines Ltd.	BM	Assess	EM	1977	2.2554	II-4
				Assess	12 DDH (3019)	1977		II-5
				Other	Pros	1977		II-1
		Anderson, C.D.	BM	Assess	EM, Mag	1977	2.2448	JJ-1
Eye Lake	52K/4	Englehart, T.W.		Assess	Tr	1976		A-1
Garnet Bay	52F/11 NW	Gulf Minerals Canada Ltd.	BM	Assess	4 DDH (1433)	1978		L-1
Grassy Lake	52C/10 NE	Ed-Vic Explorations Ltd.	BM	Assess	2 DDH (348)	1977/78		Z-3
		Hodge, J.	BM	Assess	3 DDH (1122)	1977		CC-1
Halkirk Twp.	52C/11 NE	Armstrong, G.	BM	Assess	1 DDH (359)	1978		A-4
		Cousineau, R.	BM	Assess	1 DDH (271)	1978		H-3
Halkirk-Farrington Twps.	52C/10 NW	Armstrong, G.	BM	Assess	13 DDH (5518)	1977		H-10
		Lakatos, S.	BM	Assess	1 DDH (176)	1978		Q-3
Kawashegamuk Lake	52F/8 NW	Selco Mining Corp. Ltd.	BM	Assess	EM, Mag	1977	2.2562	M-1
			BM	Assess	EM, Mag	1977/78	2.2705	M-2
			BM	Assess	1 DDH (187)	1978		M-3
Laval Twp.	52F/15 SE	Hollinger Mines Ltd.	BM	Assess	Geol	1977	2.2523	N-1
				Assess	EM	1977	2.2458	N-2
		Selco Mining Corp. Ltd.	BM	Assess	EM, Mag	1977	2.2660	M-3
Laval Twp.	52F/16 SW	Selco Mining Corp. Ltd.	BM	Assess	EM, Mag	1977	2.2530	Q-1
				Assess	EM, Mag	1977/78	2.660	Q-2,3,4
				Assess	1 DDH (70)	1978		Q-5
MacNichol Twp.	52F/13 SW	Rollmac Exploration Corp.	U	Assess	Rad, Mag	1976/77	2.2480	BB-1
			U	Assess	Tr	1978		BB-2
Melgund Twp.	52F/9 SW	Selco Mining Corp. Ltd.	BM	Assess	EM, Mag	1977	2.2590	V-5
Osbourne Bay	52F/11 SE	Amoco Petroleum Co.	BM	Assess	2 DDH (648)	1978		D-1
Paterson Lake	52L/7 SE	Noranda Exploration Co. Ltd.	U	Assess	Tr	1976		F-4
		Koski, J.	U	Assess	6 DDH (1119)	1977		I-1
Reed Lake	52C/16 SW	Pearson, E.A.	BM	Assess	Tr	1977		M-3
Reynar Lake	52L/6 NE	Prestige Mines Ltd.	BM	Assess	3 DDH (2469)	1977		R-1
Tabor Lake	52F/9 SW	Selco Mining Corp. Ltd.	BM	Assess	EM, Mag	1977	2.2562	V-6
				Assess	1 DDH (200)	1978		V-7
				Assess	EM, Mag	1976	2.2457	V-3
				Assess	1 DDH (298)	1976		V-4
Temple Twp.	52F/11 NE	Gulf Minerals Canada Ltd.	BM	Assess	2 DDH (658)	1978		X-1
Treelined Lake	52L/8 SW	Hale, R.	U	Assess	Tr	1978		E-1
		Perkins, G.	U	Assess	Tr	1978		D-1
Turtlepond Lake	52F/10 SE	UMA Mines Ltd.	BM	Assess	EM	1976	2.2424	W-1
				Assess	1 DDH (184)	1977		W-2
		Underground, McLellan & Assoc.	BM	Assess	2 DHH (290)	1977		P-5
Van Horne Twp.	52F/15 SW	Hudson's Bay Oil & Gas Co. Ltd.	BM	Assess	Air EM	1977	2.2489	C-1
Watten Twp.	52C/11 NE	McTavish, K.	BM	Assess	1 DDH (200)	1977		T-8
		McTavish-Armstrong	BM	Other	Geol	1977		LL-1
Wiley Bay	52E/10 SE	Kuryliw, C.	BM	Assess	2 DDH (649)	1977		F-6
Zealand Twp.	52F/15 SE	Hudson's Bay Oil & Gas Co. Ltd.	BM	Assess	Air EM	1977	2.2489	O-1
		Selco Mining Corp. Ltd.	BM	Assess	EM, Mag	1977	2.2530	M-1

1978 Report of Red Lake Resident Geologist

L.O. Koskitalo[1] and D.A. Panagapko[2]

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TABLES

FIGURES

INTRODUCTION

Exploration activity declined somewhat in 1978 and remained predominantly base-metal oriented. A recovery in overall activity, with an increasing level of exploration for gold, is indicated for 1979.

No new discoveries were reported in 1978, but new targets were publicly identified in two major releases of airborne surveys by the Ontario government. Airborne radiometric surveys of four NTS areas (53C, 53E, 53F, 53K) were released July 26, 1978. Airborne electromagnetic and magnetic coverage of the Red Lake metavolcanic-metasedimentary belt was released on September 14, 1978.

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[2]Resource Geologist.

RESIDENT GEOLOGIST'S ACTIVITIES

Staffing of the Resident Geologist's office in Red Lake remained unchanged in 1978, with L. O. Koskitalo as Resident Geologist, D. A. Panagapko as Resource Geologist, and A. Havard as secretary. Two student assistants were employed during the summer, under the Experience '78 program.

Provision of information, assistance, and geoscience consultative service to prospectors, the mining and exploration industry, the general public, educational institutions, and various government agencies continued as the most actively solicited service of the Red Lake office staff. Visitors to the office have nearly doubled in number from 1976 to 1978. An increasing demand is noted for consultative time and assistance by Ministry personnel.

Visits were made to the four producing mines of the district. Twenty-one active and inactive properties and showings were examined during the year. Advice and assistance was provided to five Mineral Exploration Assistance Program projects.

Geological field tours and visits to mining operations were assisted or organized for Ontario Geological Survey, ministry, and industry representatives on eight occasions.

Public and high school students were provided with fourteen geological and mining lectures, demonstrations, and field tours.

Geological Branch field parties, visited and assisted during the year, numbered seven. Major assistance was given to the geological uranium follow up party (Bond and Breaks 1978). Facilities were also provided to G. Bernius of the Geological Survey of Canada for interpretation of airborne reconnaissance radiometric surveys in progress.

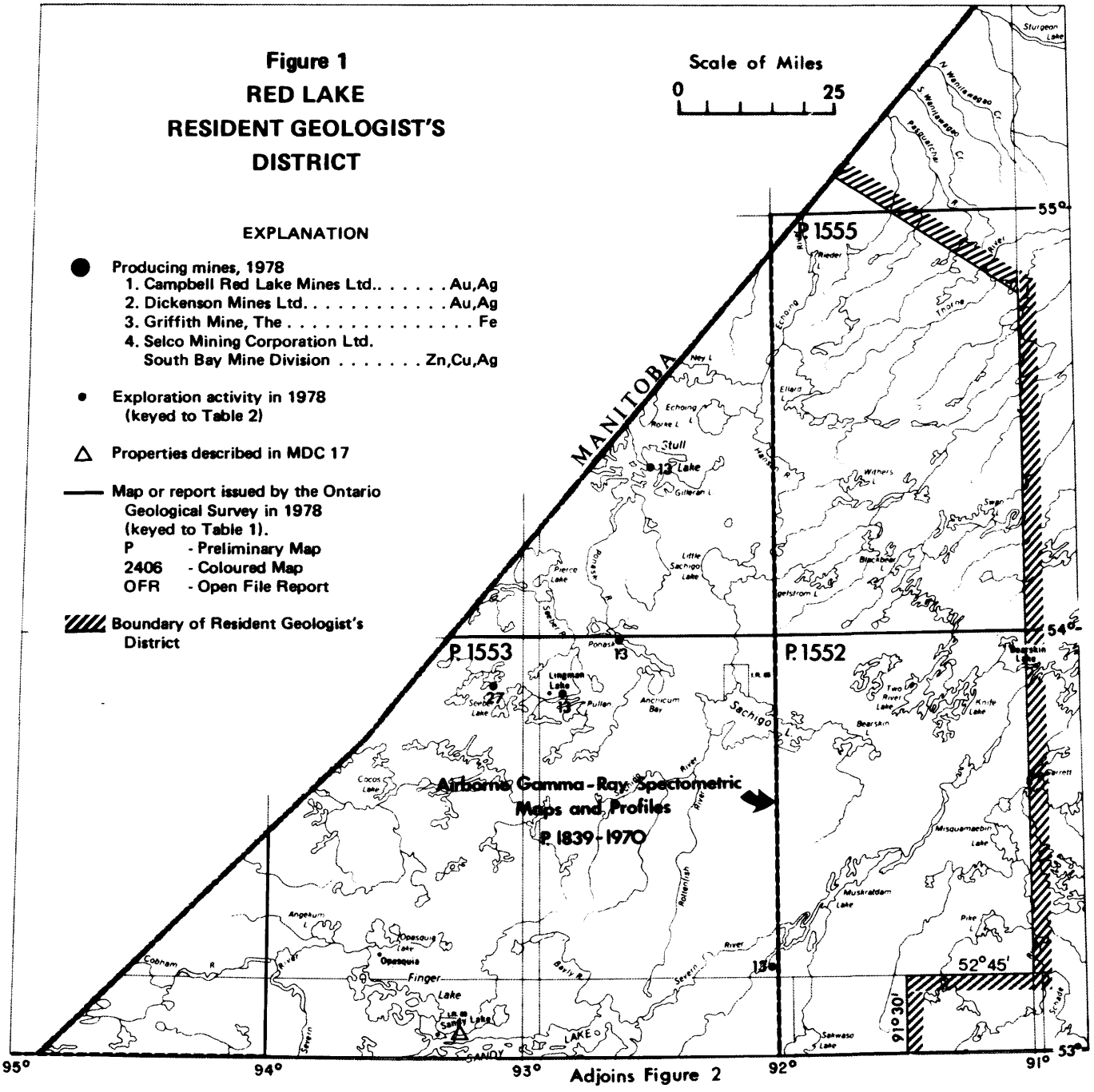
Figure 1
RED LAKE
RESIDENT GEOLOGIST'S
DISTRICT
Scale of Miles
0
25
EXPLANATION
Producing mines, 1978
1. Campbell Red Lake Mines Ltd.. . . . . Au,Ag
2. Dickenson Mines Ltd. . . . . Au,Ag
3. Griffith Mine, The . . . . . Fe
4. Selco Mining Corporation Ltd.
South Bay Mine Division . . . . . Zn,Cu,Ag
Exploration activity in 1978
(keyed to Table 2)
Properties described in MDC 17
Map or report issued by the Ontario
Geological Survey in 1978
(keyed to Table 1).
P - Preliminary Map
2406 - Coloured Map
OFR - Open File Report
Boundary of Resident Geologist's
District
MANITOBA
P. 1555
P. 1553
P. 1552
Airborne Gamma-Ray Spectometric
Maps and Profiles
P 1839-1970
Adjoins Figure 2
55°
54°
53°
52°45'
95°
94°
93°
92°
91°
91°30'

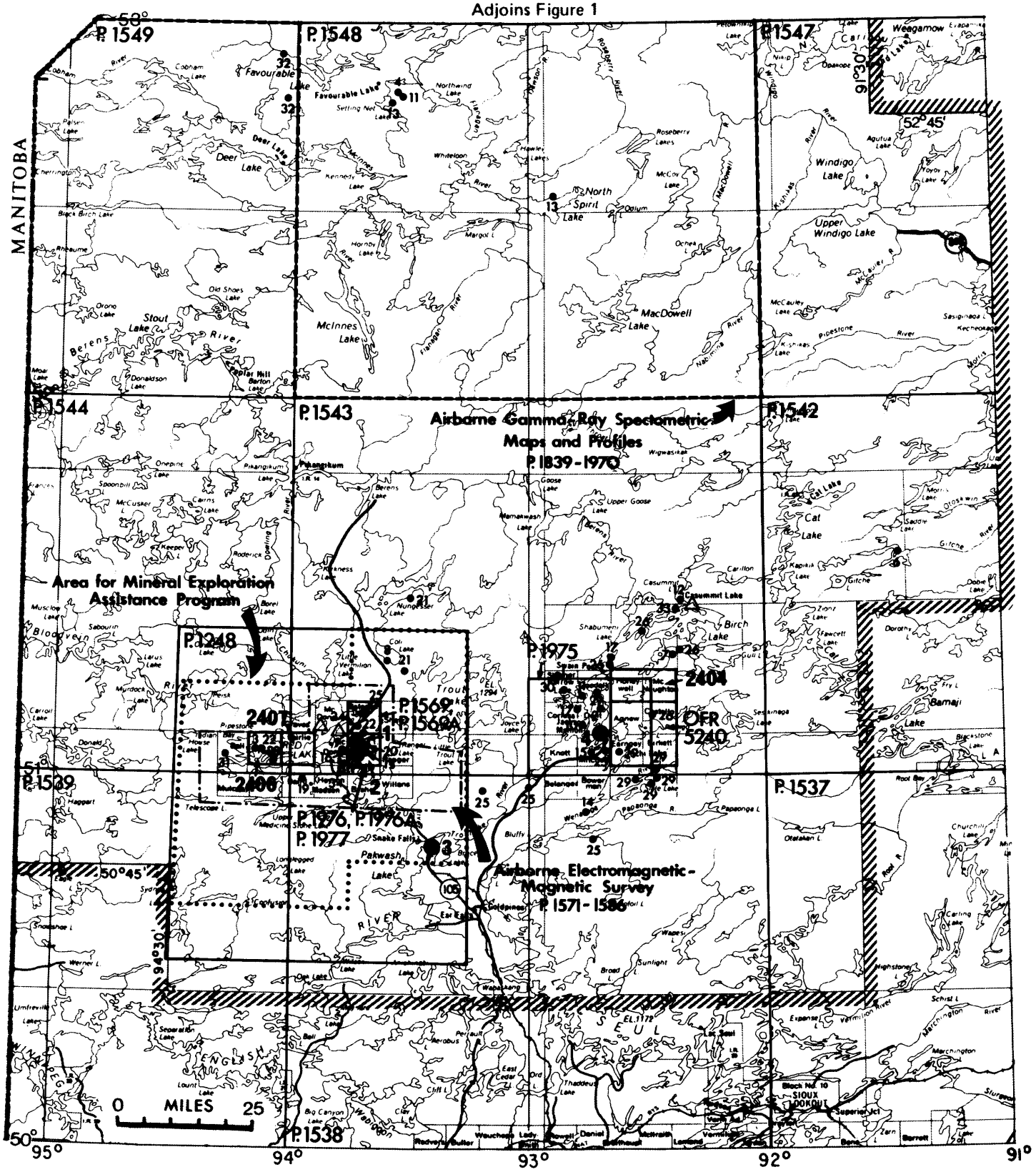
Adjoins Figure 1
P. 1549
P. 1548
P. 1547
P. 1544
P. 1543
P. 1542
P. 1539
P. 1538
P. 1537
MANITOBA
Airborne Gamma-Ray Spectometric Maps and Profiles P. 1839-1970
Area for Mineral Exploration Assistance Program
Airborne Electromagnetic - Magnetic Survey P. 1571-1586
P. 1248
P. 1975
P. 1569
P. 1569A
P. 1976, P. 1976A
P. 1977
2401
2400
2404
OFR 5240
Favourable Lake
Deer Lake
Stout Lake
McInnes Lake
MacDowell Lake
North Spirit Lake
Upper Windigo Lake
Windigo Lake
Weegamow
Cat Lake
Birch Lake
Casummit Lake
Bamaji Lake
Pakwash Lake
Trout Lake
Snake Falls
Bloodvein River
Berens River
Pipestone River
Poplar Hill
Pikangikum
Sioux Lookout
0 MILES 25
95°
94°
93°
92°
91°
50°
50°45'
52°45'
94°30'
91°30'

Figure 2

Three data series maps, covering parts of the Favourable Lake and Casummit Lake areas, were prepared in draft form. Compilation and draughting of recent assessment work and new mineral occurrence information was provided to facilitate the production of the Skinner Township preliminary geological map by A. P. Pryslak.

Geological input to a variety of government planning processes and studies, predominantly within the framework of the West Patricia Land Use Plan of the Ministry of Natural Resources, was a continuing and growing activity during the year.

MINING ACTIVITY

Four mines were in operation in 1978 (see Figures 1 and 2).

The continued improvement in gold prices should yield better returns for the two operating gold mines, as compared to 1977, and is also generating programs for possible revival or initiation of gold production on some former producers and major prospects. The Griffith Mine maintained continuous, full production of pellets during the year. Production declined at the South Bay mine.

A summary of the main developments at the various operations follows. The cooperation of the mine manager of each operation in supplying information is gratefully acknowledged.

Campbell Red Lake Mines Limited

Campbell Red Lake Mines Limited operated continuously through 1978, and milled an average 823 tons per day, on a total 300,502 tons or ore, yielding 183,546 ounces of gold. The comparable figures in 1977 were 814 tons per day milled, 297,248 tons total milled, and 191,031 ounces of gold produced. Lateral development of 2 066 m exposed enough ore to improve reserves to 1,761,400 tons grading 0.67 ounces of gold per ton. Employment remained constant at a full complement of 330 men throughout the year. S. M. Reid is mine manager.

Dickenson Mines Limited

Dickenson Mines Limited (including previously associated Robin Red Lake Mines Limited, which amalgamated with Dickenson during the year), milled 110,438 tons of ore, for a daily average of 303 tons, to yield 59,957 ounces of gold and 5,309 ounces of silver in 1978. By comparison, 1977 production was 129,184 tons milled at 353 tons per day to yield 60,036 ounces of gold. Employment averaged 246 during 1978. R. P. Tapper is mine manager.

A shaft-sinking contract was let to deepen the No.2 internal shaft by 195 m, which will open up three new levels for development. Sinking commenced in November 1978.

The Griffith Mine

The Griffith Mine, a wholly owned subsidiary of the Steel Company of Canada Limited, managed by Pickands Mather & Company, is situated at Bruce Lake, 50 km southeast of Red Lake. Milling of 5,602,533 tons (natural) of ore gave a production of 1,538,534 tons (natural) of pellets containing 66.71 percent iron (dry) and 3.60 percent silica. Total ore, waste, and overburden removed in open-pit mining was 13,850,261 long tons. The SL/RN direct reduction kiln was not operated during 1978 due to the low price of scrap steel. The payroll as of year end was 503 employees. J. D. Jeffries is manager.

Other developments at the property included completion of diversion of waste material flow from the west side of the plant complex, and seeding for reclamation of the then unused secondary tailings disposal area, with 1978 growth exceeding expectations. In the plant, equipment was installed for recovery of fine iron from flotation tailings and installations were commenced for flotation automatic control, to be completed in early 1979. No exploration or development diamond drilling was carried out on the mine property during 1978.

Selco Mining Corporation Limited

The South Bay Division of Selco Mining Corporation Limited operates a zinc-copper-silver mine located in the southeastern part of Dent Township, 80 km northeast of Ear Falls. In 1978, 134,080 tons of ore were milled, at a head grade of 1.43 percent copper, 12.20 percent zinc, and 2.21 ounces of silver per ton, to yield 6,578 tons of copper concentrate and 27,345 tons of zinc concentrate. Refining recovered 3,447,564 pounds of copper, 29,013,183 pounds of zinc, and 188,485 ounces of silver. The average work force during the year was 135. Mr. D. Thompson is mine manager.

Mining of the No.11 orebody was completed, and mining of the No.12 orebody continued by means of three cut-and-fill stopes. As of April 1978, the mining contractor was released and the company took over the underground work force.

The exploration drift on the 1,950-foot level was driven 89 m to completion, and a diamond drilling program to look for ore at depth was completed.

EXPLORATION ACTIVITY

Mineral exploration activity showed some decline in 1978 (Table 1), though the five-year trend of activity remains relatively flat, and a recovery in exploration is anticipated in 1979. However, no new discoveries were reported in 1978, and the long term trend of exploration is down.

The number of claims recorded during the year decreased significantly, with 1,207 claims recorded, down 48 percent from the 2,324 claims recorded in 1977. Staking activity was largely within the southern part of the Red Lake Mining Division, and was concentrated in the McVicar Lake area, the Gerry Lake area, the general Confederation-Birch Lakes area, the general Red Lake area, the Azure Lake area, and the Casummit Lake area (Red Lake Mining Recorder's files).

Assessment work filed decreased 14 percent, with 50,997 days recorded in 1978, compared with 59,196 days in the previous year. Diamond drilling (25,574 days) and geophysical surveys (14,793 days) were the main types of work reported. It is estimated that the total work reported represented exploration for base metals, gold, and uranium, in the proportions 75, 15 and 10 percent, respectively.

Exploration activity was stimulated by the release of two government airborne geophysical surveys during the year.

Reconnaissance airborne radiometric surveys, carried out jointly by the Provincial and the Federal governments, were released on August 24, 1978 (see Figures 1 and 2). Some staking and exploration for uranium resulted in the general Deer Lake-Favourable Lake and Sandy Lake areas.

Airborne electromagnetic and aeromagnetic survey results for the Red Lake area, a Ministry of Natural Resources/Ministry of Northern Affairs funded project, were released on September 14, 1978. Staking of anomalies located by the survey, for base metal-gold exploration possibilities, amounted to some 333 claims to December 31, 1978.

A summary of known mineral exploration activity in the Red Lake Resident Geologist's District in 1978 is given in Table 3; locations are shown in Figures 1 and 2. Assessment and other work data received are listed in Table 4.

RECOMMENDATIONS FOR EXPLORATION

Currently rising prices and outlook on most all metal markets, and most notably for gold, create a climate for increased mineral exploration within the Red Lake Mining Division in 1979.

Whereas exploration seems most feasible within the more accessible southern part of the district, particularly for gold and base metals in the Uchi Subprovince, the central and northern parts of the district continue to present target areas of interest which will become of increasing attraction as the Roads to Resources network advances.

A number of areas for exploration and concepts meriting consideration have been outlined by the Ontario Geological Survey (see MP82, Summary of Field Work, 1978).

Gold, base metal, and molybdenum potentials are of high interest in the Uchi Subprovince.

1. In the Red Lake belt, the recently released airborne electromagnetic-magnetic survey (Wadge 1978) outlines many long-strike-length conductors. Many of these conductors reflect sulphide-bearing interflow metasedimentary rocks that, though on drilling to date show only limited base metal potential, are worth further examination for potential gold mineralization (Pirie 1978b, p.21).

Alteration and silicification in mafic metavolcanics, such as broadly surrounds the Campbell and Dickenson mines (Pirie 1978a, p.19) and probably transferable Timmins region criteria of mafic and ultramafic volcanics, and local extensive carbonate alteration related to felsic centre activity intervals (Karvinen 1978; Fyon and Karvinen 1978, p.205) are gold exploration guides.

2. In the Birch Lake-Uchi Lake area, gold mineralization and potentials are, firstly associated with ironstones and felsic metavolcanics to the north and to the east of Birch Lake (Thurston 1978b, p.14) and, secondly appear related to synvolcanic concentrations from mafic unit sources during Cycle II volcanism in the Uchi Lake area (Thurston 1978a, p.133).

3. Base metal targets are offered by the many short-strike-length conductors defined by the Red Lake area airborne electromagnetic-magnetic survey (Wadge 1978). Such anomalies are most notable in the east and west ends of the belt, with some centrally located.

In the northwestern part of Byshe Township, minor copper mineralization in the "Howey Diorite" intrusive complex is suggestive of a porphyry copper type setting (Pirie 1978a, p.19). Exploration for economic occurrences of this type of mineralization, elsewhere in the complex or in similar hosts in the Red Lake belt, should be considered.

4. In the Uchi-Confederation Lakes area, Thurston's work (Thurston, Wan, Squair, Warburton, and Wienzbicki 1978, p.308-310) recognizes distinctive geochemical signatures of Cycle III metavolcanics (which host the South Bay mine) as compared to Cycles II and I rocks, and may provide a technique for identifying sequences prospective for base metal deposits.

Sulphur isotope and trace metal compositions of base metal mineralization at and near the South Bay mine also appear to offer a method for identifying economic occurrences (Seccombe 1977).

Further guides can be expected in the rock geochemistry studies for the area by L.G. Closs and A.C. Colvine (1976), probably to be released in preliminary form in 1979 (Robertson 1978).

5. Molybdenum prospects are numerous in Northwestern Ontario, with several of interest in the Uchi Subprovince.

Many occurrences are detailed in the Bamaji Lake area (Sutherland 1978), and H. Wallace (1978, p.9) and Colvine (1978, p.216) suggest that younger granitoid rocks in the southwestern part of the area warrant exploration.

The Mink Lake molybdenite occurrences (Riley 1970, p.12-13), to the northwest of Birch Lake, have not been evaluated by drilling and are of note.

Pirie's (1978b, see above) suggestion of porphyry copper type possibilities in the Red Lake belt (and any associated gold indications) merits follow up.

In the God's Lakes Subprovince, similar potentials apply, though the data base is much less detailed.

6. Gold occurrences are identified in most of the metavolcanic-metasedimentary belts. Significant deposits are known in the Favourable Lake, Lingman Lake, and Sachigo River areas. Continued gold exploration is recommended, particularly in the Favourable Lake area where important grades of gold-silver-lead-zinc mineralization have been produced and are indicated.

7. Complex volcanism, outlined in some belts (Ayres 1977; 1978), inferred in others, suggests that base metal possibilities should be pursued in the Favourable Lake, North Spirit Lake, Severn River-Muskrat Dam Lake and Stull Lake metavolcanic-metasedimentary belts.

8. Molybdenum mineralization is presently under evaluation at Setting Net Lake (Table 3, Item 4). Occurrences are noted marginal to the Favourable Lake belt, and near the northern margin of the Lingman Lake belt (Ontario Geological Survey Maps 2262; 2178). Further prospecting and geochemical reconnaissance of plutons marginal to metavolcanic-metasedimentary belts in the God's Lakes Subprovince (and in the Uchi Subprovince) appears warranted.

In the Berens Subprovince, uranium potentials are of some interest.

9. Uranium reconnaissance work (Barlow 1978; Bond and Breaks 1978) outlines a 125 km length of the Bearhead Lake Fault Zone and the general Hornby Lake area as prospective, and indicates a proximity to metasedimentary terrain as a possible controlling association for uranium mineralization of interest. The Hampton-Cornelius Lakes area, to the east of Hornby Lake, may deserve further exploration.

In the English River Gneiss Belt, an association of uranium mineralization with the Sydney Lake Fault Zone (Breaks, Bond, and Stone 1978), has only been identified as minor showings to date, but detailed work should be undertaken at some time.

10. Complex lithium-beryllium-cesium-tantalum-tin type pegmatite potential exists. The beryllium showing at Sandy Creek, north of Ear Falls, is interpreted as a possible apophysis from a large mass of homogeneous diatexite situated to the north (Breaks, Bond, Bartlett, and Facca 1978, p.234). Exploration of the diatexite mass area and peripheries is merited, including investigation of a small airborne radiometric anomaly situated about 8 km to the northeast of the Sandy Creek showing. Breaks, Bond, and Stone (1978) also suggest geochemical determinations to identify suitable host rocks.

Of general interest, but of possible local specific application in uranium and gold exploration, the recently published Metamorphic Map of the Canadian Shield (Geological Survey of Canada, Map 1475A) and the related Paper 78-10, warrant study and use for mineral deposit controls.

In the Red Lake and Uchi-Confederation Lakes areas, Thurston and Breaks (1978) concept of nappe tectonics, and implications for metallogenesis, should be recognized.

MINERAL EXPLORATION ASSISTANCE PROGRAM

The Mineral Exploration Assistance Program (MEAP) of the Ontario Government has provided $514,000 support on 55 approved contracts since inception in 1971 to March 31, 1978 (Burr and Sun 1978).

A summary of MEAP activities in the fiscal year 1977-1978 is given in OFR 5251 (see List of Publications, back pocket).

Two contracts of that period, reported in 1978, were as follows:

1. R.L. Byng did line cutting, magnetic and electromagnetic surveys, and 167.3 m of diamond drilling in five holes in Todd Township. Some vein material was encountered in the first three holes, but assays were unavailable (MEAP RL-54, Toronto file no. 63.3521).

2. Selco Mining Corporation Limited drilled 1 524 m in 12 holes in the South of Otter Lake area to explore for extensions of a small zinc-copper sulphide deposit previously located on their Grid 150-18, and to test electromagnetic anomalies on their Grid 150-17B-D. The best mineralized intersection was 2.43 m of 0.74 percent copper, 7.09 percent zinc, and 0.34 ounces per ton silver in hole no. 150-18-16. Of note is a hole (no. 150-17B-1), drilled immediately prior to the contract, reported as intersecting 9.45 m of 1.44 percent copper, 7.34 percent zinc, and 0.94 ounces of silver per ton (MEAP RL-57, Toronto file no. 63.3503).

Eight projects, with a total support commitment of $167,000, were approved in the Red Lake MEAP area in 1978-1979. These included work by Orelock Explorations Limited in Baird and Heyson Townships, Follansbee Red Lake Gold Mines Limited in Dome Township,

A. Kostynuk in Dome Township, Redcon Gold Mines Limited in Balmer and Bateman Townships, Dickenson Mines Limited in Balmer Township, and R.H. Soltermann in Todd Township, during 1978.

The boundaries of the area in which exploration assistance is available are outlined on Figure 2.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Ontario Geological Survey activities were at their highest level ever within the Red Lake district in 1978.

Byshe, Ranger, and Willans Townships in the southeastern part of the Red Lake metavolcanic-metasedimentary belt were largely completed as to detailed geological mapping by J. Pirie (1978a). A start was made on a synoptic survey of the entire belt, with detailed mapping in parts of Dome Township (Pirie 1978b).

In the Birch Lake area, P.C. Thurston (1978) completed compilation mapping, in extension of recent detailed mapping in the Confederation Lake area to the south.

In the Bamaji Lake area, H. Wallace (1978) completed detailed geological mapping, working largely in the western half of the map-area. Concurrent with the mapping, I.G. Sutherland (1978) examined the numerous molybdenum showings in the area.

Within the general Favourable Lake-Hornby Lake region, for the most part, ground follow up investigations of uranium reconnaissance airborne surveys were undertaken by W.D. Bond and F.W. Breaks (1978), in support of the Ministry of Natural Resources' West Patricia Land Use Plan inventories. The work was directed to assessment of economic potentials of uranium mineralization in the region, and a classification of deposit types. Occurrences noted were limited in number; three types of uranium mineralization association were defined.

The above geological reconnaissance was supported by a geophysical crew using a gamma-ray spectrometer equipped helicopter (Barlow 1978). The combined team followed up federal-provincial surveys released in 1978, and surveys flown in 1978, to be released in 1979.

Results of airborne gamma-ray spectrometer surveys covering four NTS quadrangles, 53C, 53E, 53F, and 53K were jointly released by the Geological Survey of Canada and the Ontario Geological Survey on July 26, 1978. Six NTS sheets, 52I, 52O, 52P, 53A, 53B, and 53G were flown during the 1978 field season and results are to be released in early 1979 (Bond and Breaks 1978).

Gravity interpretation studies continued for the Red Lake and Confederation-Birch Lakes areas (Barlow 1978; Gupta 1978).

Geochronological work on the Confederation Lake area, done in association with the Royal Ontario Museum, neared completion (Barlow 1978). Preliminary zircon ages indicate that volcanism spanned a 220 million year period during the evolution of the Confederation-Uchi Lakes metavolcanic-metasedimentary belt (Nunes and Thurston 1978).

An airborne electromagnetic-magnetic survey of the Red Lake metavolcanic-metasedimentary belt, a joint program of the Ministry of Northern Affairs and the Ministry of Natural Resources, was flown in December 1977. The data were released on September 14, 1978 (Wadge 1978).

The Mineral Deposits Section published mineral potential maps (1:250,000) covering the district, is contemplating gold studies in the Red Lake area, and has preliminary maps in press for rock geochemistry studies by L.G. Closs and A.C. Colvine (1976) in the vicinity of base metal deposits in the Red Lake and Confederation Lakes areas (Robertson 1978). M.A. Vos examined lithium prospects in the Roadhouse River area, 25 km west of Root Bay, Lake St. Joseph.

Accessible sand and gravel resources in the Red Lake-Ear Falls area were mapped by V.K. Prest (1978), in the first year of a two-year program to detail the Quaternary geology of the area.

Ontario Geological Survey staff led two field trips in the district in October, in conjunction with Toronto '78, the Joint Annual Meeting of the Geological Society of America, the Geological Association of Canada and the Mineralogical Association of Canada. P.C. Thurston *et al.* (1978) guided a tour in the Confederation Lake area and at the South Bay Mine; F.W. Breaks *et al.* (1978) traversed the English River Subprovince and visited the Griffith Mine.

RESEARCH BY OTHER AGENCIES

The Geoscience Research Grant Program of the Ontario Geological Survey supported studies of the controls of gold mineralization at the Campbell Red Lake Mines. C.J. Hodgson, H. Helmstaedt, P. MacGeehan, and D. Rigg of Queen's University undertook detailed mapping and sampling in the first part of this three year study.

Gold metallogeny of the Red Lake area and of the Dickenson Mine, in particular, were the subject of continuing investigations by J.M. Franklin of the Geological Survey of Canada and J.H. Crocket of McMaster University (Bolton 1978, p.55, 57).

G. Bernius and K. Richardson of the Geological Survey of Canada supervised contract flying of the joint federal-provincial airborne radiometric reconnaissance surveys of NTS sheets 52I, 52O, 52P, 53A and 53B (to be released in 1979). Preliminary results were provided to the geophysical-geological follow up crews of the Ontario Geological Survey.

The Centre for Precambrian Studies of the University of Manitoba reported on magnetic studies done to the south of Red Lake (Hall 1977).

University geoscience theses related to the Red Lake area, known to be in progress during 1978, are as follows:

1. P.C. Thurston (University of Western Ontario, Ph.D. thesis project, R.W. Hodder, supervisor) neared completion of a study of the geochemistry and volcanology of cyclical volcanism in the Confederation-Uchi Lakes area.

2. D. Stone (University of Toronto, Ph.D. thesis project, W.M. Schwerdtner, supervisor) continued a structural study of the Sydney Lake Fault system.

3. D. Andrews (University of Manitoba, M.Sc. thesis project) carried on with investigations of sulphide mineralization and host rocks of the Dixie 150-17B, 18 and 19 prospects of Selco Mining Corporation Limited.

4. P. Cowan (McMaster University, M.Sc. thesis project, J.H. Crocket, supervisor) sampled interflow metasedimentary rocks in the eastern portion of the Red Lake belt in a project to evaluate the possible role of such rocks and hydrothermal processes in gold mineralization.

5. R. Kusmirski (McMaster University, M.Sc. thesis project, J.H. Crocket, supervisor) did underground sampling at the Dickenson Mine in a study to determine whether gold content is correlative with lithology, alteration, sulphide or carbonate content, or any other measurable feature.

6. R. Gillespie (McMaster University, B.Sc. thesis project, J.H. Crocket, supervisor) studied uranium mineralization in the F zone of the Tudale Explorations Limited property in the Favourable Lake area.

Recently completed theses of interest present results of studies of the Berens River Mine (Adams 1976) and the Favourable Lake area caldera sequence which hosts the mine (Buck 1978), the South Bay Mine (Corkery 1977), Red Lake area gravity modelling (Runnals 1978), and geology of parts of Bateman and McDonough Townships (Kita 1978).

The Mineral Resources Branch of the Ministry of Natural Resources supervised a preliminary contract survey of abandoned mine workings and hazard potentials in the vicinity of the town of Red Lake.

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TABLE 1 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT RECEIVED, RED LAKE MINING DIVISION.

	Claims Recorded	Claims Active	Diamond Drilling (Man Days)	Geophys. Surveys (Man Days)	Geological Surveys (Man Days)	Total All Work (Man Days)
1978	1,207	3,916	25,574	14,793	2,480	50,997
1977	2,324	4,261	12,994	45,080	620	59,196
1976	2,705	4,332	18,680	23,578	380	46,544
1975	1,368	2,957	29,377	12,714	960	44,717
1974	1,339	3,648	47,362	5,660	3,040	57,719
1973	1,616	4,009	60,027	20,474	Nil	83,227
1972	2,219	5,588	34,261	14,858	5,216	56,866
1971	1,541	8,486	73,019	50,920	2,243	127,567
1970	3,971	11,759	73,866	329,065	17,606	427,093
1969	10,999	14,772	49,377	66,032	2,384	120,906
1968	2,451	4,784	15,367	48,800	1,228	64,967

TABLE 2 MAPS AND REPORTS PERTAINING TO THE RED LAKE MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

MINERAL DEPOSITS CIRCULAR
- MDC 17

MISCELLANEOUS PAPERS
- MP 72
- MP 77
- MP 78
- MP 81
- MP 82

OPEN FILE REPORTS
- OFR 5240
- OFR 5251

MISCELLANEOUS PUBLICATIONS
- Rocks and Minerals Information, 1978
- Ontario Mineral Review 1976-1977

COLOURED MAPS
- Map 2404
- Map 2406
- Map 2407

PRELIMINARY MAPS
- P.1248
- P.1537-1539, 1542-1544, 1547-1549, 1552, 1553, 1555
- P.1569, 1569-A
- P.1571-1586
- P.1839-1970
- P.1971
- P.1975
- P.1976, 1976-A
- P.1977

TABLE 3 Exploration activity in 1978.

The following is a list of individuals and companies known to be engaged in exploration within the Red Lake Mining Division in 1978, and the type of work undertaken in each case. The numbers correspond to the numbered areas on Figure 1.

	INDIVIDUAL OR COMPANY	ACTIVITY
1.	Bertram, A., and Alcock, G.	Exploration in Skinner Tp.
2.	Bowerman, W.	Exploration in Dent Tp.
3.	Byng, R.L.	Ground mag. and EM in Todd Tp.
4.	Caspian Resources Ltd.	Diamond drilling in Setting Net Lake area.
5.	Cochenour Willans Gold Mines Ltd.	Diamond drilling in Bateman Tp.
6.	Cominco Ltd.	Exploration in Stoughton-McVicar Lakes area.
7.	Dickenson Mines Ltd.	Trenching in Satterly Lake area.
8.	Dome Exploration (Canada) Ltd.	Diamond drilling in Coli Lake and surrounding areas.
9.	Follansbee Red Lake Gold Mines Ltd.	Geology and diamond drilling in Dome Tp.
10.	Frank, R.A.	Exploration in Dent Tp.
11.	Geophysical Engineering Ltd.	Ground geophysics, geology and trenching in Goodall Tp.; Diamond drilling in Confederation Lake area.
12.	Grand Bay Exploration	Diamond drilling in Casummit Lake area.
13.	Gulf Minerals Canada Ltd.	Geological reconnaissance in Pakwan, Mamaybin and Setting Net Lake areas as well as in the vicinity of Lingman, Ponask and Stull Lakes.
14.	Hudson Bay Exploration and Development Co. Ltd.	Diamond drilling in Fredart Lake area.
15.	Kerr Addison Gold Mines Ltd.	Ground mag. and EM in Mitchell Tp.
16.	Kostynuk, A.	Diamond drilling in Dome Tp.
17.	McIntyre Mines Ltd.	Diamond drilling in Corless Tp. and Shabumeni Lake area.
18.	Onaping Resources Ltd.	Exploration in Balmer Tp.
19.	Orelock Exploration Ltd.	Geology and diamond drilling in Baird Tp.
20.	Peterson, C.W.	Exploration in Balmer Tp.
21.	Prospecting Geophysics Ltd.	Exploration in Coli and Nungesser Lakes area.
22.	Redcon Gold Mines Ltd.	Exploration and diamond drilling in Balmer Tp.
23.	Rivard, O.	Diamond drilling in Todd Tp.
24.	Sabina Industries Ltd.	Ground mag. in Bateman Tp.
25.	Selco Mining Corporation Ltd.	Ground mag. and EM in Mitchell Tp., Gerry and Fredart Lakes areas; exploration in Bruce and Whitemud Lake areas; diamond drilling in Bateman Tp.
26.	Sherritt Gordon Mines Ltd.	Ground geophysics in Birch Lake and adjacent areas.
27.	Silveroc Mines Ltd.	Diamond drilling in Vanderbrink Lake area.
28.	Soltermann, R.H.	Diamond drilling in Todd Tp.
29.	St. Joseph Explorations Ltd.	Exploration and diamond drilling in Goodall Tp.; geology and geochemistry in Slate and Uchi Lake-Earngey Tp. areas; mag. and EM surveys in Avis, Jubilee and Slate Lake areas.
30.	St. Mary's Exploration Ltd.	Exploration in Skinner Tp.
31.	Stupack, W.	Trenching and diamond drilling in Ball Tp.
32.	Union Oil Company of Canada Ltd.	Exploration in Borland and South of Borland Lake areas.
33.	Utah Mines Ltd.	Ground mag. and EM surveys in Casummit Lake area.
34.	Wood, R.	Exploration in Dome and Heyson Tps.

TABLE 4 Assessment work and other information received in 1978.

Abbreviations

Assess.	- Assessment Work	GL	- Geological Survey
Ag	- Silver	Mag.	- Magnetometer Survey
Au	- Gold	MEAP	- Mineral Expl. Assistance Program
BM	- Base Metals	Rad.	- Radiometric Survey
DDH(3) 1513'	- 3 Diamond drill holes totalling 1513'	Tr.	- Trenching
EM	- Electromagnetic Survey	U	- Uranium

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Avis Lake	52K/16	St. Joseph Exploration Ltd.	BM	Assess.	Mag., EM	1978	2.2739	52K/NE
Bruce, Dixie Lakes	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1977	2.2415	52K/NW
Bruce, South of Otter Lake	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1976	2.2411	52K/NW
Balmer Tp.	52N/4	Dome Exploration (Canada) Ltd.	Au	Assess.	DDH(13) 7401'	1977		Balmer Tp.
Bateman Tp.	52N/4	Cochenour Willans Gold Mines Ltd.	Au, Ag.	Assess.	DDH(3) 1513'	1978		Bateman Tp.
		Sabina Industries Ltd.	Au	Assess.	Mag.	1978	2.2661	Bateman Tp.
		Selco Mining Corp. Ltd.	Au, Ag.	Assess.	Assaying	1978	2.2761	Bateman Tp.
Bruce Lake	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	DDH(1) 300' DDH(1) 310'	1977 1978		52K/NW
Bluffy Lake	52K/15	Selco Mining Corp. Ltd.	BM	Assess.	DDH(2) 551'	1978		52K/NW
Baggy, Cannon, McVicar, Saddle, Stoughton Lakes, and Cannon Cr.	52O/11, 12	Cominco Ltd.	BM	Assess.	Airborne Mag.	1977	2.2713	52O/NW
Blackbear, Coli, Nungesser, Hanton, Sobeski, Pringle Lakes	52N/4,5 6,12	Dome Exploration (Canada) Ltd.	BM	Assess.	Airborne Mag.	1977	2.2636	52N/SW/NW
Casummit Lake	52N/8	Frederick Yellowknife Mines Ltd.	Au, BM		Mag., GL.	1946	63.73	52N/SE
		Utah Mines Ltd. - McIntyre Mines Ltd.	Au	Assess.	Mag., EM	1978	2.2783	52N/SE
Corless Tp.	52N/2	McIntyre Mines Ltd. - Utah Mines Ltd. Joint Venture	BM	Assess.	DDH(1) 327'	1978		Corless Tp.
Curie Lake, Roadhouse R.	52K/16 52J/13	Noranda Exploration Co. Ltd.	BM	Assess	Mag., EM., GL	1977-78	2.2649	52K/NE
Deer Lake	53C/12	Noranda Exploration Co. Ltd.	U	Assess	Rad. GL.	1976 1976-77	2.2483 2.2760	53C/NW
Dent Tp.	52N/2	Frank, Raymond A.	Au	Assess	Tr.	1978		Dent Tp.
		Sherritt Gordon Mines Ltd.	BM	Assess.	DDH(2) 400'	1977		Dent Tp.
Dixie Lake	52K/13	St. Joseph Exploration Ltd.	BM	Assess.	Mag., EM	1976-77	2.2529	52K/NW
Dixie, Cabin Bay, Bruce Lake	52K/12, 13,14	Cominco Ltd.	BM	Assess.	Airborne Mag.	1977	2.2597	52K/NW
Ellard R., Yelling Lake	53J/12, 13	Mattagami Lake Mines Ltd.	BM, U	Assess.	Mag., Rad.	1976-77	2.2455	53J/NW
Fredart Lake Belanger Tp.	52K/15	Consolidated Copper-Lode Developments Inc.	BM	Assess.	DDH(1) 500'	1978		52K/NE
Fredart Lake	52K/15	Consolidated Copper-Lode Developments Inc.	BM	Assess.	DDH(2) 1001.8'	1977		52K/NE
		Selco Mining Corp. Ltd.	BM	Assess.	DDH(1) 236'	1978		52K/NE
Gerry Lake	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	DDH(1) 276' Mag., EM	1977 1977	2.2425	52K/NW
Gerry, Karas Lakes	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM DDH(6) 2264'	1977 1976-77	2.2412	52K/NW
Gerry, South of Otter Lakes	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM DDH(5) 1576' Mag., EM	1977 1977 1977-78	2.2414 2.2698	52K/NW

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Heyson Tp.	52K/13	Wood, R.A.	Au	Assess.	DDH(2) 210'	1978		Heyson Tp.
Jubilee, Slate Lakes	52K/15	St. Joseph Exploration Ltd.	BM	Assess.	Mag., EM	1978	2.2743	52N/SE
Karas Lake	52K/14	Hudson Bay Exploration & Development Co. Ltd.	BM	Assess.	DDH(2) 645' DDH(2) 1110' DDH(3) 1323'	1973 1976 1977		52K/NW
		Selco Mining Corp. Ltd.	BM	Assess.	DDH(3) 1965'	1976		
Matthews Lake	53J/5	Spooner Mines & Oils Ltd.	BM	Assess.	Mag., EM	1977	2.2497	53J/SW
Meen,(Drum, Kawaske, Nabe-makoseka Lakes in Patricia Mining Div.)	52O/6	Cominco Ltd.	BM	Assess.	Airborne Mag.	1977	2.2712	52O/SW
Mitchell Tp.	52N/2	Hudson Bay Exploration & Development Co. Ltd.	BM	Assess.	EM	1977	2.2392	Mitchell Tp.
		Kerr Addison Gold Mines Ltd.	BM	Assess.	Mag., EM	1977-78	2.2670	
		Selco Mining Corp. Ltd.	BM	Assess.	DDH(1) 410' Mag., EM	1977 1978	2.2703 2.2703	
Mitchell Tp., Uchi Lake & Earngey Tp.	52N/2	Kerr Addison Mines Ltd./ Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1977	2.2619	Mitchell Tp.
Palsen Lake	53D/15	Meekis, D.	BM	Assess.	Mag., EM., GL., Rad.	1977	2.2634	53D/NE
Roadhouse R.	52J/13	Noranda Exploration Co. Ltd.	BM	Assess.	GL.	1977	2.2592	52J/NW
Root Lake	52J/13	Noranda Exploration Co. Ltd.	BM	Assess.	Mag., EM	1977	2.2559	52J/NW
Shabumeni Lake	52N/7	McIntyre Mines Ltd. - Utah Mines Ltd. Joint Venture	BM	Assess.	DDH(2) 964' Mag., EM DDH(7) 2177'	1978 1977 1977	 2.2426	52N/SE
Setting Net Lake	53C/13	Vantreal Resources Ltd.	BM	Assess.	Mag.	1977	2.2594	53C/NW
South of Otter Lake	52K/14	Selco Mining Corp. Ltd.	BM	Assess.	Mag., EM	1977	2.2605	52K/NW
				MEAP RL-57	Mag., EM DDH(13) 5000'	1977	63.3503	
Todd Tp.	52M/1	Byng, R.L.	Au	MEAP RL-54	Mag., EM., DDH(5) 549'	1977-78	63.3521	Todd Tp.
		Rivard, O.	Au	Assess.	DDH(1) 165'	1978		Todd Tp.
		Soltermann, R.H.	Au	Assess.	DDH(2) 216'	1978		Todd Tp.
Uchi Lake & Earngey Tp.	52N/2	Selco Mining Corp. Ltd.	BM	Assess.	DDH(1) 250'	1978		52N/SE
Vanderbrink Lake	53F/14	Silveroc Mines Ltd.	BM	Assess.	DDH(1) 130'	1978		53F/NW

1978 Report of Sioux Lookout Resident Geologist

P. A. Palonen[1] and A. A. Speed[2]

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INTRODUCTION

The Sioux Lookout office was staffed by P.A. Palonen, Resident Geologist, A.A. Speed, Resource Geologist and E. Fraser, secretary.

Exploration companies continued to be active during the year with several major groups undertaking airborne geophysical surveys. Large exploration programs were concentrated in the Savant Lake, Sturgeon Lake, Lake St. Joseph, and English River areas. Interest remained particularly high in the Houghton-Hough Lakes area, where a band of metavolcanics was made accessible by the Marchington Lake Road. Although base metal deposits are still the primary target of most large companies, additional programs are underway for gold and uranium.

Recent mapping by the Ontario Geological Survey has shown the existence of two new areas where felsic pyroclastic rocks are more common than previously assumed. Both of these areas are now undergoing active exploration by major companies.

RESIDENT GEOLOGIST'S ACTIVITIES

Two operating base metal mines were visited during the year: the open pit operations of Mattabi Mines Limited (Mattagami Lake Mines Limited and Abitibi Paper Company Limited) and Sturgeon Lake Mines Limited (Falconbridge Copper Limited and NBU Mines Limited). Several visits were also made to the Goldlund Mines Limited property in Echo Township, where an active underground bulk sampling program was completed in the fall.

Geological and mineral resource information components were prepared for the West Patricia Land Use Plan, now underway by the Ministry. One background report on mineral potential, showing areas in which mining activity should be considered a possibility in the future, is nearing completion. The impact of mineral discoveries on the past history of remote areas is also portrayed. A second report on aggregate supply and demand in the Sioux Lookout area is in the final stages. Pleistocene mapping has been carried out by V.K. Prest, and the resulting data, along with all available information on existing pits and quarries have been compiled on a series of maps. Past and present usage has been compiled

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and future demand estimated. Both the mineral potential section and the aggregate study will be published in the near future as a background report by the West Patricia Land Use Planning Group.

Two data series compilation maps were published by the Ontario Geological Survey; one in the Pickle Lake area (Kapkichi Lake) and one in the Sturgeon Lake area (Valora Lake). Geological and mineral identification lectures were given to two high school groups and two Junior Ranger Camps. Office staff also performed judicial duties at one science fair.

Office staff also provided logistical support for an international Archean Field Conference, sponsored by the University of Toronto. This field trip examined various gneissic rocks of the English River Subprovince in the eastern Lac Seul region.

MINING ACTIVITY

Three mines remained in production in 1978; the Thierry Mine operated in the Pickle Lake area, and the Mattabi Mine and Sturgeon Lake Mine operated in the Sturgeon Lake area.

The Thierry Mine, owned by Union Miniere Explorations and Mining Corporation Limited, gradually increased production from 2,000 tons per day in 1977 to full capacity of 4,000 tons per day in 1978, largely from the surface stockpile. Plans are for a constant 2,500 tons per day (75,000 tons per month) from underground operations (Dryden Observer, October 11th, 1978).

Mattabi Mines Limited operated at the designed production rate of 3,000 tons per day throughout much of the year. All ore came from the open pit, which will continue to supply ore until late 1980. Pit wall remnants and underpit ore will supply additional mill feed until the underground workings are fully functional in 1982.

The Lyon Lake Deposit of Mattagami Lake Mines Limited remained on a standby maintenance basis during 1978. However, this deposit is expected to begin production at a rate of 1,000 tons per day in mid 1980. Ore will be trucked to the Mattabi mill.

The "F Group" orebodies, also owned by Mattagami Lake Mines Limited, are scheduled to go on stream in 1981. These orebodies, although small, will be an important source of mill feed for the Mattabi mill. The main deposit, or C-zone, is the most significant and has been outlined by vertical drilling on 50-foot centres. Development will be by open pit, at a proposed rate of 400 tons per day.

Sturgeon Lake Mines Limited continued to produce copper-zinc-silver ore at the rate of 1,200 tons per day throughout 1978. Although ore reserves at the mine are reportedly limited, search for additional ore on the property is continuing.

MINERAL EXPLORATION ACTIVITY

A significant increase in exploration activity was evident in the Sioux Lookout Resident Geologist's district in 1978.

This is reflected by the number of claims recorded during 1978, 2,018, compared with 1,261 in 1977, a 60 percent increase; and by a total of 95,010 days of assessment work credits recorded in 1978 compared with 34,663 days in 1977, a 174 percent increase (Mining Recorder's files, Sioux Lookout).

The following statistics were compiled for the Patricia Mining Division and as shown by the figures, the overall trend of base metals, precious metals, and uranium exploration, combined, has generally increased.

TABLE 1 CLAIMS RECORDED AND ASSESSMENT WORK CREDIT RECEIVED PATRICIA MINING DIVISION FROM 1974 TO 1978.

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Survey (Man Days)	Geological Survey (Man Days)
1978	2,018	765	5,094	33,371.3	57,501	600
1977	1,261	1,320	3,760	17,880.1	13,931	946
1976	1,185	1,120	3,958	27,111.0	11,555	185
1975	1,019	2,489	3,903	38,492.7	18,953	1,858
1974	1,011	3,223	5,659	38,049.0	6,255	102

Properties Under Evaluation and/or Exploration

GOLDLUND MINES LIMITED

During October and November of 1978, Goldlund Mines Limited conducted a 3000 pound bulk sampling program on its underground operations in Echo Township, 40 km southwest of Sioux Lookout. The shaft was dewatered to the first level (200 feet) for the purpose of the bulk sampling program. Instead of a random sampling program, material was extracted from the ore zones in a standard mining procedure. This procedure was followed to achieve a grade of ore equivalent to those in working stopes should the mine get into production.

Feasibility studies are underway to determine if further work is warranted.

EXPLANATION

● Producing Mines, 1978
1. Mattabi Mines Ltd.. . . . . Zn,Cu,Pb,Ag
2. Sturgeon Lake Mines Ltd.. . . Zn,Cu,Pb,Ag (owned by Falconbridge Copper Ltd. & NBU Mines Ltd.)
3. Union Miniere Explorations and Mining Corp. Ltd. (UMEX). . . . . Cu

◑ Mines Under Development
1. Mattagami Lake Mines Ltd.* (Lyon Lake Division) . . . . . Zn,Cu,Ag,Au
2. Mattagami Lake Mines (Group "F" Deposit) . . . . . Zn,Cu,Pb,Ag

▲ Properties under evaluation and/or exploration
1. Goldlund Mines Ltd.. . . . . Au
2. Lake St. Joseph Iron Ltd.. . . . . Fe (optioned to The Algoma Steel Corp. Ltd.-Algoma Ore Division)
3. Ramsay, R. G. . . . . Fe
4. Steep Rock Iron Mines Ltd. . . . . Fe
5. Thompson, W. M. . . . . Ag,Cu,Pb

*On standby maintenance basis

• Exploration activity in 1978 (keyed to Table 3)

* Exploration activity with assessment work filed in 1978 (keyed to Table 3)

◆ Properties or Areas Recommended for Exploration

——— Map or report issued by the Ontario
- - - - Geological Survey in 1978 (keyed to Table 2)
P - Preliminary Map
OFR - Open File Report

▨ Boundary of Resident Geologist's district

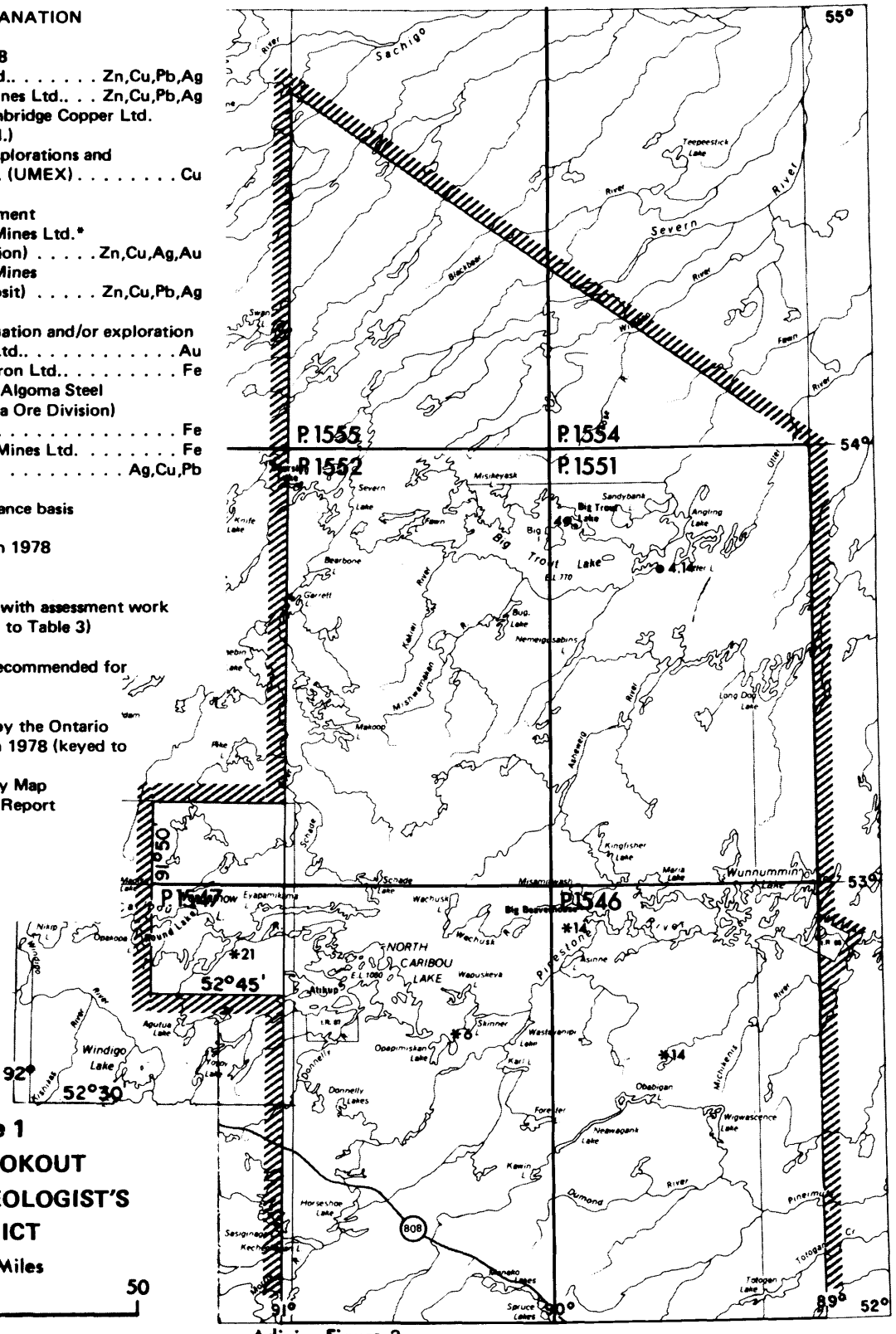

Figure 1
SIOUX LOOKOUT RESIDENT GEOLOGIST'S DISTRICT

Scale of Miles
0 25 50

Adjoins Figure 2

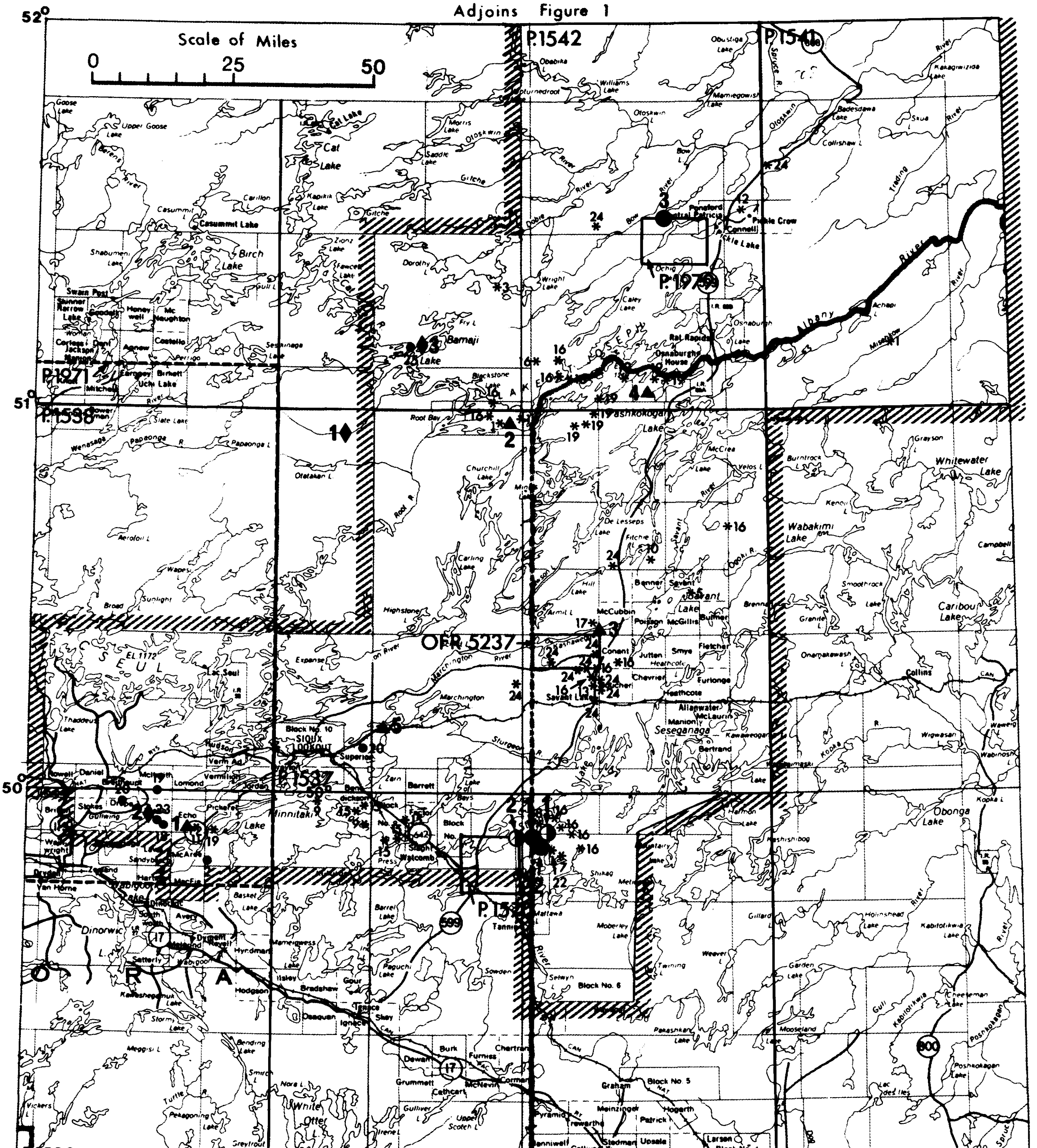
52°
Adjoins Figure 1
Scale of Miles
0
25
50
P.1542
P.1541
P.1971
P.1538
P.1979
OFR 5237
P.1537
P.1530
P.1529
KENORA
51°
50°
49°
93°
92°
91°
90°
89°
Cat Lake
Casummit Lake
Birch Lake
Bamaji Lake
Central Patricia
Pickle Crow
Pickle Lake
Osnaburgh House
Albany River
Whitewater Lake
Wabakimi Lake
Caribou Lake
Savant Lake
Sioux Lookout
Minnitaki
Obonga Lake
Dinorwic
Sturgeon R.
Block No. 6
Block No. 5
Block No. 4
Figure 1
Figure 2

Figure 2

LAKE ST. JOSEPH IRON PROSPECTS

Both iron ore deposits in the Lake St. Joseph area, Lake St. Joseph Iron Limited (The Algoma Steel Corporation Limited option), and Steep Rock Iron Mines Limited (Soules Bay Deposit), remained on a standby basis in 1978. A new timber access road (Vermilion River Road) directed toward the Lake St. Joseph area via the Marchington Road, leading from Sioux Lookout, may improve the economic viability of these deposits in the future.

R.G. RAMSAY IRON PROSPECT (KASHAWEOGAMA LAKE IRON PROSPECT)

Considerable assessment work in the form of trenching and geological and radiometric surveys was performed on the Kashaweogama Lake Iron Prospect, 20 km north of Savant Lake, by R.G. Ramsay, formerly held by Pershland Gold Mines Limited. Trench samples analyzed up to 38.55 percent iron over narrow widths (Resident Geologist's Files, Ontario Ministry of Natural Resources, Sioux Lookout).

THOMPSON PROSPECT

The W.M. Thompson silver-copper-lead prospect located near Rosnel on the Canadian National Railways rail line remained in good standing during 1978, however, no work was done on the property (W.M. Thompson 1978, personal communication). R.O. Page who mapped the area during the 1978 field season states "The Rosnel occurrence consists at depth of disseminated pyrite, chalcopyrite, and sphalerite within carbonatized quartz-sericite schist, based on New Insco Mines Limited drill hole data" (Page 1978, p.47). Page (1978, p.48) concludes, that although the geology of the Rosnel-Out Lake area is complex due to structural complications imposed by the Botsford Lake fault and local intrusive bodies, the area warrants a more thorough investigation for massive base metal sulphide deposits.

RECOMMENDATIONS FOR EXPLORATION

As a result of field visits to properties by the authors, it is suggested that three of these properties warrant further examination as to the possibilities of their mineral potential. Some of these field investigations are described below.

Roadhouse River Lithium Occurrence

This lithium occurrence is located approximately 107 km (58 miles) north of Sioux Lookout. Little information exists in the Sioux Lookout Resident Geologist's Files on the Roadhouse River property. The property was held by Capital Lithium Mines Limited in 1955-1957 and subsequently patented. An intensive diamond drill program was performed during those years on the property and surrounding properties. A total of 39 diamond drill holes were drilled for a total of 17,684 feet, on and in the general area of the showing and filed as assessment work. Hole No.1, drilled on the main showing, showed analysis results averaging 1.56 percent Li_2O over 46.3 feet.

The showings examined occur on the north side of an east-trending ridge. Outcrop is scarce. The country rock in the vicinity of the showing has a trend of S54E and dips 67 degrees north. Although the rock is highly sheared it exhibits both mineralogical and colour variation which may be relict bedding. The mineralogy and structures suggest a highly metamorphosed greywacke although adjoining rocks along strike were mapped as mafic metavolcanics by Clifford in 1964 (Clifford 1969).

A pegmatite dike exposed at the east end of an outcrop, attains a minimum width of 10 m. The general trend is east-west. On the western exposures neither contact is visible. The dike is cut by a northeast-trending set of dextral faults, one of which has a horizontal displacement of about 5 m.

Zoning was observed in the dike. Spodumene crystals varied in size from less than 1 cm on the north side to about 20 cm on the south side of the outcrop. The density of spodumene also varied from several percent to over 10 percent on the south side. Tourmaline was concentrated along the north edge of the outcrop in the very fine grained aplite.

White to bluish spodumene occurs as large blocky cyrstals in the pegmatite. Three size ranges were observed, fine (1.5-2.0 cm), medium (2.0-10.0 cm) and coarse (15.0-18.0 cm) grained. No perferred orientation was observed. Spodumene crystal size and concentration increase toward the central part of the dike.

The renewed interest in lithium would seem to warrant further investigation as to the exact dimensions of the dike and quantity of Li_2O present. Pegmatite dikes appear to occur frequently within the belt of metavolcanics in the Root Lake area. Several others are noted by Clifford (1969). Significantly, most of the dikes are of mineable volume. The dikes would warrant a specialized study to determine lithium and tantalum potential. Economic potential of this area will be greatly increased when the timber access road (Vermilion River Road) from Sioux Lookout to Lake St. Joseph penetrates the area.

Gullwing Molybdenum-Copper Showing

The Gullwing molybdenite showing is located in Webb Township near the northeast end of Gullwing Lake. The showing consists of several pegmatite dikes into which three trenches, each about 1 m in depth, have been blasted. The dikes are not aligned and show considerable variability in dip. Country rock in the vicinity of the showing is thin-bedded greywacke. Metamorphic effects are indicated by shearing and the presence of recrystallized hornblende and biotite. The metamorphism appears regional rather than local. No clear evidence of metamorphism occurs near the dikes themselves.

The pegmatite dikes are between 1.5 and 2 m thick on the outcrop although the thickness varies considerably. Strike-length of the longest dike is about 20 m.

Sulphide mineralization is present within the dikes. Molybdenite rosettes and flakes to 2 cm in diameter are common and are present in amounts of 1 to 2 percent. Pyrite, chalcopyrite, and sphalerite are also present. These latter sulphide minerals appear concentrated in the centre of the dikes but form a rather minor content.

The pegmatite dikes contain pink orthoclase more typical of granitic differentiates than the white lithium-bearing dikes. Although the showing is of subeconomic size, it is similar to the Lateral Lake molybdenite deposit to the east. The pegmatite dikes may be indicative of a larger differentiated porphyry-type deposit at depth. The presence of molybdenum combined with the presence of other base metal minerals might make a comprehensive drilling program worthwhile.

Bamaji Lake Gold-Uranium Occurrence

Several showings of gold-uranium mineralization occur on the east end of the north arm of Bamaji Lake. Considerable trenching and diamond drilling was undertaken on the property in 1953 by R.J. McCombe of Sioux Lookout. In 1968, Kirkland Townsite Gold Mines Limited performed a geological survey and an airborne spectrometer survey of the area. The property is presently held by R. Knappett.

Three showings occur on the property. The No.1 showing was first discovered on the lakeshore and traced west. Assays from trenching and several x-ray drill holes produced values of up to 0.5 ounces per ton of gold over narrow widths. The horizon in which this exploratory work was performed consists of up to 2 m of skarn. In hand specimen the mineralogy consists of pink dolomite, white calcite, and dark green actinolite. The actinolite occurs as rosettes of needle-like crystals and generally occupies about 25 percent of the rock. Buff sericite schist is present along the contacts of the carbonate unit and several lenses of black granular quartz were observed. Pyrite is common in the quartz lenses. Radioactivity is sporadic in the trenches with high readings of about 1300 cpm recorded from the sericite schist and the quartz lenses. This horizon is, in the vicinity of the showing, stratiform with mafic volcanic flows to the south and a fine-grained felsic volcanic unit to the north.

No.2 showing occurs on a ridge north of two narrow swamps crossing the property. Radioactivity is confined to several alternating layers of actinolite and sericite over a width of one-half metre. Alternating bands of green actinolite and buff sericite contain the radioactivity. Grey granodiorite is the country rock. It is possible that this zone is similar to the No.1 showing and consists of felsic tuff and skarn minerals although no carbonate was observed. Mafic volcanic rocks are present on an adjacent outcrop.

No.3 showing is only poorly exposed and has not been trenched. The unit has been traced over a strike-length of 1 000 m. The radioactive zone is about 1.5 m wide and consists of minor pink carbonate, buff quartz schist, and green actinolite.

The radioactive tremolite ± carbonate zones are laterally extensive and appear to form stratigraphic horizons in a mixed pile of mafic metavolcanic rocks and thin felsic metatuff units. The stratigraphy is complicated by intruded sills and dikes of granodiorite.

The possibility of stratigraphically controlled uranium deposits associated with the skarn horizons should be thoroughly investigated. Thin soil cover in much of the area would allow good results from a ground scintillometer survey. In addition, careful mapping could define the thickest carbonate zones. The authors would suggest that exploration programs in the area not be confined to the claim group.

Other recommended areas for exploration have been outlined by geologists of the Precambrian Geology Section in the Summary of Field Work, 1978 (Ontario Geological Survey, MP82, see list of publications in back pocket).

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Detailed mapping was performed in the Zarn Lake area by R.O. Page of the Precambrian Geology Section. Previously unrecognized felsic pyroclastic and extrusive flow rocks, potentially favourable for massive base metal sulphide mineral deposits, were identified as a result of this project (Page 1978, p.47-48).

H. Wallace completed a detailed mapping project in the Slate Falls area, principally as a basis for determining the molybdenum-copper potential of the area.

Occurrences of granular aggregate materials were examined in the Sioux Lookout area by V.K. Prest to outline the distribution of favourable granular materials.

N.F. Trowell completed a synoptic survey concentrating his efforts in the Sioux Lookout-Gullwing Lake area, while J.R. Bartlett conducted a similar study in the Loggers Lake-Southeast Bay (Minnitaki Lake) area. Both projects are part of a special regional study incorporating the stratigraphy, structure, and economic geology of the western section of the Wabigoon Belt of metavolcanic-metasedimentary rocks between Savant Lake and Crow Lake.

RESEARCH BY OTHER AGENCIES

Field work for graduate and undergraduate theses projects in the Sioux Lookout area was conducted by students of several universities. Some of the projects which have resulted in published reports are listed below.

Doctoral Thesis

Shegelski, R.J.

Stratigraphy and Geochemistry of Archean Iron Formations in the Sturgeon Lake-Savant Lake Greenstone Terrain, Northwestern Ontario; University of Toronto.

Bachelors Theses

Jose, B.F.

A Comparison of an Airborne Gamma-Ray Spectrometry Anomaly with Ground Follow-up Survey Results in the Claw Lake area, Queen's University, Kingston, Ontario.

Reid, J.

Archean Variolitic Lavas, Queen's University, Kingston, Ontario.

RECENT PUBLICATIONS AND REFERENCES

Annis, R.C., Cranstone, D.A., and Vallee, M.
1978: A Survey of Known Mineral Deposits in Canada that are not being mined; Department of Energy, Mines and Resources, Mineral Bulletin MR 181.

Ayres, L.D.
1977: Metamorphism in the Superior Province of Northwestern Ontario and its relationship to crustal development; p.25-36 *in* Metamorphism in the Canadian Shield, Geological Survey Paper 78-10, edited by J.A. Fraser and W.W. Heywood, 367p.

Bartlett, J.R.
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TABLE 2 MAPS AND REPORTS PERTAINING TO THE PATRICIA MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY OF THE MINISTRY OF NATURAL RESOURCES IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

OPEN FILE REPORT
OFR 5237

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Ontario Mineral Review 1976-1977

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TABLE 3 **Exploration activity in 1978.**

Number on Figure	Individual or Company	Activity
1.	Algoma Steel Corporation, The-Algoma Ore Division	Diamond drilling in the Achapi Lake and Trist Lake areas. Ground magnetometer survey in the Achapi Lake area.
2.	Beth-Canada Mining Company	Airborne magnetometer survey in the Keikewabik Lake, MacFie and McAree Township areas.
3.	Cominco Limited	Airborne magnetometer survey in the Drum, Kawashe, Meen and Nabemakoseka Lakes areas.
4.	Confederation College	Ground magnetometer and electromagnetic survey in the Big Trout Lake area.
5.	Denison Mines Limited	Ground electromagnetic, magnetometer, geological and rock geochemical reports in the Endogoki Lake area.
6.	Dome Exploration (Canada) Limited	Diamond drilling in the Skinner and Zeemel Lakes areas.
7.	Falconbridge Copper Limited	Induced polarization survey in the Bell Lake area.
8.	Falconbridge Nickel Mines Limited	Diamond drilling in the Sixmile Lake area.
9.	Geophysical Engineering Limited	Diamond drilling in the Parnes Lake and Smock Lake area. Airborne electromagnetic and magnetometer survey in the Lowry - August - Caron Lakes areas.
10.	George Armstrong Company Limited	Diamond drilling in the Endogoki Lake area.
11.	Goldlund Mines Limited	Ground magnetometer survey in Echo Township.

Number on Figure	Individual or Company	Activity
12.	Great National Corporation (Rio Tinto Canadian Exploration Limited)	Ground electromagnetic and magnetometer survey in the Tarp Lake area.
13.	Hadley, E. W.	Diamond drilling in the Evans Lake area.
14.	International Minerals and Chemical Corporation (Canada) Limited	Diamond drilling, geological surveys and semiqualitative spectrographic analyses in the Misamikwash Lake and Schryburt Lake areas. Diamond drilling and induced polarization survey in the Big Trout Lake area.
15.	Mattagami Lake Mines Limited	Diamond drilling and induced polarization surveys in the Flyingloon Lake and Wyatt Lake area. Diamond drilling and ground electromagnetic and magnetic surveys in the Smock Lake area.
16.	Noranda Exploration Company Limited	Ground electromagnetic and magnetometer surveys in the Bell Lake and Trist Lake areas. Airborne radiometric survey in the Claw Lake area. Diamond drilling, ground electromagnetic and geological surveys in the Evans Lake and Johnston Bay (Lake St. Joseph) areas. Diamond drilling and ground electromagnetic and magnetometer survey in the Sixmile Lake area.
17.	Ramsay, R. G.	Rock trenching, radiometric and geological surveys in the Grebe Lake - McCubbin Township area.
18.	Rio Tinto Canadian Exploration Limited	Base metal exploration in Webb Township.
19.	Selco Mining Corporation Limited	Diamond drilling in the Carling Island (Lake St. Joseph) and Dawson Lake areas. Ground magnetometer and electromagnetic surveys in the Doran Lake area. Diamond drilling, ground magnetometer and electromagnetic surveys in the Kabik Lake - Pickerel Township area. Mineral exploration in McIlraith Township.
20.	Sherritt Gordon Mines Limited	Claim staking in the Superior Junction - Zarn Lake area, and uranium exploration in Drope Township.
21.	St. Joseph Explorations Limited	Airborne electromagnetic survey in the Randall Lake area.
22.	Sturgeon Lake Mines Limited	Diamond drilling in the Bell Lake area.
23.	Tantalum Mining Corporation of Canada Limited	Exploration for lithium - tantalum mineralization in Webb Township.
24.	Union Miniere Explorations and Mining Corporation Limited (UMEX)	Diamond drilling in the Beckington Lake, Collishaw Lake and Solitude Lake areas. Diamond drilling and airborne magnetometer survey in the Evans Lake, Houghton Lake and Watin Lake areas. Ground magnetometer and electromagnetic survey in the Nanos Lake and South of Nanos Lake areas.
25.	Urangesellshaft Canada Limited	Trenching and geological mapping in the Fry Lake area.

TABLE 4 Assessment work and other information received in 1978.

PATRICIA MINING DIVISION

SYMBOLS AND ABBREVIATIONS

Au-gold	sp-sphalerite	rtr-rock trenching	Mag-Ground Magnetometer Survey
Ag-silver	mag-magnetite	tr-trace amounts	VEM-Vertical Loop Survey
Cu-copper	cp-chalcopyrite	DD 5 - 2,629.2 - diamond drilling	VLF-Very Low Frequency Survey
Pb-lead	S-sulphides	5 holes 2,629.2 foot total	HEM-Horizontal Loop Survey
Zn-zinc	hem-hematite	Assess-Assessment Data	Rock Chem-Rock Geochemical Report
Fe-iron	sid-siderite	Non-Assess-Non-assessment Data	Geol-Geological Survey
Ni-nickel	ank-ankerite	ARA-Airborne Radiometric Survey	AEM-Airborne Electromagnetic Survey
py-pyrite	ap-apatite	RA-Ground Radiometric Survey	AM-Airborne Magnetometer Survey
po-pyrrhotite	gn-galena	IP-Induced Polarization Survey	SSA-Semiqualitative Spectrographic Analyses

Local	NTS	File Name	Commodity Found	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Achapi Lake	52 P/4 NE	The Algoma Steel Corporation Limited	Fe,py,po,cp(tr)	Assess.	DD 12-1656.1	1977-78		4, 5
	52 P/4 NE	The Algoma Steel Corporation Limited	Fe	Assess.	Mag	1978	2.2751	6

Local	NTS	File Name	Commodity Found	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Beckington Lake	52 J/2 NE	Union Miniere Explorations & Mining Corporation Limited		Assess.	DD 1-150	1977		44
Bell Lake	52 G/15 SW	Falconbridge Copper Limited		Assess.	IP	1977	2.2561	35
	52 G/15 SW	Noranda Exploration Company Limited		Assess.	VEM, Mag	1977	2.2383	32
	52 G/15 SW	Noranda Exploration Company Limited		Assess.	VLF, Mag	1977	2.2659	34
	52 G/15 SW	Sturgeon Lake Mines Limited	py,po,cp(tr), mag,sp(tr)	Assess.	DD 9-6115.8	1978		33
Carling Island (Lake St. Joseph)	52 O/2 SE	Selco Mining Corporation Limited	mag,py,po, cp(tr)	Assess.	DD 2-552	1978		10, 11
Claw Lake	52 J/9 NE	Noranda Exploration Company Limited		Assess.	ARA,RA,Geol.	1977	2.2447	5
Collishaw Lake	52 P/12 NW	Union Miniere Explorations & Mining Corporation Limited	po(tr),cp(tr)	Assess.	DD 1-1530	1977		19
Dawson Lake	52 J/15 NW	Selco Mining Corporation Limited	po,py,gf	Assess.	DD 3-1132	1978		1, 2,3
Drum Lake	52 O/3 NE	Cominco Limited		Assess.	AM	1977	2.2712	7 (52 O/6NW
East of Beardy Creek	53 H/12 NE	International Minerals & Chemical Corporation (Canada) Limited	cp,py,po,mag, Cu, Zn	Non-assess.	IP DD 8-3899	1977 1977		3
	53 H/12 NE	Confederation College		Non-assess.	Mag, VLF	1978		2
Echo Township	52 F/16 NW	Goldlund Mines Limited		Assess.	Mag	1977	2.2548	32
Endogoki Lake	52 J/9 SW	Denison Mines Limited (W.G. Wahl Limited)	Au,Cu,Pb,Ag, Zn	Assess.	HEM, MAG, Geol,Rock Chem.	1977	2.2544	35
	52 J/9 SW	George Armstrong Company Limited	py,po,cp,sp, gf	Assess.	DD 6-3040	1978		34
Evans Lake	52 J/7 SE	Hadley, E. W.		Assess.	DD 1-104	1978		61
	52 J/7 SE	Noranda Exploration Company Limited	gn,po,py,cp	Assess.	Geol.	1975	2.2553	46
	52 J/7 SE	Noranda Exploration Company Limited	po,py,sp,cp	Assess.	DD 1-289	1976		50
	52 J/7 SE	Noranda Exploration Company Limited		Assess.	Geol.	1975	2.2617	51
	52 J/7 SE	Noranda Exploration Company Limited		Assess.	Geol.	1975	2.2686	57
	52 J/7 SE	Noranda Exploration Company Limited		Assess.	VLF	1978	2.2742	58
	52 J/7 SE	Noranda Exploration Company Limited		Assess.	HEM	1978	2.2735	60
	52 J/7 SE	Union Miniere Explorations & Mining Corporation Limited		Assess.	AM	1978	2.2536 2.2537	7 (52 J/7SW
	52 J/7 SE	Union Miniere Explorations & Mining Corporation Limited	py, cp	Assess.	DD 4-1573	1978		48, 59
	52 J/7 SE	Union Miniere Explorations & Mining Corporation Limited	po,py,cp(tr) sp(tr),mag(tr)	Assess.	DD 4-2505	1977		49
	52 J/7 SE	Union Miniere Explorations & Mining Corporation Limited	po,py,cp,mag	Assess.	DD 5-1828	1978		52,53, 54,55,56
Flyingloon Lake	52 G/13 SE	Mattagami Lake Mines Limited	Cu(tr),Zn(tr), Ni,Fe	Assess.	DD 1-426	1978		3
	52 G/13 SE	Mattagami Lake Mines Limited		Assess.	IP	1977	2.2538	4

Local	NTS	File Name	Commodity Found	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
	52 G/13 SE	Mattagami Lake Mines Limited	Cu,Zn,Ni,Fe,	Assess.	DD 1-453	1978		5
Grebe Lake & McCubbin Township	52 J/7 NE	Ramsay, Raymond G.	Fe	Assess.	Geol.	1972	2.2201	34
	52 J/7 NE	Ramsay, Raymond G.	Fe	Assess.	Geol.	1976	2.2579	35
	52 J/7 NE	Ramsay, Raymond G.	Fe	Assess.	rtr	1977		33
	52 J/7 NE	Ramsay, Raymond G.	Fe	Assess.	RA	1977	2.2603	36
Houghton Lake	52 J/7 SW	Union Miniere Explorations & Mining Corporation Limited		Assess.	AM	1977	2.2536 2.2537	7
	52 J/7 SW	Union Miniere Explorations & Mining Corporation Limited	py,po,mag,cp, sp,gn	Assess.	DD 4-1995	1978		8,9,10
Johnston Bay (Lake St.Joseph)	52 O/3 SE	Noranda Exploration Company Limited		Assess.	Mag	1977	2.2657	8
	52 O/3 SE	Noranda Exploration Company Limited		Assess.	VLF, Mag	1977	2.2657	9
	52 O/3 SE	Noranda Exploration Company Limited		Assess.	VLF,VEM,HEM, Mag	1977	2.2657	10
	52 O/3 SE	Noranda Exploration Company Limited	py,po,Cu,Zn, Ag(tr),Au(tr)	Assess.	DD 3-983.8	1978		11
	52 O/3 SE	Noranda Exploration Company Limited		Assess.	HEM, Mag	1978	2.2767	12
Kabik Lake & Pickerel Township	52 F/16 NE	Selco Mining Corporation Limited		Assess.	HEM, Mag	1976	2.2423	33
	52 F/16 NE	Selco Mining Corporation Limited	py,gf	Assess.	DD 1-282	1978		34
Kawashe Lake	52 O/6 SE	Cominco Limited		Assess.	AM	1977	2.2712	7 (52 O/6NW)
Meen Lake	52 O/6 NW	Cominco Limited		Assess.	AM	1977	2.2712	7
Misamikiwash Lake	53 A/13 NW	International Minerals & Chemical Corporation (Canada) Limited		Assess.	DD 5-680 Geol., SSA	1976-77		4
Nabemakoseka Lake	52 O/6 SW	Cominco Limited		Assess.	AM	1977	2.2712	7 (52 O/6NW)
Nanos Lake	52 O/10 SE	Union Miniere Explorations & Mining Corporation Limited		Assess.	Mag, VEM	1977	2.2716	4 (52 O/7NE)
Parnes Lake	52 G/13 NW	Geophysical Engineering Limited	py,gf,Cu(tr), Zn(tr),Ag(tr)	Assess.	DD 1-300	1977		25
Post Island of Big Trout Lake	53 H/13 SW	Confederation College		Non-assess.	Mag, VLF	1978		2 (53H/12NE)
Randall Lake	53 B/14 SE	St. Joseph Explorations Limited		Assess.	AEM	1977		8
Riach Lake	52 O/1 SW	Selco Mining Corporation Limited	po,py	Assess.	DD 2-520	1978		16, 17
Schryburt Lake	53 A/12 SE	International Minerals & Chemical Corporation (Canada) Limited	po,py,mag,ap, sid,ank, clinohumite	Assess.	DD 6-960 Geol.,SSA	1976-77	2.2341	2
Sixmile Lake	52 G/15 NW	Falconbridge Nickel Mines Limited	py	Assess.	DD 1-1401	1978		101
	52 G/15 NW	Noranda Exploration Company Limited	py,po,mag	Assess.	DD 1-298	1978		102
	52 G/15 NW	Noranda Exploration Company Limited		Assess.	HEM, Mag	1977	2.2535	103
	52 G/15 NW	Noranda Exploration Company Limited		Assess.	HEM, Mag	1977	2.2667	104
	52 G/15 NW	Noranda Exploration Company Limited		Assess.	HEM, Mag	1977	2.2673	105

Local	NTS	File Name	Commodity Found	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Skinner Lake	53 B/9 NW	Dome Exploration (Canada) Limited	mag,po,py,cp	Assess.	DD 16-4383.2	1978		14 (53B/9SW)
Smock Lake	52 G/13 NE	Geophysical Engineering Limited	po,py	Assess.	DD 1-402	1977		44
	52 G/13 NE	Mattagami Lake Mines Limited		Assess.	HEM, Mag	1977	2.2440	45
	52 G/13 NE	Mattagami Lake Mines Limited	py,po	Assess.	DD 1-397	1978		46
	52 G/13 NE	Mattagami Lake Mines Limited		Assess.	HEM, Mag	1977	2.2655	47
Solitude Lake	52 J/10 SE	Union Miniere Explorations & Mining Corporation Limited	py,po,cp	Assess.	DD 1-400	1978		19
South of Nanos Lake	52 O/7 NE	Union Miniere Explorations & Mining Corporation Limited		Assess.	Mag, VEM	1977	2.2716	4
Tarp Lake	52 O/9 SE	Great National Corporation Limited (Rio Tinto Canadian Exploration Limited)		Assess.	Mag, VLF	1976	2.2421	35
Trist Lake	52 J/14 NE	The Algoma Steel Corporation Limited	Fe (hem,mag)	Assess.	DD 1-357.5	1978		9
	52 J/14 NE	Noranda Exploration Company Limited		Assess.	Mag,VLF,HEM	1978	2.2656	10
Watin Lake	52 J/6 SE	Union Miniere Explorations & Mining Corporation Limited		Assess.	AM	1977	2.2536 2.2537	7 (52 J/7SW
	52 J/6 SE	Union Miniere Explorations & Mining Corporation Limited	py,po	Assess.	DD 1-340	1977		5
Wyatt Lake	52 G/14 NW	Mattagami Lake Mines Limited		Assess.	IP	1977	2.2556	19
	52 G/14 NW	Mattagami Lake Mines Limited	po,py	Assess.	DD 2-665	1978		20
Zeemel Lake	53 B/9 SW	Dome Exploration (Canada) Limited	mag,po,py,cp	Assess.	DD 7-1661.7	1978		14

1978 Report of North Central Regional Geologist

K.G. Fenwick[1] and J.F. Scott[2]

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TABLES

FIGURES

INTRODUCTION

The Regional Geologist's office is staffed by K.G. Fenwick, Regional Geologist, J. Scott, Resource Geologist, J.K. Mason and B. MacRae, Geological Assistants, and A.R. Dowton, Secretary.

[1]Regional Geologist, Ontario Ministry of Natural Resources, Ontario Government Building, 435 James Street S., Box 5000, Thunder Bay, Ontario, P7C 5G6.

[2]Resource Geologist.

REGIONAL GEOLOGIST'S ACTIVITIES

Consultation on various aspects of geology, mineral, and aggregate potential and exploration activities in the region was carried out with the general public, prospectors, and personnel from mining companies, universities, and government agencies. Visits were made to three field parties of the Ontario Geological Survey and familiarization tours of the operations of Caland mine, Steep Rock mine, Shebandowan mine, and Little Bear Amethyst quarry were undertaken.

The office staff continued to be involved in strategic land use planning by providing geological science input to lake development plans, proposed land and park resources, environment assessment plans, road placements, proposed hydro generating sites and transmission lines, earth science inventories, proposed townsites, and master plans for parks.

A survey of the lead-zinc occurrences in the Thunder Bay area and of five lithium occurrences in the Nipigon area was completed under the "Experience 78" program. An unedited report which provides an accurate location of the sites and information on the physical description and geology can be viewed in the Regional Geologist's office, Thunder Bay.

Lectures on regional geology were provided for the Thunder Bay Naturalist Club and two school groups.

MINING AND EXPLORATION ACTIVITY

In 1978, the number of staked claims recorded in the Thunder Bay Mining Division increased by 79 percent from the number staked in 1977 (Table 1). This increase was mainly due to the increased exploration for uranium in the area south of Lake Nipigon. The amount of diamond drilling is at its lowest peak since 1964.

The location of the assessment work credits (Table 4) and exploration activity (Table 3) can be seen on Figures 1, 2, and 3. Areas receiving the most attention were the Burchell-Shebandowan Lakes area west of Thunder Bay; the area underlain by the Late Precambrian sedimentary

TABLE 1 SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT RECEIVED THUNDER BAY MINING DIVISION.

Year	Claims Recorded	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)
1978	3,517	20,182	20,589	6,206
1977	1,964	24,879	25,601	4,870
1976	2,364	52,551	29,504	4,600
1975	3,436	38,652	52,020	4,700
1974	3,305	37,130	26,061	4,300
1973	2,253	49,575	24,320	7,450
1972	3,442	61,512	53,757	4,776
1971	4,627	63,775	53,028	7,456
1970	5,830	103,559	83,389	6,078

rocks of the Sibley Group in the Nipigon area; the Beardmore area; the McKay-Pagwachuan Lakes area, 50 km east of Geraldton; and the Mimininska-Eabamet Lakes area, about 240 km northwest of Geraldton.

Six mines were in operation in 1978 (see Figures 1 and 2). On November 12, 1978, the Shebandowan mine belonging to Inco Limited, was shut down and only a small work force was retained to maintain the safety and security of the plant. It will remain closed until Inco's smelting operations in Sudbury are resumed (The Chronicle-Journal, October 3, 1978, p.1).

Steep Rock Iron Mines Limited will cease mining operation in the Atikokan area at the end of January 1979. Projected closure of their pelletizing operation is estimated to be in the middle of August 1979 (Bruce Taylor, general manager, written communication).

Caland Ore Company Limited will have terminated their mining operation at Atikokan by December 31, 1979 and their pelletizing operation in 1980 (Canadian Mines Handbook 1978-1979, Northern Miner Press Limited, p.281).

In 1978, the Thunder Bay Amethyst Mining Company Limited commenced mining operations in May and continued until October. The mine, located in central McTavish Township, is a popular tourist attraction, visited by more than 20,000 people in 1978. An estimated 3,500 tons of amethystine material was mined; eight people were employed at the mine site (R. Hartviksen, president, personal communication).

The Algoma Development Company mined 12 tons of high-grade gold-copper ore from their property in Pifher Township during 1978. This company plans to have a 5-ton-per-day custom mill located in Thunder Bay by February 1979. The mill will handle hand cobbed ore from the Pifher Township property as well as ore from other small high-grade gold deposits in the area. The milling process will be non-chemical and only 'free' gold will be extracted. The resulting concentrate will be shipped to Noranda for further treatment. The mill will be portable and will employ 2 to 4 people (S. Cowan, personal communication).

In 1978, the $70 million Thunder Bay Terminal on McKellar Island was completed, highlighting the first large-scale effort to bring western coal to eastern Canada markets. Agreements between Ontario Hydro and Luscar-Sterco Limited call for the delivery of two million tons per year from a new mine at Coal Valley, in the Coalspur area of Alberta. Byron Creek Collieries Limited will supply 700,000 tons per year from their mine near Corbin, British Columbia. Beginning in 1979 the Manitoba and Saskatchewan Coal Company near Bienfait, Saskatchewan, will ship one million tons of lignite per year to Thunder Bay for use in the expanded generating station (Canadian Mining Journal, December 1978, p.39).

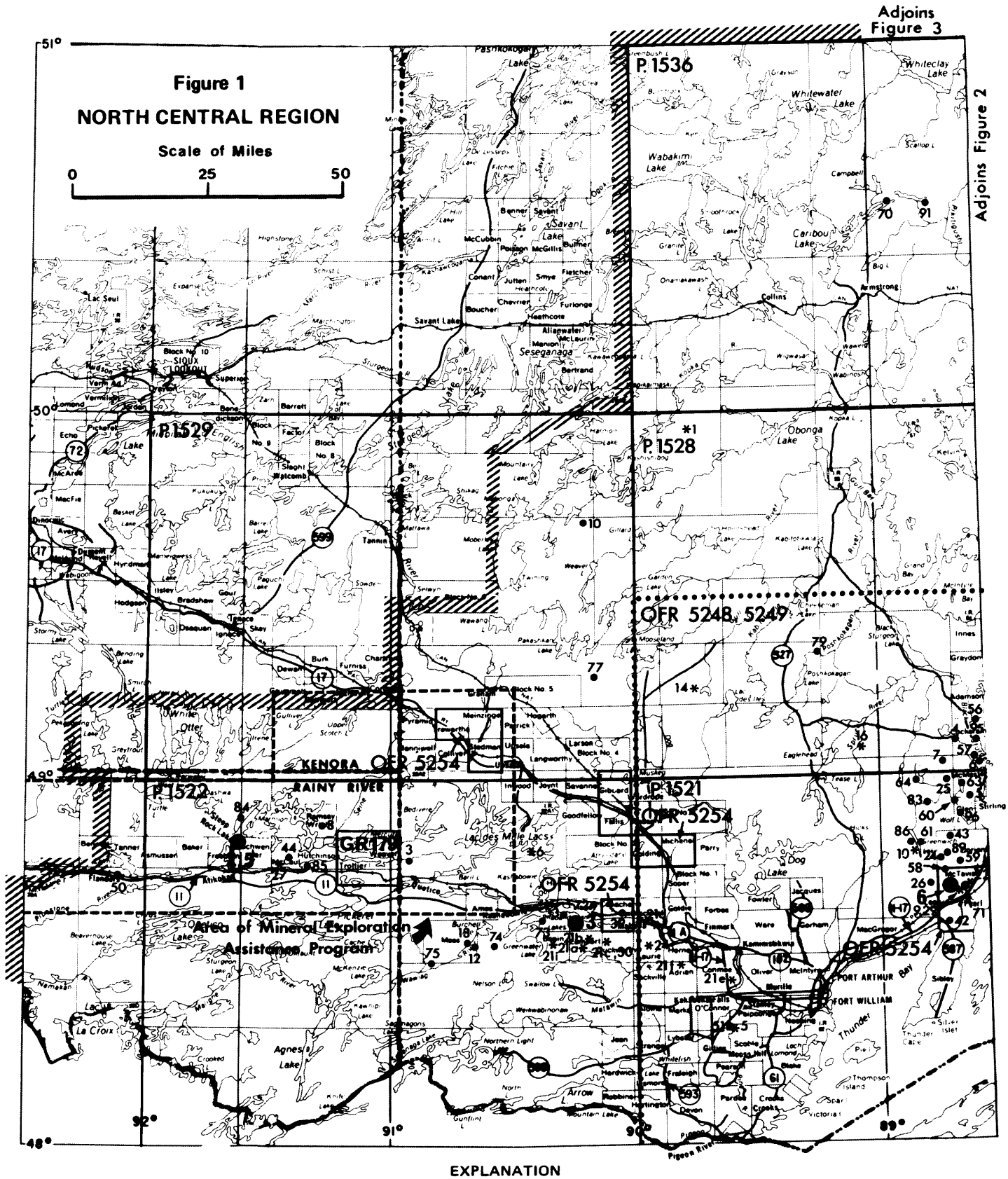
The Ontario Gem Company's amethyst property is located in the northeast section of Lot 12, McTavish Township and can be reached by taking a gravel road that intersects Highway 11-17 approximately 8.5 km (5.25 miles) northeast of the village of Pearl. The mine is situated at the end of the road, a distance of 3.2 km (2 miles). W. Miron (personal communication) estimated that about 5,000 persons visited the property in 1978, most of them between June and September. The mine is open from early spring to late fall. If the weather is not too severe, the mine is worked intermittently during the winter months. During early spring and late fall, mine production is geared towards rock and mineral dealers; in the intervening time the Ontario Gem Company caters to the tourist trade.

A gift shop and small manufacturing facility is planned for the 1979 tourist season. Current equipment consists of an 18" Ray Tech slab saw, several small trim saws, tumblers and polishers. Saleable minerals extracted from the property include amethyst, quartz, barite, galena, and chalcopyrite.

Several tons are extracted on a yearly basis. Amethystine material is hand sorted, cleaned, and graded as to size and quality. Manufactured items include bookends, pen holder slabs, clock face slabs, bracelets, and necklaces.

Uranium Exploration

Much of the claim staking related to uranium exploration was spurred by the release of data from a combined Federal-Provincial regional lake sediment and water geochemical reconnaissance survey, north shore of Lake Superior, and two summary reports, one by M. Franklin (1978) for the Geological Survey of Canada entitled "Uranium Mineralization in the Nipigon area, Thunder Bay District, Ontario", and, the other by M.W. Carter (1977) of the Ontario Geological Survey on the "Greenwich Lake Area, District of Thunder Bay".



EXPLANATION

- Map or report issued by the Ontario Geological Survey in 1978 (keyed to Table 3)
  - P - Preliminary Map
  - 2412 - Coloured Map
  - GR - Geoscience Report or OGS Report
  - OFR - Open File Report
- Boundary of North Central Region
- Exploration activity in 1978 (keyed to Table 3)
- * Assessment work filed in 1978 (keyed to Table 4)

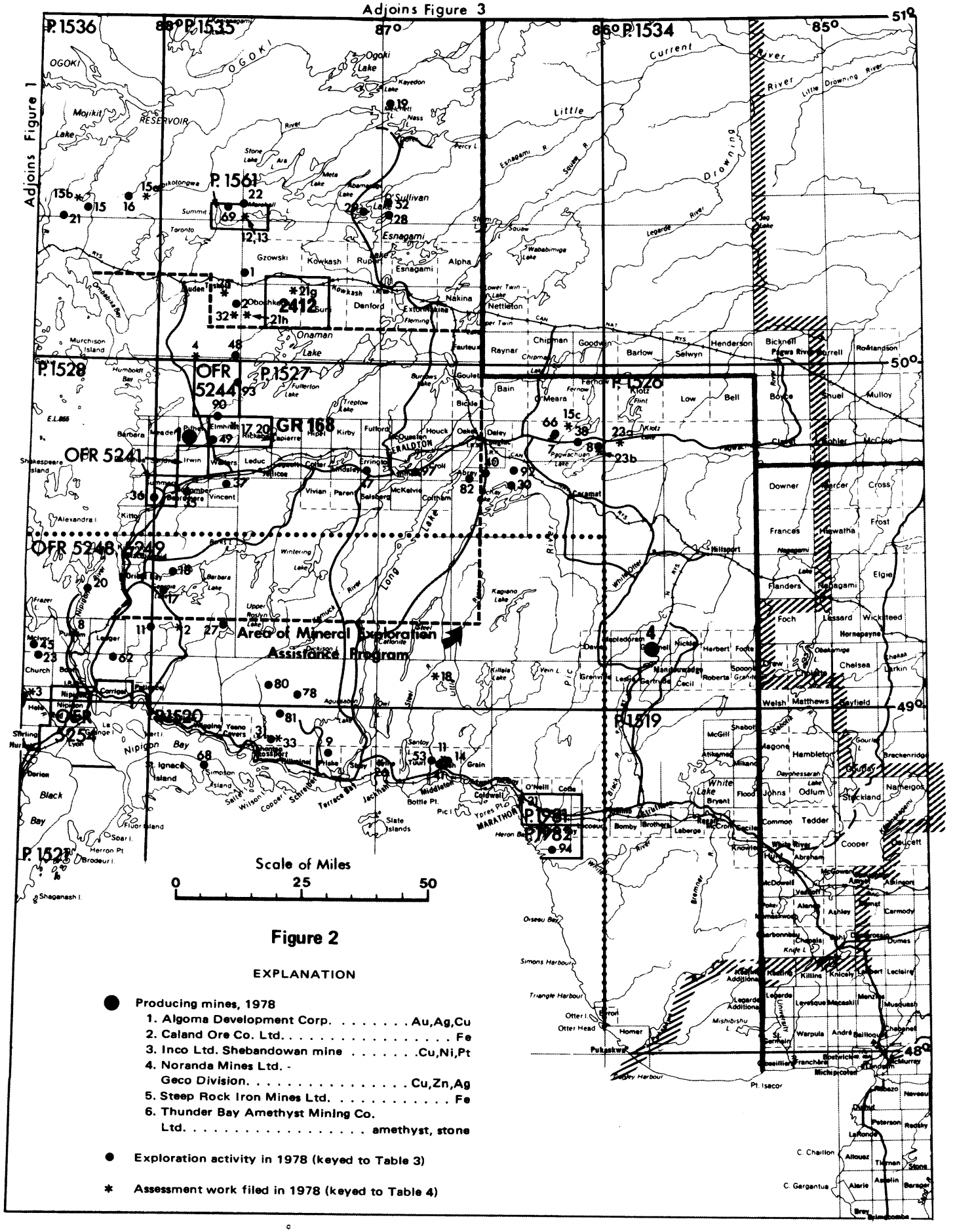


Figure 2

EXPLANATION

- Producing mines, 1978
  1. Algoma Development Corp. . . . . Au,Ag,Cu
  2. Caland Ore Co. Ltd. . . . . Fe
  3. Inco Ltd. Shebandowan mine . . . . . Cu,Ni,Pt
  4. Noranda Mines Ltd. - Geco Division. . . . . Cu,Zn,Ag
  5. Steep Rock Iron Mines Ltd. . . . . Fe
  6. Thunder Bay Amethyst Mining Co. Ltd. . . . . amethyst, stone
- ● Exploration activity in 1978 (keyed to Table 3)
- * Assessment work filed in 1978 (keyed to Table 4)

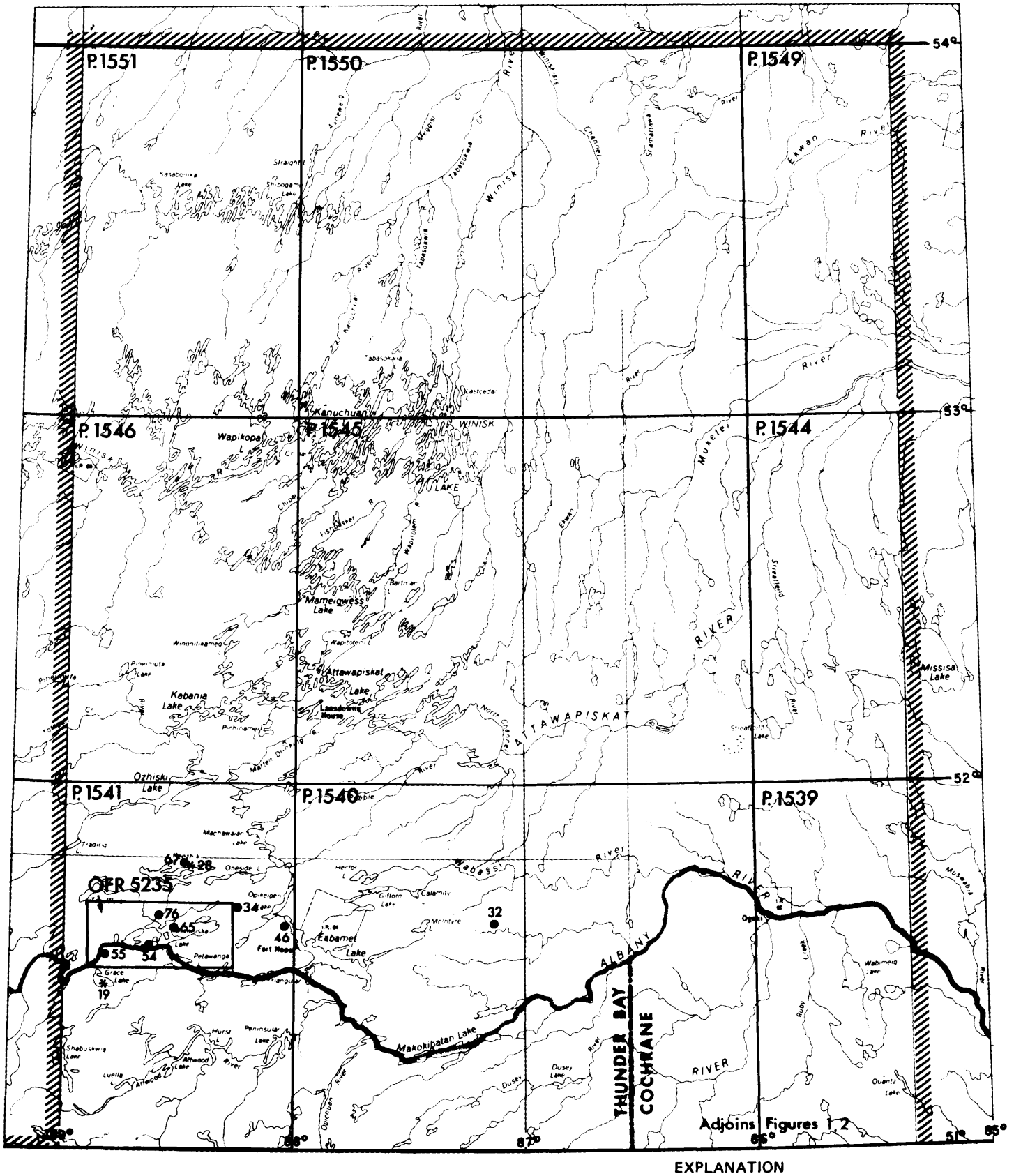


Figure 3

NORTH CENTRAL REGION

Drilling programs were undertaken by Greenwich Lake Explorations Limited at Greenwich Lake and Gulf Minerals Canada Limited in Walsh Township. Other companies and individuals active in uranium exploration in the area along the north shore of Lake Superior included Asarco Exploration of Canada, Cominco Limited, Camflo Mines Limited, Essex Mineral Company, David S. Robertson and Associates, Robert Fairservice, Kerr Addison Mines Limited, Lacana Mining Corporation, Norcen Energy Resource Limited, M.W. Rennick, New Insco Mines Limited, Shell Canada Resources Limited, J. Ternowesky, Uranerez Exploration and Mining Limited, Union Carbide Exploration Limited, and Union Oil Company of Canada Limited.

Lithium Exploration

In 1978, interest was shown in the potential for lithium in the North Central Region. Cominco Limited staked six known lithium pegmatite areas north and east of Lake Nipigon. Tantalum Mining Corporation of Canada Limited, Bird River Mines Company Limited, and R. Fairservice were also active in the region.

Gold Exploration

A diamond drilling program for gold mineralization was carried out by Metalore Resources Limited in Elmhirst Township, and by UMEX Corporation Limited in Duckworth Township.

Several previously known gold properties were reassessed in 1978. Feasibility studies and/or exploration work was done by: Geophysical Engineering Limited on the Consolidated Louanna Gold Mines Limited property at O'Sullivan Lake; T. Gledhill on the Leitch mine near Beardmore; Lynx-Canada Explorations Limited on the Magnet Consolidated mine near Geraldton; La-Chib Mines Limited on the Fort Hope Gold mine at Eabamet Lake; K. McTavish on the Mayflower mine at Flanders; A. Hopkins on gold occurrences in Summers, McComber, and Vincent Townships; Surveymin Limited on the area near the Sunbeam mine in Ramsay Wright Township; and Camflo Mines Limited on a gold occurrence at Snodgrass Lake in Moss Township.

Base Metal Exploration

During 1978, drilling programs for base metals were carried out by: Conwest Exploration Company Limited at Lac Des Mille Lacs; Imperial Oil Limited at Marshall Lake; and Rio Tinto Canadian Exploration Limited in the Burchell Lake area.

Other companies that were actively exploring for base metals in the region were Amax Potash Limited, Asarco Exploration Company of Canada, Beth-Canada Company Limited, Cominco Limited, Essex Mineral Company, Hanna Mining Company, Hudson Bay Exploration and Development Company Limited, Lynx-Canada Exploration Limited, New Jersey Zinc Exploration Company (Canada) Limited, Placer Development Limited, Price Company Limited, Selco Mining Corporation Limited, Shell Canada Resources Limited, and Texasgulf Canada Limited.

PROPERTY EXAMINATIONS

New Insco Mines Limited

New Insco Mines Limited has the Prairie Lake carbonatite-alkalic complex, a roughly circular intrusion of approximately 8.8 km^2 surface area, covered by 39 unpatented claims. Prairie Lake is located 39 km northeast of Terrace Bay. New Insco's 1977 Annual Report states that:

> "At Location "B", weighted averages of 7 drill holes outlined what could be a continuous zone of radioactive rock 450 feet by 22¼ feet, which above the 250 foot elevation may contain an average 1000 tons/vertical foot of material assaying 1.74 lbs./ton U_3O_8 with added credits of about 5 lbs. of niobium. We believe the ore zone stands near vertical and extends below the 450 foot elevation where DH No.17 averaged 0.74 lbs./ton U_3O_8 over a true width of 30 feet. . . .
>
> To detect niobium and phosphate minerals, portions of 8 holes were assayed in 10 foot sections; significant values were obtained in all (151) samples. Assays for 562 consecutive feet of core (400 foot true width) in drill hole No.P17 averaged 0.2% Nb_2O_5 and 4.2% P_2O_5."

In the summer of 1978, New Insco Mines Limited completed a magnetometer survey over the outer edge of the claim group. Prospecting and trenching were concentrated in the northwestern part of the property, where significant quantities of radioactive float analyzing 2 to 18 lbs./ton U_3O_8 have been located. In the fall of 1978, geologists from Union Oil Company of Canada Limited, David S. Robertson and Associates, and Korea visited the property. In December of 1978, New Insco Mines Limited hired the consulting firm of Barnett-McQueen Company Limited to do a feasibility study on the economics of shipping lime and phosphate to fertilizer plants in western Canada.

V. Ruzicka (1979, p.146) conducted laboratory work on samples from Prairie Lake and reported:

"During a spectrochemical examination of selected radioactive samples of ijolite from the Prairie Lake area that is being explored by New Insco Mines Limited, levels of 10 to 20 per cent P_2O_5, 0.5 to 1 per cent Nb, 0.15 to 0.20 per cent Nd, 0.3 per cent Sr, up to 0.1 per cent Zr, 0.2 to 0.3 per cent Ce, and up to 0.1 per cent La, were detected. Uranium contents, according to neutron activation, were in the range between 0.02 and 0.29 per cent U and thorium between 0.01 and 0.05 per cent Th."

Bird River Mines Company Limited

Bird River Mines Company Limited has a lithium occurrence 30.6 km northeast of Nipigon. The property is covered by seven unpatented claims. The occurrence, previously known as the M.N.W. Lithium Deposit, is described by Pye (1965, p.84-86).

The company signed an agreement with the firm of Jan de Poorter of Holland for 2 000 metric tons of lithium-bearing ore grading at least 4 percent Li_2O and containing less than 0.1 percent Fe_2O_3. J. Donner, property manager, states that if the ore is found to be satisfactory, the Holland firm may put in an order for an additional 10,000 metric tons a year. Donner estimates the reserves to be 100,000 metric tons of 4 to 6 percent Li_2O (personal communication).

Atkinson Occurrence

T. Atkinson has an amethyst-copper occurrence in the west-central part of Dorion Township. The showing is situated on claim 459918, in the NW¼ of the E½ of Lot 8, Concession XIII and lies just northwest of Furcate Lake.

A composite quartz vein system with an exposed width of 8 m was noted in a pit 7 m long, 2 m wide, and approximately 1½ m deep. The vein system has a strike-length of 128 m and strikes west with a vertical dip.

Mineralization consists of amethystine quartz, chalcopyrite, malachite, and azurite. Malachite occurs along fractures. Copper mineralization forms less than 1 percent of the total pit volume. Quartz crystals are pale purple to pale red and vary in size to as much as 4 cm across the base. Hematite-coated quartz crystals and black smoky quartz can also be found.

[1]Source Mineral Deposit Record, Geoscience Data Centre, Ontario Geological Survey.

RECOMMENDATIONS FOR EXPLORATION

Cobalt

A tight supply situation, due to a politically unstable climate in Zaire, coupled with a rising demand for cobalt, has caused the price of the metal to rise from $4.00 (U.S.) a lb. in early 1976 to around $45.00 (U.S.) a lb. on the free market, in late 1978 (Canadian Minerals Yearbook, 1976; Northern Miner, December 21, 1978, p.18).

A brief search into the assessment files and reference library on the cobalt occurrences in the North Central Region has revealed the following information:

1. Cobalt is recovered as a by-product from concentrates produced at the Shebandowan mine of Inco Limited (D. Moses, personal communication).

2. Interesting cobalt values have been reported in the area of the old Atikokan iron mine (26 km east of Atikokan). Analyses of drill cores, returned values of 32.7 percent soluble iron, 0.23 percent copper, and 0.7 0.71 lbs. cobalt per ton over an estimated true width of 81.8 feet (SMDR[1]000964). The main zone, estimated to contain 12,000,000 tons (Northern Miner, October 26, p.1), has been outlined on surface for a length of 3,800 feet and a width of at least 250 feet (Northern Miner, January 8, 1970, p.1 and 16). The Atikokan iron mine and three additional properties to the west have been indicated, by previous work, to contain 24,000,000 tons to a depth of just 300 feet of a minimum of 35 percent iron, 0.40 percent copper with nickel and cobalt indications (Northern Miner, October 26, 1972, p.1 and 17). G.P.B. Grabowski (1975, p.viii) reports that: (a). the deposit at the Atikokan iron mine represents a distal facies of the Steep Rock iron deposit on the basis of correlation of the amphibolite and "ashrock" along with the stratigraphic positions of the ore zones and related lithologic units; (b). The 'ore' consists of magnetite, pyrite, pyrrhotite, and minor chalcopyrite; (c). five samples of the pyrite contained an average trace element concentration of 1,964 ppm cobalt, 2,352 ppm copper, 1,354 ppm nickel, and 319 ppm zinc; five samples of the pyrrhotite contained an average of 781 ppm cobalt, 3,001 ppm copper, 1,670 ppm nickel, and 248 ppm zinc; and nine samples of the magnetite contained an average of 159 ppm cobalt, 169 ppm copper, 159 ppm nickel, and 184 ppm zinc.

3. The assessment files on Carndesson Mines indicates that drill hole H-43-69 on claim 2424 intersected 7.6 m (25 foot) wide mineralized section that contained 10 percent pyrrhotite, 1 percent chalcopyrite, and 1 percent pyrite. The mineralization was in a porphyry dike and in banded iron formation. This hole is directly south of the Headvue's "Main Zone" and is located just east of Macdonald Lake (Latitude 50°01'N and Longitude 87°43'W). A geophysical survey indicated that the

porphyry dike is 366 m (1,200 feet) long. Two trial samples ran 0.3 percent cobalt.

4. R. Shklanka (1969, p.332) reported that low-grade but widespread iron-copper-nickel-cobalt-platinum mineralization occurs within the serpentinite stock at Puddy Lake (Latitude 49°58′, Longitude 89°30′). A composite sample (2 samples) from diamond drill hole 7, by Commerce Nickel Mines Limited in 1968, analyzed 60.69 percent total iron, 0.59 percent nickel, 0.86 percent chromium and 0.06 percent cobalt. A composite sample (6 samples) from hole No.4 assayed 54.73 percent total iron, 0.61 percent nickel, 3.5 percent chromium and 0.06 percent cobalt. A second composite sample (3 samples) from hole number 7 analyzed 62.08 percent total iron, 0.65 percent nickel, 0.77 percent chromium and 0.07 percent cobalt (Regional Geologist's Files, Ontario Ministry of Natural Resources, Thunder Bay).

5. R. Shklanka (1969, p.340) stated that three grab samples from the Leitch prospect, which is an outcrop of anorthositic gabbro, east of Linsey Bay, Shabuskwia Lake (Latitude 51°10′, Longitude 88°55′) indicated from 0.50 to 2.30 percent copper, from 0.38 to 0.62 percent nickel and from 0.21 to 0.26 percent cobalt.

Gold

In 1976, W.O. Karvinen (1978, p.48 to 53) initiated a study of the spatial distribution of carbonate-rich rocks and their relation to gold deposits in the Timmins area. He concluded that: 1) two major and one minor carbonate-rich units, consisting mainly of ankerite and/or magnesite, quartz, chlorite and chlorite are present in the Timmins area; 2) all quartz-feldspar porphyries in the area occur along or near one of the carbonate-rich units and are intimately associated with them; 3) all deposits which produced gold in the area are located on or near the carbonate-rich rocks or the porphyries.

L.F. Kindle (1931, p.99 to 100), in describing a gold occurrence on claim TB 2730 on the north shore of Discovery Bay, O'Sullivan Lake, states:

> "Narrow quartz veins fill the fissures in a sheared quartz porphyry dike that outcrops for 110 feet along the shore of O'Sullivan Lake. . . .The country rock is greenstone, in which ankerite has developed across 30 feet at 10 feet west of the porphyry. . . . Gold values reported from a 5-foot and a 4-foot channel sample in the ankerite zone were $6 and $20, respectively (gold at approximately $20 an ounce). Horace Strong is said to have panned gold in the porphyry dike."

Based on the above description, it is recommended that the O'Sullivan Lake area be prospected for gold using Karvinen's indicators as a guide.

ONTARIO GEOLOGICAL SURVEY'S ACTIVITIES

The Howard Falls area, 250 km northeast of the city of Thunder Bay, was mapped in detail by S.E. Amukun. R.P. Sage undertook a program of investigating a number of diatreme structures north of Lake Superior. The Hemlo area, approximately 350 km from the city of Thunder Bay, was mapped in detail by T.L. Muir.

D. Innes has begun a study of Ontario's nickel resources and reserves and, in 1978, visited Puddy Lake (Cu-Ni-Fe), and the Shebandowan mine (Ni-Cu). In 1978, P.J. Whittaker began a study of chromium deposits in Ontario and visited Chrome Lake, Hagey Township and Pardee Township. S. Wilkinson started a study of the sulphide mineralization in the marginal phases of the Coldwell alkalic complex. W. MacRae, in May of 1978, initiated a study of the mineral deposits of the Atikokan area, the first phase of which comprised a study of the known gold occurrences.

E.V. Sado did a reconnaissance inventory of glacial material in the Nakina-Onaman Lakes area bounded by Latitudes 50°00′ and 50°30′N and Longitudes 86°00′ and 88°00′W.

RESEARCH BY OTHER ORGANIZATIONS

Graduate theses recently completed, that deal with the region, include:

1. Analysis of strain, shape and orientation of a deformed greywacke and conglomerate from the Shabaqua Corners area, Ontario, by Roman Tykajlo, 1978, Lakehead University, B.Sc. thesis.

2. Geology and Mineralogy of the Beaver Junior Mine, Mainland Belt Silver Region, Thunder Bay District, by Brian Cole, 1978, Lakehead University, B.Sc. thesis, 54p.

3. The Long Lake Diversion: An Environmental Evaluation by Simon Peet, 1978, University of Waterloo, M.Sc. thesis, 270p.

4. Geology and Mineralogy of the Rabbit Mountain Mine, Mainland Belt Silver Area, Thunder Bay District, by Eric Mosley, 1977, Lakehead University, B.Sc. thesis.

Graduate theses in progress in the region include:

1. Genesis of the ore at the Shebandowan mine, by P. Morton, Carleton University; Ph.D. thesis.

2. Structural analysis of the central part of the Shebandowan metavolcanic-metasedimentary belt: a summary report, by G.M. Stott, University of Toronto; Ph.D. thesis.

3. Geological study of Archean iron formation at Kaministikwia by F. Stolzenbert, University of Hamburg,

West Germany; M.Sc. thesis.

4. Geological study of the Gunflint Formation rocks in the Kakabeka Falls area, by C. Muencheberg, University of Hamburg, West Germany; M.Sc. thesis.

5. Precambrian stratigraphy of the Kaministikwia area, Thunder Bay District, by J.K. Mason, Lakehead University, M.Sc. thesis.

6. Geology of the Red Sucker Cove area, Coldwell Alkalic Complex, by H. Christmann, Lakehead University, B.Sc. thesis.

7. Geology, petrology and structure of the MacKenzie River Granite, by J. Rogers, Lakehead University, B.Sc. thesis.

8. Geology and uranium potential of the Good Morning Lake Fault area, by G. Yule, Lakehead University, B.Sc. thesis.

Dr. P.R. Mainwaring from Carleton University is studying assimilation of the country rocks at, and genesis of the Zenith zinc deposit, Schreiber, Ontario.

Dr. S.A. Kissin from Lakehead University is studying the silver deposits in the Thunder Bay area.

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TABLE 2 MAPS AND REPORTS PERTAINING TO THE THUNDER BAY MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES IN 1978.

ONTARIO GEOLOGICAL SURVEY REPORT
- GR 168
- GR 179

OPEN FILE REPORTS
- OFR 5254
- OFR 5249
- OFR 5248
- OFR 5244
- OFR 5235
- OFR 5241

COLOURED MAPS
- 2405
- 2412

PRELIMINARY MAPS – MINERAL POTENTIAL
- P.1519
- P.1520
- P.1521
- P.1522
- P.1526
- P.1527
- P.1528
- P.1529
- P.1534
- P.1535
- P.1540
- P.1541
- P.1544
- P.1545
- P.1546
- P.1549
- P.1550
- P.1551

PRELIMINARY MAPS – GEOLOGICAL SERIES
- P.1561
- P.1981
- P.1982

TABLE 3 **Exploration activity in 1978.**

Number on Figure	Individual or Company	Type of Work
1.	Amax Potash Limited	Claim staking, airborne magnetometer survey, Gzowski Township
2.	Amax Potash Limited	Claim staking, prospecting, west of Oboshkegan Township
3.	Asarco Exploration Company of Canada	Exploration work, east of Weaver Township
4.	Asarco Exploration Company of Canada	Claim staking, magnetometer survey, Cockeram Township
5.	Asarco Exploration Company of Canada	Magnetometer survey, exploration work, southwest McMaster Township
6.	Asarco Exploration Company of Canada	Magnetometer survey, exploration work, northeast McMaster Township
7.	Asarco Exploration Company of Canada	Magnetometer survey, exploration work, west of McMaster Township
8.	Aube, Armand	Claim staking, north of Pagwachuan Lake
9.	Ayrhart, J. E.	Claim staking, Priske Township
10.	Beth-Canada Company Limited	Claim staking, exploration work, east of Metionga Lake
11.	Bird River Mines Company Limited	Trenching, sampling, negotiating with Holland firm over lithium property, west of Cosgrave Lake
12.	Brown, Philip	Claim staking, Moss Township
13.	Camflo Mines Limited	Geophysical and geological surveys, Moss Township
14.	Camflo Mines Limited	Claim staking, geological survey, Walsh Township
15.	Cominco Limited	Claim staking, lithium occurrences, Crescent Lake area
16.	Cominco Limited	Claim staking, lithium occurrences, Falcon Lake area

Number on Figure	Individual or Company	Type of Work
17.	Cominco Limited	Claim staking, lithium occurrences, Georgia Lake area
18.	Cominco Limited	Claim staking, lithium occurrences, Jean Lake area
19.	Cominco Limited	Geological mapping, line cutting, Melchett Lake area
20.	Cominco Limited	Claim staking, lithium occurrences, Nipigon River area
21.	Cominco Limited	Claim staking, lithium occurrences, Seymour Lake area
22.	Coyne, Glen	Claim staking, northwest of Marshall Lake
23.	Essex Minerals Company	Claim staking, exploration work, Church Township
24.	Essex Minerals Company	Claim staking, exploration work, Dorion Township
25.	Essex Minerals Company	Claim staking, exploration work, west of McMaster Township
26.	Essex Minerals Company	Claim staking, exploration work, west of Dorion Township
27.	Fairservice, Robert	Claim staking, prospecting, west of Upper Roslyn Lake
28.	Gagnon, Frank	Claim staking, prospecting, trenching, O'Sullivan Lake area
29.	Geophysical Engineering Limited	Feasibility study of gold property, Consolidated Louanna Gold Mines Limited, O'Sullivan Lake area
30.	Gibson, James	Claim staking, McKay Lake area
31.	Halonen, John	Claim staking, prospecting, north of Lahontan Township
32.	Hanna Mining Company, The	Airborne geophysical survey, geological survey, claim staking, east of McIntyre Lake
33.	Hayne, William	Claim staking, assaying, Haines Township
34.	Henry, Tom	Prospecting, west of Opikeigen Lake
35.	Hopkins, Albert	Claim staking, exploration work, McComber Township
36.	Hopkins, Albert	Claim staking, exploration work, Summers Township
37.	Hopkins, Albert	Claim staking, exploration work, Vincent Township
38.	Hussey, John	Claim staking, north of Pagwachuan Lake
39.	Ivanov, Steve	Claim staking, Cona cher Township
40.	Jarzylo, S.	Prospecting, east and south of Longlac
41.	Kaye, Leslie	Claim staking, Walsh Township
42.	Kerr Addison Mines Limited	Claim staking, geological, geochemical and radiometric surveys, McTavish Township
43.	Kovac, James	Claim staking, prospecting, Dorion Township
44.	Kremko, Myron	Claim staking, McCaul Township
45.	Lacana Mining Corporation	Claim staking, exploration work, McIvor Township
46.	La-Chib Mines Limited	Claim staking, E.M. and magnetometer survey, Fort Hope Gold Mine, Eabamet Lake area
47.	Lynx-Canada Exploration Limited	Claim staking, re-assess Magnet Consolidated Mine, Errington Township
48.	Lynx-Canada Exploration Limited	Back hoeing, boulder trace survey, prospecting, west of Onaman Lake
49.	Maruska, E.	Claim staking, Elmhirst Township
50.	McTavish, Ken	Claim staking, re-assess Mayflower Gold Mine, west of Flanders
51.	McWilliams, P.	Diamond drilling, Beaver Mine, O'Connor Township
52.	Megan, Angus	Claim staking, prospecting, O'Sullivan Lake area
53.	Moses, Alphonses	Claim staking, Walsh Township
54.	New Jersey Zinc Exploration Company (Canada) Limited	Claim staking, exploration work, Miminiska Lake area
55.	New Jersey Zinc Exploration Company (Canada) Limited	Claim staking, exploration work, southwest of Miminiska Lake area
56.	Norcen Energy Resources Limited	Claim staking, exploration work, Adamson and Cockeram Townships area
57.	Norcen Energy Resources Limited	Claim staking, exploration work, Cockeram and McMaster Townships area
58.	Norcen Energy Resources Limited	Claim staking, exploration work, southwest corner of Dorion Township
59.	Norcen Energy Resources Limited	Claim staking, exploration work, southcentral portion of Dorion Township

Number on Figure	Individual or Company	Type of Work
60.	Norcen Energy Resources Limited	Claim staking, exploration work, Glen Township
61.	Norcen Energy Resources Limited	Claim staking, geophysical survey, exploration work, Greenwich Lake area
62.	Norcen Energy Resources Limited	Claim staking, exploration work, south of Ledger Township
63.	Norcen Energy Resources Limited	Claim staking, exploration work, McMaster Township
64.	Norcen Energy Resources Limited	Claim staking, exploration work, west of McMaster Township
65.	Picklands Mather and Company	Assess iron deposit, Miminiska Lake area
66.	Placer Development Limited	Claim staking, south of O'Meara Township
67.	Polson, Gordon	Claim staking, Keezhik Lake area
68.	Porter, Joseph	Claim staking, exploration work, St. Ignace and Simpson Islands area
69.	Price Company Limited	Geophysical survey, Summit Lake area
70.	Randa, Ty	Claim staking, Caribou Lake area
71.	Rennick, Melville	Geological, geophysical and geochemical surveys, McTavish Township
72.	Richter, John	Prospecting, Hagey Township
73.	Rio Tinto Canadian Exploration Limited	Geological and geophysical surveys, Greenwater Lake area
74.	Rio Tinto Canadian Exploration Limited	Airborne geophysical survey, diamond drilling, east of Burchell Township
75.	Rio Tinto Canadian Exploration Limited	Airborne geophysical survey, diamond drilling. Moss Township
76.	River of Gold Mining Corporation Limited	Claim staking, north of Miminiska Lake
77.	Selco Mining Corporation Limited	Prospecting, Graham - Mooseland Lake area
78.	Selco Mining Corporation Limited	Claim staking, airborne geophysical survey, northwest of Aguasabon Lake
79.	Selco Mining Corporation Limited	Prospecting, Poshkokagan Lake area
80.	Selco Mining Corporation Limited	Claim staking, airborne geophysical survey, northeast of Yesno Township
81.	Selco Mining Corporation Limited	Claim staking, east of Yesno Township
82.	Shell Canada Resources Limited	Claim staking, Abrey Township area
83.	Shell Canada Resources Limited	Claim staking, airborne radiometric survey, exploration work, north of Greenwich Lake
84.	Shell Canada Resources Limited	Claim staking, geophysical survey, Finlayson Lake area
85.	Staines, Bruce	Claim staking, McCaul and Hutchinson Township
86.	Starr, Eugene	Claim staking, exploration work, Greenwich Lake area
87.	Surveymin Limited	Claim staking, Ramsay Wright Township
88.	Teck Corporation Limited	Removing waste material from Leitch Gold Mine for smelter feed, Eva Township
89.	Ternowesky, John	Geological and radiometric survey, Dorion Township
90.	Ternowesky, John	Claim staking, assaying, Elmhirst Township
91.	Texasgulf Canada Limited	Claim staking, exploration work, Linklater Lake area
92.	Thompson, Sidney	Claim staking, McKay Lake area
93.	Thornsteinson, D. and Cox, N.	Claim staking, exploration work, southwest of Onaman Lake
94.	Transtar Mines Limited	Airborne magnetometer survey, assaying (TiO_2) south of Pic Township
95.	Uranerez Exploration and Mining Limited	Claim staking, exploration work, Cockeram Township
96.	Uranerez Exploration and Mining Limited	Claim staking, exploration work, Glen Township
97.	Wilson, Alexander	Claim staking, Ashmore Township

TABLE 4 Assessment work and other information received in 1978.

ABBREVATIONS

Air	Airborne Survey	BM	Base Metals (Cu, Zn, Pb)
Assess.	Assessment Work	Cu	Copper
5 ddh 1766'	5 diamond drill holes totalling 1766 feet	U	Uranium
Geol.	Geological Survey	Ag	Silver
Geochem.	Geochemical Survey	Amy	Amethyst
Geophy.	Geophysical Survey	St	Building Stone
Rad.	Radiometric Survey	Phos.	Phosphates
Mag.	Magnetometer Survey	Au	Gold
EM	Electromagnetic Survey	Co	Cobalt
I.P.	Induced Polarization Survey	Mo	Molybdenum

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	MAP
Whitebirch Lake Area	52H13/SW/SE	Amax Explorations Inc.	BM	Assess	5 DDH 1766'	1976	1
Cosgrave Lake Area (M1684)	42E4/NW	Aspen Explorations Inc.	Cu	Assess	7 DDH 2289'	1977	2
Hele Twp.	52H2	BP Minerals Ltd.	U	Assess	Geol.,Geochem.,Geophy(Radiometric)	1976	3
Elbow Lake Area (M1404)	42L4/SW	Canadian Nickel Co. Ltd.	BM	Assess	Mag., Geol.	1977	4
Paipoonge/Scoble/Gillies Twps.	52A5/SE	Cairngorm Mines Ltd.	Ag	Assess	EM	1977	5
Henderson Lake Area (M2399)	52B16/SW	Conwest Exploration Co. Ltd.	BM	Assess	1 DDH 327'	1978	6
Castlebar Lake Area (M2477) & Lukinto Lake Area (M2491)	42E16/SE	Dora Explorations Ltd.	BM	Assess	Air EM., Air Mag.	1977	7
Purdom Twp.	52H1/NW	Falconbridge Nickel Mines Ltd.	U	Assess	Airb. Radiom.	1977	8
McTavish Twp. (M1812)	52A10/NE	Godzik, Alex	Amy	Assess	Manual	1977	9
Greenwich Lake Area (M2621)	52A15/SW	Greenwich Lake Explorations Ltd.	U	Assess	20 DDH 3747'	1978	10
Walsh Twp. (M1928)	42D15/SE	Gulf Minerals Canada Ltd.	U	Assess	1 DDH -	1978	11
Summit Lake Area (M1406)	42L5/NE	Imperial Oil Ltd.	BM	Assess	2 DDH 534' 16 DDH 4643' 2 DDH 546' Trenching	1977	12
Summit Lake Area (M1406)	42L5/NE	Giant Gripp Mines Ltd.	BM	Assess	5 DDH 1266'	1977	13
Tib Lake Area (M2911)	52H4/NW	Kuhner, K.C.	BM	Assess	1 DDH 496'	1977	14
Falcon Lake Area (M1787)	52I8/NE	Mattagami Lake Mines Ltd.	BM	Assess	Linecutting, Mag., EM	1977	15a
Crescent Lake Area (M2609)	52I8/NW	Mattagami Lake Mines Ltd.	BM	Assess	EM., Mag.	1977	15b
Castlebar Lake Area (M2477)	42E16/SE	Mattagami Lake Mines Ltd.	BM	Assess	EM., Mag. 4 DDH 1793', Assays	1977	15c
Eaglehead Lake Area (M2639)	52H13/SE	McAteer, William	St	Assess	Powerstripping, trenching	1977	16
Kaby Lake Area (M1873)	42E13/SE	Metalore Resources Ltd.	Au,Ag,Cu	Assess	1 DDH 130'	1978	17
Killala Lake Mines (M2681)	42E2/SE	New Insco Mines Ltd.	U, phos.	Assess	29 DDH 10,047' 3 Reverse Circulation Holes 345' Assays, Geol. Maps	1977	18
Miminiska Lake (M1859, 2323, 2324, 3174, 3186, 3189, 3190)	52P6, 7, 8	New Jersey Zinc Explor. Co.(Canada) Ltd.	BM	Assess	Air Mag.	1977	19
Kaby Lakes Area (M1873)	42E13/SE	New Metalore Mining Co. Ltd.	Au,Ag,Cu	Assess	Trenching GB-66	1977	20
Lamport Twp. (M1790)	52B9/SW/SE	Noranda Exploration Co. Ltd.	BM	Assess	Mag., EM	1977	21a
Lamport Twp. (M1790)	52B9/SW/SE	Noranda Exploration Co. Ltd.	BM	Assess	Mag., EM	1977	21b
Duckworth Twp. (M1703)	52B9/SE	Noranda Exploration Co. Ltd.	BM	Assess	EM., Mag.	1978	21c
Blackwell Twp. (M1658) & Laurie Twp. (M1792)	52A12/SW	Noranda Exploration Co. Ltd.	BM	Assess	Geochem., Geol.	1976	21d
Conmee Twp. (M1683)	52A5/NE	Noranda Exploration Co. Ltd.	BM	Assess	I.P.	1976	21e
Adrian Twp. (M1625)	52A5/NW	Noranda Exploration Co. Ltd.	BM	Assess	EM., Mag. (CEM, VLEM)	1977	21f
Oboshkegan Twp. (M1413)	42L4	Noranda Exploration Co. Ltd.	BM	Assess	Geol.	1977	21g
Oboshkegan Twp. (M1413)	42L4/NE	Noranda Exploration Co. Ltd.	BM	Assess	EM	1976	21h
Begin Twp. (M1648)	52B9/SW	Noranda Exploration Co. Ltd.	BM	Assess	EM., Mag.	1977	21i

. . .3

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	MAP
McTavish Twp. (M1812)	52A10/NE	Noyes, G.	Amy	Assess	Trenching	1978	22
Klotz Lake Area (M2868)	42F13/SW	Otto, H. H. & Otto, L. J.	Au	Assess	5 DDH 1224'	1978	23a
Kassigimini Lake (M2290)	42F12/NW	Otto, H. H. & Otto, L. J.	Au	Assess	1 DDH 180'	1978	23b
Laurie Twp. (M1792)	52A12/SW	Rayrock Mines Ltd. (Caltor Syndicate)	BM,Au	Assess	Prospectus	1973	24
Metcalfe Lake Area (M1408)	42L4/NE	Ross, Cameron	BM	Assess	Trenching and sampling, assays	1976	25
Syine Twp. (M1930)	42D15/SW	Stachiw, W.	Au	Assess	Trenching	1978	26
McCaul Twp. (M2382)	52B14/SW	Staines, Bruce L.	Co	Assess	1 DDH 112.4' (100.1' reported previously)	1978	27
Keezhik Lake Area (M2330)	52P16/SW	Stanford Mines Ltd.	BM	Assess	DDH 2098'	1977	28
McTavish Twp. (M1812)	52A10/NE	Thompson, William J.	Amy	Assess	1 DDH 101.0'	1978	29
Duckworth Twp. (M1703)	52B9/SE	Union Miniere Exploration and Mining Corp. Ltd.	Au	Assess	2 DDH 500'	1978	30
Pic Twp. (M1860)	42D9/NW	Wilkinson, Donald	St	Assess	2 DDH 129'	1978	31
Metcalfe Lake Area (M1408)	42L4/NE	Yzerdraat, Walter	BM	Assess	Mag., Radiom.	1977	32
Pays Plat Area (M2522)	42D14/NW	Zenmac Metal Mines Ltd.	Mo,Au,Cu	Assess	Geol., Trench.	1970	33

1978 Report of Northern Regional Geologist and Timmins Resident Geologist

L.A. Tihor[1] and D.S. Hunt[2]

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TABLES

FIGURES

INTRODUCTION

Mineral exploration expenditures in the Northern Region fell to approximately $3,209,000 in 1978 from $4,883,000 in 1977. Of this, $400,000 in 1978 and $1.5 million in 1977 was spent on delineating mineral deposits. The remainder was spent on concept evaluation. Claim staking was marginally up at 5,333 claims from 4,264 in 1977. These figures reflect a continuing low level of exploration which began in the early 1970s.

The outlook for the next year or two, however, is encouraging. Most companies have reported significantly higher exploration budgets in this region for 1979. In addition, markets have improved markedly for copper, zinc, lead, and the precious metals (January 1979). There are indications that lithium, a long neglected metal, is being actively pursued by some companies.

In the Timmins Resident Geologist's district, claim staking is up slightly at 3,623 compared to 2,438 claims in 1977.

REGIONAL GEOLOGIST'S ACTIVITIES

Staff at the Timmins office included: L.A. Tihor, Regional Geologist, D.S. Hunt, Resource Geologist, and K. Burke, Secretary.

In addition to routine consultative office duties, staff members were involved in:

1. Preparation of Data Series Maps, primarily from assessment file data.
2. Property examinations including mineral occurrences and producing mines.
3. Conducting and attending geological field trips.
4. Participating in geological discussion group sessions.
5. Providing geological input to lake plans, municipal, and other land use plans.
6. Participating in development of the Northeastern Ontario Strategic Land Use Plan.
7. Input in development of the proposed new Mining Lands Act.
8. Retrieval and storage of about 9 000 m of exploration diamond drill core.

Drill Core Collection Program, 1978:

Representative samples from 30,154 feet (9 187 m) of drill core were added to the core library during 1978. A small amount of core was submitted for assessment

[1]Regional Geologist, Ontario Ministry of Natural Resources, 60 Wilson Avenue, Timmins, P4N 3W2.
[2]Resource Geologist.

credits, however most was donated by the following companies or individuals: R. Allerston, Amoco Canada Petroleum Company Limited, R. Middleton, and Rosario Resources Canada Limited.

The 1978 additions to the Regional Core Library are summarized in Table 4.

OPERATING MINES

Base Metals

On November 10th Texasgulf Canada Limited completed their $31 million No.2 Mine shaft. The new shaft is 5,105 feet deep and 25 feet in diameter. Ore from the No.2 Mine will increase production from the present 10,000 tons per day (TPD) to 13,500 TPD by 1981. Also expected in 1981 is completion of a new $275 million copper smelter and refinery complex capable of initial annual production of 65,000 tons of refined copper.

Weak metal prices, especially for zinc, forced a month long shutdown of the Texasgulf mine during July 1978. However, with strong increases in prices of zinc, copper, and silver during January, 1979 and low operating costs for an underground mine the future looks excellent for Texasgulf.

Tonnage milled during 1978 totalled 3.3 million. The breakdown in terms of individual metals was not yet available during preparation of this report, however, during 1977 the operation produced 243,500 tons of copper concentrates, 31,000 tons of lead concentrates, 436,000 tons of zinc concentrates and 91,000 tons of zinc metal, 8.9 million ounces of silver, 2.2 million pounds of cadmium, and 372,000 pounds of tin contained in concentrates (Timmins Press, 1978b). Total employment by Texasgulf including mining and metallurgy is 2,130.

Copper-gold production at Pamour's Schumacher Division is discussed under "Precious Metals".

Poor nickel markets and large stockpiles of nickel forced closure of the Langmuir Mine March 31st, 1978. The mine is owned jointly by the Noranda Group and Inco Limited. Prior to closure, production was at the rate of 750 TPD grading about 1.6 percent nickel. Reserves remain at about 600,000 tons averaging 1.45 percent nickel (Timmins Press 1978a). Most of the 109 employees displaced by closure were transferred to other operations within the Noranda Group.

Precious Metals

Dome Mines enjoyed a very profitable year in 1978, primarily due to a higher gold price. For the first nine months of 1978, 1,112,764 tons were produced grading an average 0.24 oz. gold per ton compared to 1,109,585 tons grading 0.25 oz. per ton for the same period in 1977 (Northern Miner 1978d). Reserves are being maintained at about 2 million tons grading roughly 0.22 oz. gold per ton. Employment at Dome is 624, up from 560 a year ago.

Dome is an unusually shallow mine considering its almost 70 years of existence. Production is from all levels down to 2,900 feet. Longhole mining is the principal method used, accounting for roughly 50 percent of production. Cut-and-fill panel stoping comprises 30 percent and the balance consists of straight narrow cut-and-fill and a few small shrinkage stopes. There has been a trend over the last 8 years at Dome to greater mechanization with larger equipment.

Pamour Porcupine Mines Limited has held tenaciously to the philosophy that their continued existence as a gold producer depends on maintaining near capacity mill production regardless of short term fluctuations in the price of gold. In line with this philosophy, since 1971 Pamour has made numerous property acquisitions as proven ore reserves at the respective properties were depleted to the point where separate milling operations were uneconomic and the mines were about to be closed. This expansionist behaviour during a period of low gold prices in the mid-1970s resulted in an accumulated debt of $11.8 million. The last year, however, has proven the farsightedness of Pamour's policies. Near capacity production and an average price of $207 (U.S.) per ounce of gold in 1978 has allowed Pamour to pay off most of this debt. They are now in the position of being able to confidently predict at least another three years of profitable production at full mill capacity.

Pamour is presently operating six deep shaft mines as well as several surface properties in the Porcupine area. Total employment including mining and milling is 1,005, up marginally from 958 a year ago (personal communication, Pamour Porcupine Mines Limited).

Ore from all Pamour properties is milled at either of two large mills. Ore containing significant amounts of copper or graphite is processed at the Schumacher mill (3,000 TPD). This includes ore from the Ross Mine and the Schumacher Division. "Clean" gold ore may be treated at the Pamour No.1 Mill (3,000 TPD) or at the Schumacher mill.

Pamour's total production for 1978 was 2,000,009 tons averaging 0.092 ounces gold per ton, 0.113 percent copper, and 0.056 ounces silver per ton. This compares with 1977 production of 1,997,257 tons grading 0.093 ounces gold per ton, 0.178 percent copper, and 0.047 ounces silver per ton (personal communication, Pamour Porcupine Mines Limited).

Pamour No.1 (the former Pamour) is the lowest grade, continuously producing, still developing underground gold mine in the world. During 1978, this mine produced 782,549 tons grading an average 0.083 ounces

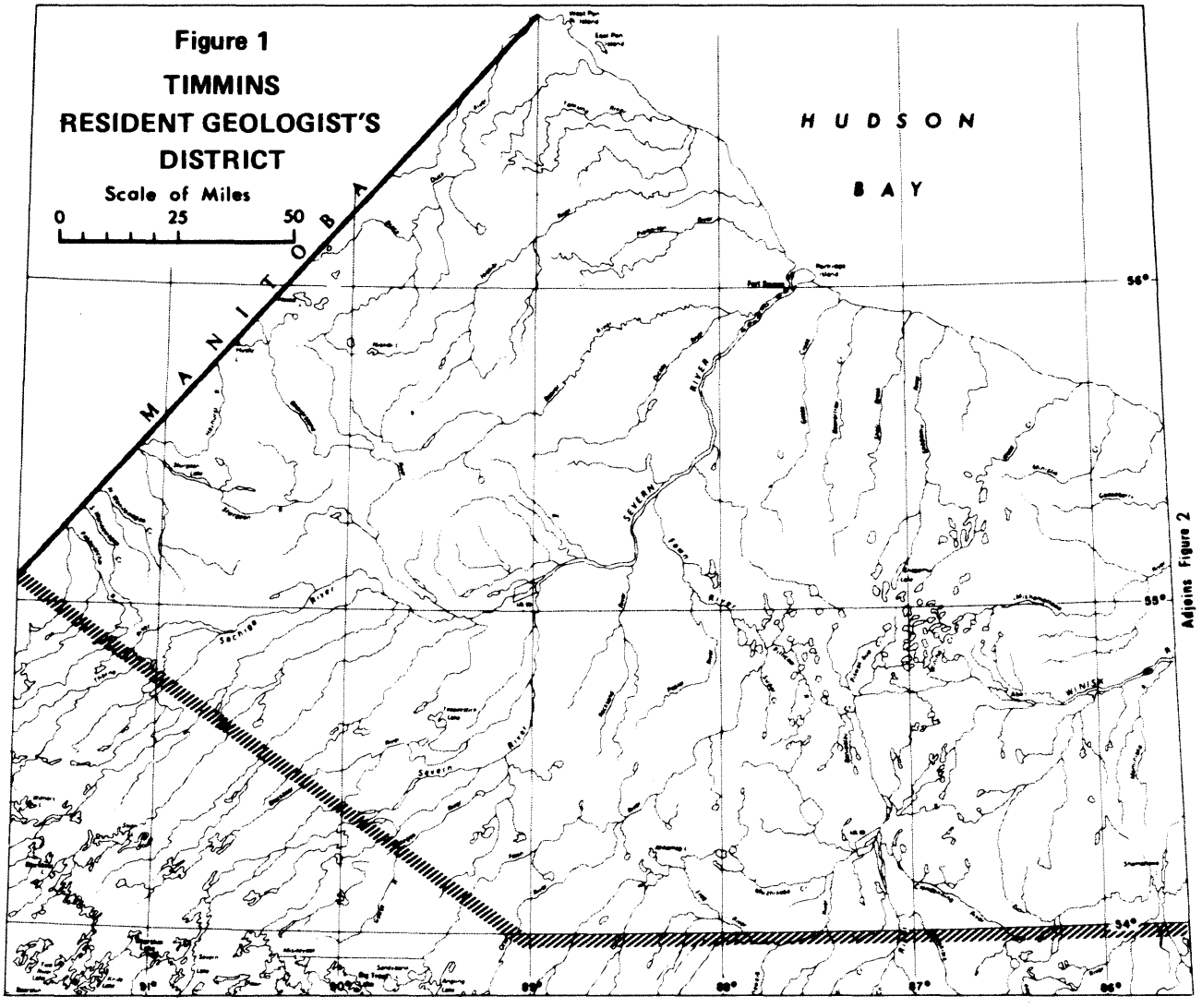
Figure 1
TIMMINS
RESIDENT GEOLOGIST'S
DISTRICT
Scale of Miles
0 25 50
HUDSON
BAY
MANITOBA
Adjoins Figure 2

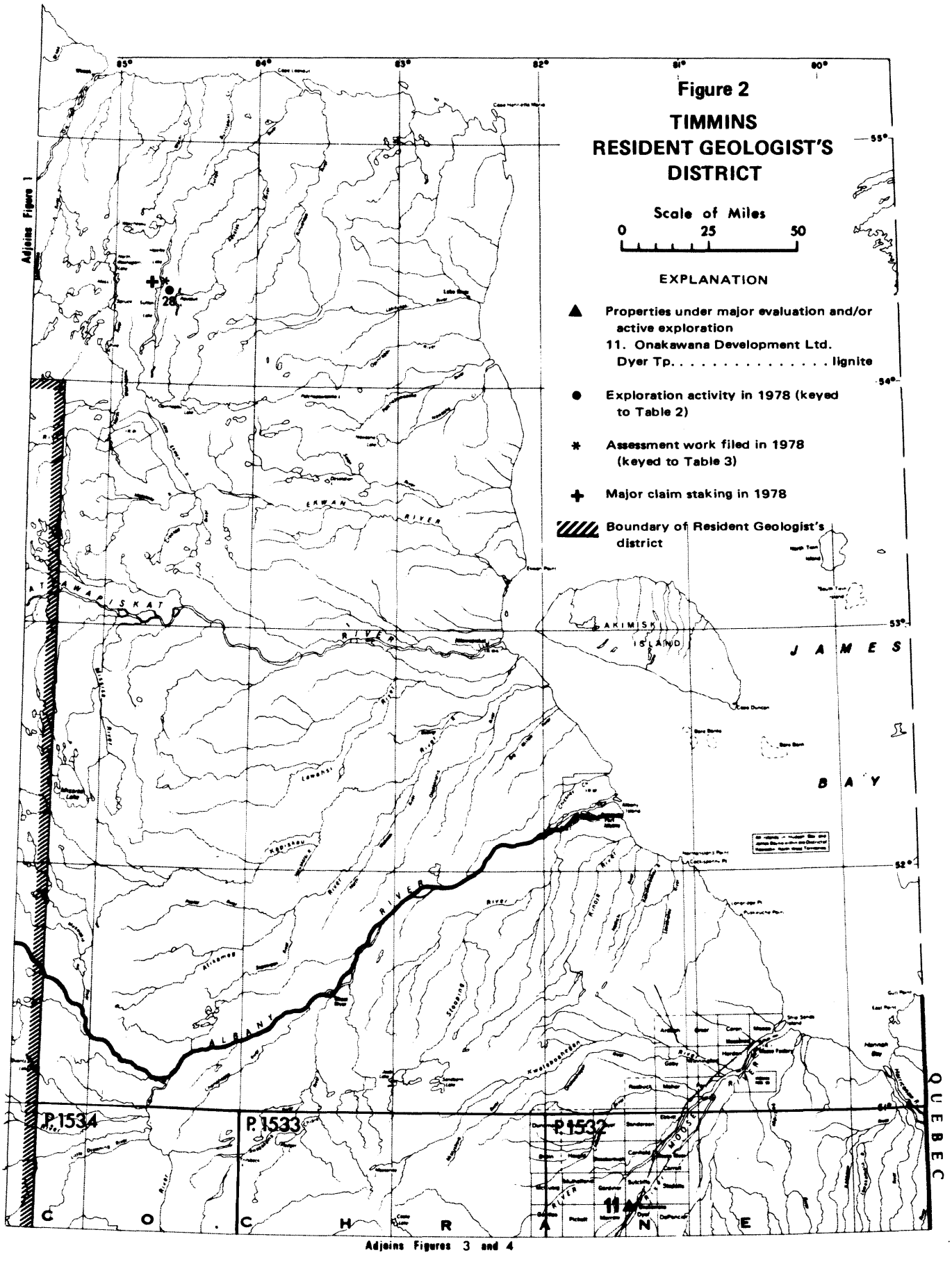
Figure 2
TIMMINS
RESIDENT GEOLOGIST'S
DISTRICT
Scale of Miles
0 25 50
EXPLANATION
Properties under major evaluation and/or active exploration
11. Onakawana Development Ltd.
Dyer Tp. . . . . lignite
Exploration activity in 1978 (keyed to Table 2)
Assessment work filed in 1978 (keyed to Table 3)
Major claim staking in 1978
Boundary of Resident Geologist's district
Adjoins Figure 1
Adjoins Figures 3 and 4
P.1534
P.1533
P.1532
ALBANY RIVER
EKWAN RIVER
ATTAWAPISKAT RIVER
AKIMISKI ISLAND
JAMES BAY
QUEBEC
CHAPLEAU
MOOSE RIVER

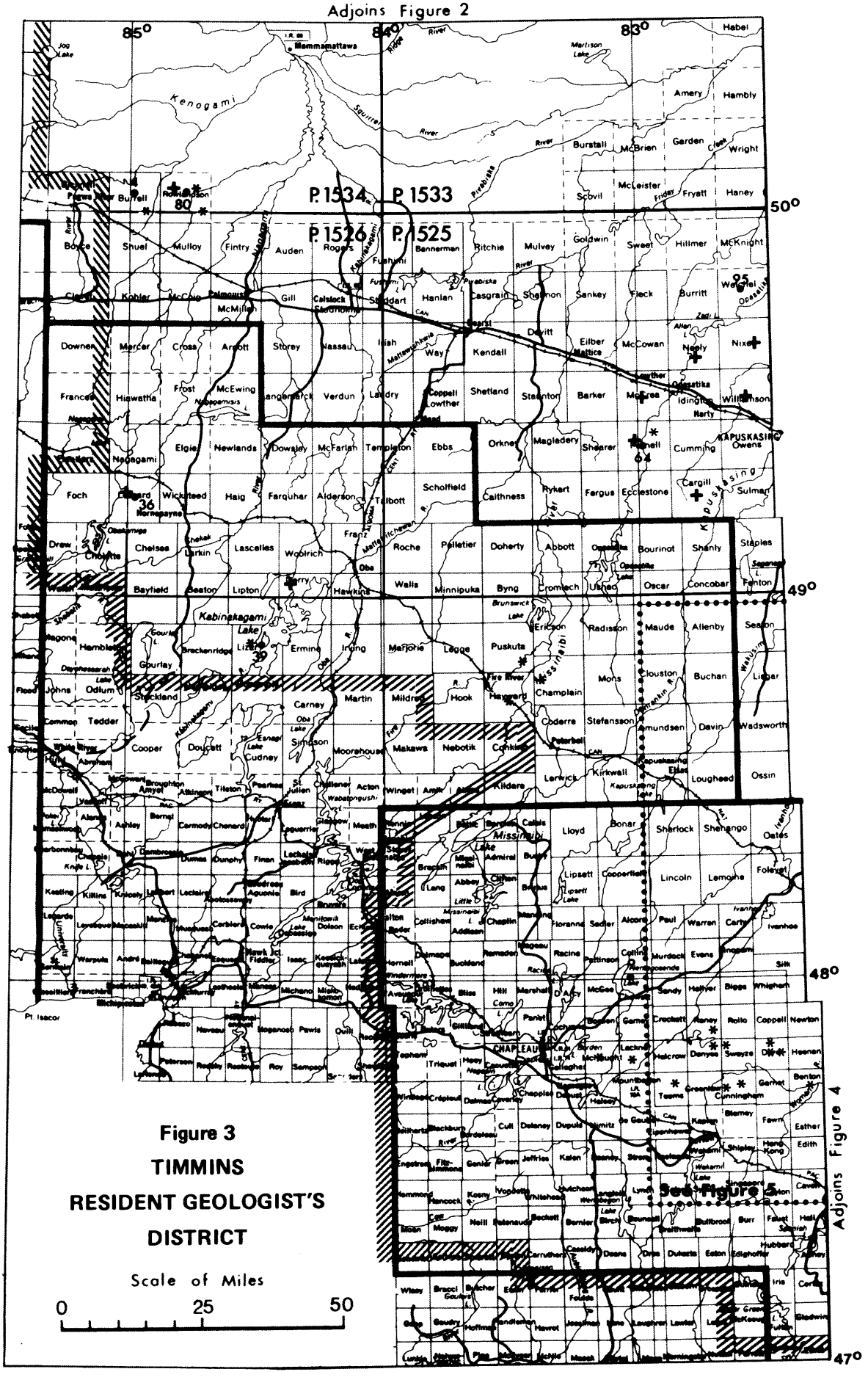

Figure 3

TIMMINS

RESIDENT GEOLOGIST'S

DISTRICT

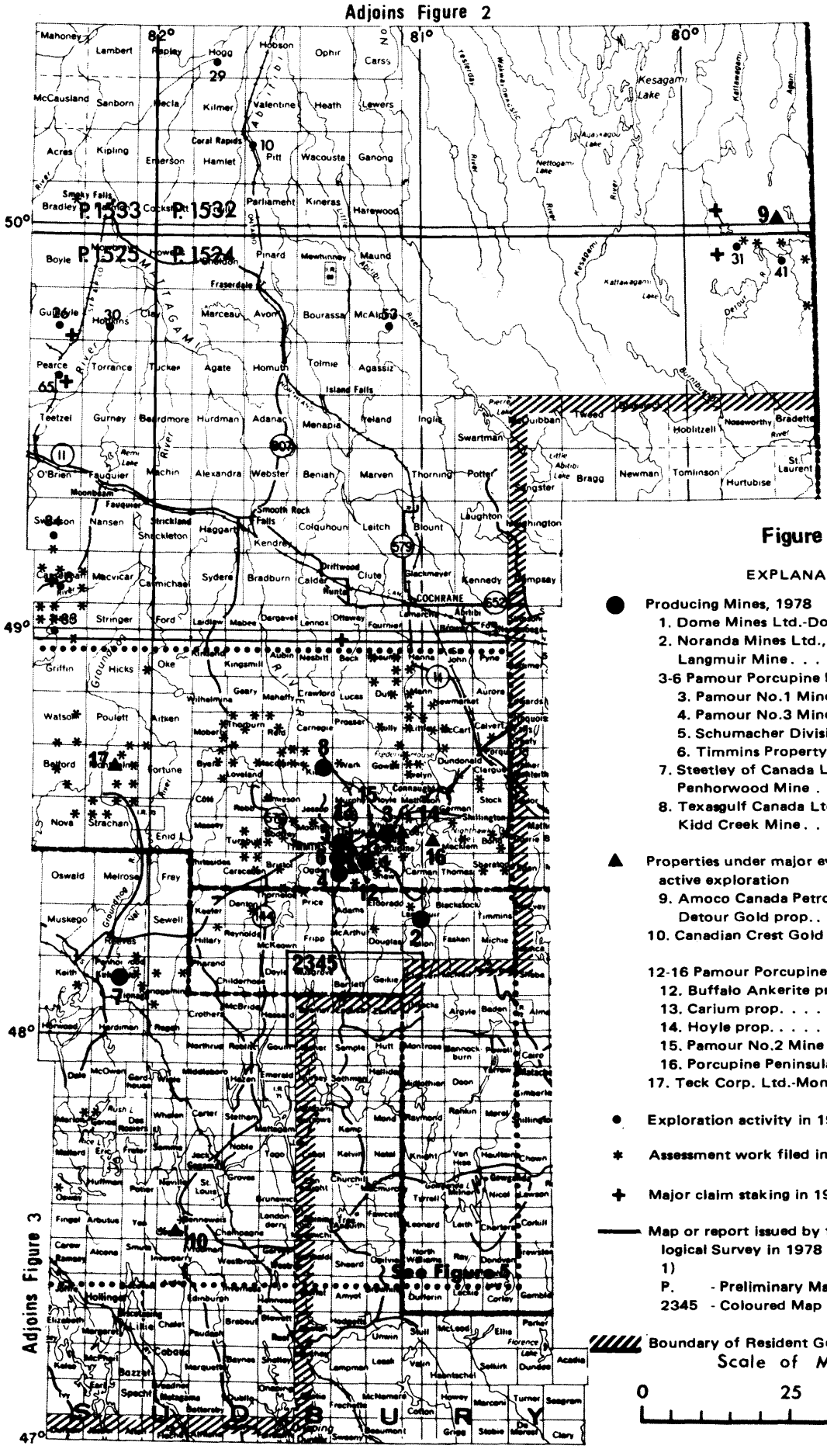

Figure 4

EXPLANATION

● Producing Mines, 1978
1. Dome Mines Ltd.-Dome Mine . . Au,Ag
2. Noranda Mines Ltd., Inco Ltd.-
Langmuir Mine . . . . . Ni
3-6 Pamour Porcupine Mines Ltd.-
3. Pamour No.1 Mine . . . . . Au,Ag
4. Pamour No.3 Mine . . . . . Au,Ag
5. Schumacher Division . . . . Au,Ag,Cu
6. Timmins Property. . . . . Au,Ag
7. Steetley of Canada Ltd.-
Penhorwood Mine . . . . . talc
8. Texasgulf Canada Ltd.-
Kidd Creek Mine . . Cu,Zn,Ag,Pb,Cd,Sn

▲ Properties under major evaluation and/or active exploration
9. Amoco Canada Petroleum Co. Ltd.-
Detour Gold prop. . . . . Au,Cu
10. Canadian Crest Gold Mines Ltd. . . . Au

12-16 Pamour Porcupine Mines Ltd.-
12. Buffalo Ankerite prop.. . . . . Au,Ag
13. Carium prop. . . . . .Au,Cu,Mo
14. Hoyle prop. . . . . Au,Ag
15. Pamour No.2 Mine . . . . . Au,Ag
16. Porcupine Peninsula prop.. . . . Au,Ag
17. Teck Corp. Ltd.-Montcalm prop.. Ni,Cu

● Exploration activity in 1978 (keyed to Table 2)

✱ Assessment work filed in 1978 (keyed to Table 3)

✚ Major claim staking in 1978

—— Map or report issued by the Ontario Geological Survey in 1978 (keyed to Table 1)
P. - Preliminary Map
2345 - Coloured Map

▨ Boundary of Resident Geologist's district

Scale of Miles

0 25 50

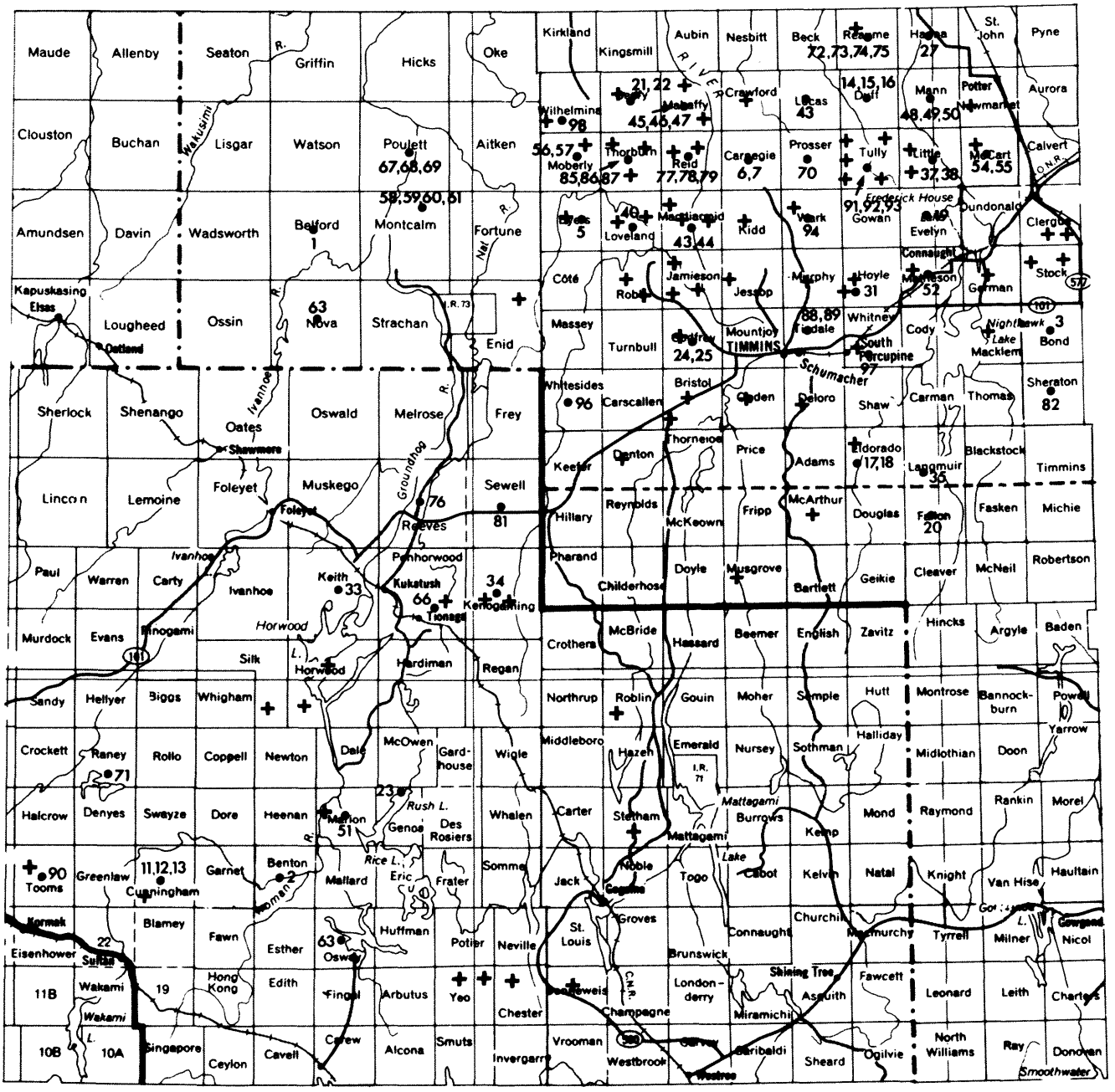

Figure 5

● Exploration activity in 1978 (keyed to Table 3)

✚ Major claim staking in 1978

gold per ton. Proven reserves are 1,398,000 tons at 0.101 ounces gold per ton (personal communication, Pamour Porcupine Mines Limited). Employment at Pamour No.1 including the mill is 382 persons.

Pamour No.2 (the former Hallnor Mine) did not produce during 1978. This property has some potential for future production and is being kept on care and maintenance.

Pamour No.3 (the former Aunor and Delnite Mines) produced 111,846 tons at 0.189 ounces gold per ton during 1978. Proven reserves are 196,737 tons at 0.200 ounces gold per ton (personal communication, Pamour Porcupine Mines Limited). Employment is 93 miners.

The Schumacher Division (the former McIntyre and Coniaurum Mines) produced 572,416 tons in 1978 grading 0.071 ounces gold per ton, 0.304 percent copper, and 0.078 ounces silver per ton. Proven reserves include 109,235 tons of gold ore grading 0.196 ounces gold per ton as well as 560,816 tons of copper ore grading 0.036 ounces gold per ton, 0.624 percent copper and 0.107 ounces silver per ton (personal communication, Pamour Porcupine Mines Limited). There are 456 workers employed by the Schumacher Division including the mill.

The Timmins Property (the former Hollinger Mine) produced 293,297 tons grading 0.081 ounces gold per ton (personal communication, Pamour Porcupine Mines Limited). Proven reserves are unknown.

The Ross Mine is described elsewhere in this publication by the Kirkland Lake Resident Geologist.

In addition to these properties Pamour has agreements to develop a number of others. These include the following.

The Porcupine Peninsular Property was optioned from Hydra Explorations and Tilal Investments Limited. Pamour is driving a 2,000 foot decline to the 425-foot level. The decline is presently approaching the 100-foot level. Definition drilling is due to commence shortly to determine the extent and grade of gold mineralization.

The Hoyle Property was optioned from Falconbridge Nickel Mines Limited. Some 78,000 tons of low-grade material have been mined from open pit operations. A portal was located at the west end of the pit and a ramp completed to the 200-foot level. Production, all from surface operations, is in the range of 1800 to 1900 tons per day (personal communication, Pamour Porcupine Mines Limited).

An agreement has been reached with Romfield Investments to surface mine veins and clean up old ore dumps at the former Buffalo Ankerite mine (personal communication, Pamour Porcupine Mines Limited).

Recent drilling has outlined a brand new copper-gold-molybdenum orebody on the former Carium Property. This deposit is located within the Pearl Lake porphyry, north and east of the presently mined Schumacher Division copper zone. Tonnage is significant and grade is economic but precise figures are not yet available (personal communication, Pamour Porcupine Mines Limited).

Industrial Minerals

Steetley Talc, wholly-owned subsidiary of the Steetley Company of the United Kingdom began mining in July on a talc deposit in Penhorwood Township which was purchased from Canadian Johns-Manville Company Limited. Processing to the final product is carried out in Timmins in the old Hollinger mill building. Production on the order of 20,000 to 30,000 tons per year is the target with mining taking place during the summer months and milling year round.

EXPLORATION ACTIVITY

The majority of exploration programs were in search of base metal deposits, specifically polymetallic deposits of the Texasgulf variety. The most active companies in the Timmins district were Geophysical Engineering Limited, Shell Canada Resources Limited, Hollinger Mines Limited, Amoco Canada Petroleum Company Limited, and Noranda Exploration Company Limited. Also quite active were Granges Exploration AB, Mattagami Lake Mines Limited, Texasgulf Canada Limited, Rosario Resources Canada Limited, and Amax Exploration Limited.

Base Metals

Base metal exploration was concentrated in five areas:

1) Northeast of Timmins, west and south of Highway 11:
   (a) Amoco Canada Petroleum Company Limited drilled geophysical targets in Duff, Little, McCart and Tully Townships.
   (b) Shell Canada Resources Limited carried out geophysical surveys and drilling in Duff, Mann, and Reaume Townships.
   (c) Rosario Resources Canada Limited drilled in Duff and Mann Townships.
   (d) Mattagami Lake Mines Limited carried out exploration programs in Little and McCart Townships.
   (e) Noranda Exploration Limited carried out geophysical surveys and drilling in Mann and Reaume Townships.
   (f) Geophysical Engineering Limited drilled in Reaume and Tully Townships.
   (g) Western Mines Limited carried out overburden and diamond drilling programs in Reaume Township.

(h) St. Joseph Explorations Limited drilled in Tully Township.

2) Northwest of Timmins, Kamiskotia area and north:
   (a) Amax Exploration Limited carried out geophysical surveys in Geary, Macdiarmid, Moberly, and Thorburn Townships.
   (b) Amoco Canada Petroleum Company Limited performed geophysical work in Geary, Mahaffy, and Thorburn Townships.
   (c) Geophysical Engineering Limited drilled in Macdiarmid, Reid, and Thorburn Townships.
   (d) Hollinger Mines Limited completed geophysical surveys in Godfrey and Moberly Townships.
   (e) Rosario Resources Canada Limited did extensive geophysical work and drilling in Mahaffy and Reid Townships.
   (f) Shell Canada Resources Limited drilled in Mahaffy and Reid Townships.
   (g) Texasgulf Canada Limited carried out geophysical surveys in Godfrey Township.

3) Montcalm Township area:

   Geophysical Engineering Limited, Hollinger Mines Limited, and Noranda Exploration Company Limited all carried out exploration programs in Montcalm and Poulett Townships including geophysical surveys and/or drilling.

   Teck Corporation Limited has been working on a nickel deposit in Montcalm Township about 35 miles west of Timmins. The deposit is owned jointly by Teck, Copperfields Mining Corporation, Metallgesellschaft AG of West Germany, and Domik Explorations Company of Japan. Reserves are estimated at 4.5 million tons grading 1.41 percent nickel and 0.66 percent copper (Northern Miner, Jan. 5, 1978). A feasibility study suggests that a milling rate of 1,100 tons per day is feasible. The only apparent impediment to bringing the property to production is the present poor nickel market.

4) Swayze Belt:
   (a) Granges Exploration AB carried out geophysical surveys and drilling in Cunningham and Tooms Townships.
   (b) Consolidated Shunsby Mines Limited and Midwest Resources Limited drilled in Cunningham Township.

5) McAlpine Township Area:

   In June and November 1977, Hudbay Mining Limited flew AEM over 411,000 acres of land east of the Abitibi River near Fraserdale. December 1, 1977, they were issued an Exploratory License of Occupation to investigate conductors located by the survey. During 1978, 22 of the 57 airborne responses were checked and 26 conductors identified. Roughly half of these will be tested in the near future by drilling (Regional Geologist's Files, Ministry of Natural Resources, Timmins, Ontario).

Precious Metals

Texasgulf Canada Limited recently concluded an option agreement with Canadian Nickel Company, wholly owned subsidiary of Inco Limited, to explore a gold property about 2 miles west of Texasgulf's Hoyle Township concentrator. Plans include underground exploration and bulk sampling on a 60-40 joint venture basis with Canadian Nickel. Previous work indicated that values in five holes along a 400-foot strike distance averaged 0.22 oz. gold per ton over an average width of 10 feet and ranged from 0.15 oz. over 15 feet to 0.27 oz. over 9 feet. There are other parallel zones with lower grade gold values over widths of up to 42 feet (Northern Miner, Nov. 23, 1978).

Amoco Canada Petroleum Company continued ore definition work on their gold property at Detour Lake, 145 miles northeast of Timmins. The deposit contains an estimated 10 million tons averaging 0.20 oz. gold per ton (Northern Miner, Mar. 2, 1978). Amoco is presently negotiating for partners to provide the large capital investment required to bring this property to production.

Canadian Crest Gold Mines Limited is continuing developmental work on a gold property, the former Young-Shannon gold mine in Chester Township about 18 miles southwest of Gogama.

The higher gold prices in 1978 encouraged increased exploration for gold by producers in the Porcupine camp. This is discussed in the section "Operating Mines".

Uranium

Prospection Limited is continuing to explore primarily for uranium on ground covered by an Exploratory License of Occupation in the Hudson Bay Lowlands. The area includes a large part of the Proterozoic inlier in the Sutton Lake-Nowashe Lake area southeast of Winisk. In 1978 Prospection's work consisted of reconnaissance scale follow-up on certain uranium anomalies discovered during the 1977 regional lake geochemistry program, and detailed follow-up techniques over radon anomalies detected during the January to March 1978 field program. In both cases the methods used are "Track Etch" radon detection, magnetometer, AFMAG, and resistivity ground geophysical surveys. Further work will include reconnaissance and detailed "Track-Etch" surveys and diamond drilling of promising targets (Regional Geologist's Files, Ministry of Natrual Resources, Timmins, Ontario).

Under an Exploratory License of Occupation Kerr Addison Mines Limited carried out exploration by drilling on three areas of the Moose River Basin. An anomalous horizon 20 metres thick with 0.05 to 0.1 lb./ton U_3O_8 was intersected (Regional Geologist's Files,

Ontario Ministry of Natural Resources, Timmins). Further work is planned for the Sextant-Coral Rapids area.

Multi-Minerals Limited has renewed exploration, primarily for uranium on its Nemegos apatite-uranium-iron property 18 miles northeast of Chapleau.

Industrial Minerals

Rosario Resources Canada Limited carried out a small amount of drilling and trenching on the Allerston talc-magnesite deposit in south-central Whitney Township.

Extender Minerals Limited carried out sampling and bench testing on a small barite showing in south-central Langmuir Township.

Early in 1978 Onakawana Development Limited was granted a 21-year lease to mine lignite from approximately 12,800 acres in the Cretaceous Basin in the James Bay Lowlands. The deposit, located 60 miles north of Cochrane, has reserves estimated at 190 million tons (Northern Miner, Mar. 9, 1978). If development proceeds, it is estimated that 1,200 workers would be employed during the 6-year construction period, and 500 to 600 people would be required on a regular basis over the anticipated 30-year operating period.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

D.R. Pyke and L.S. Jensen continued work on a stratigraphic synthesis of the Timmins-Kirkland Lake sheet.

L.S. Jensen continued compilation mapping at a scale of 1:63 360 aimed at refining understanding of the stratigraphic succession in the Kenogami Lake, Kirkland Lake, Larder Lake area.

Reconnaissance mapping was completed by G.W. Johns in the Burntbush-Detour Lakes area, District of Cochrane.

G.M. Siragusa carried out detailed areal mapping in Benton and Mallard Townships of the Swayze Belt, District of Sudbury.

H.M. Verma and P.G. Telford supervised drilling of eight boreholes in Cretaceous rocks in the Smoky Falls area, James Bay Lowlands. The purpose was to gain a better understanding of the geological framework of the southern part of the basin and to assess its potential for lignite.

D.G. Innes studied the chemical characteristics of a recently recognized suite of ultramafic and tholeiitic rocks in the southern part of Newton Township, Swayze Belt, District of Sudbury.

The Ontario Centre for Remote Sensing (Ministry of Natural Resources, Lands and Waters Group) continued its physiographic mapping program in northwestern Ontario. In 1978, the survey was concentrated in the areas of Fort Severn, the Winisk River, and the Attawapiskat River.

The 1978 phase of the Northern Ontario Engineering Geology Terrain Study (N.O.E.T.S.) was carried out in two blocks of Ontario. The eastern block included part of the west half of the District of Cochrane, specifically the regions of Hearst, Kapuskasing, and Foleyet. The prime objective of the study is to provide an inventory of basic engineering terrain information, at a scale of 1:100 000, which can be used as a resource base for regional planning in northern Ontario.

RESEARCH BY OTHER AGENCIES

Laurentian University

R.E. Whitehead, R.A. Cameron, and J.F. Davies: Gold Exploration using CO_2, H_2O and Alkali "Anomalies".

McMaster University

J.A. Fyon in conjunction with W.O. Karvinen (formerly Regional Geologist, Timmins): Volcanic Environment of Gold Mineralization in the Timmins Area.

University of Waterloo

R.G. Roberts and R.D. Harris: Volcanic and Tectonic Setting of Gold Veins and their Relationship to Hydrotermal Alteration.

REFERENCES

Northern Miner, January 5, 1978: "Teck has made considerable progress. . ."

Northern Miner, March 2, 1978: "As in 1977, the company will again focus. . ."

Northern Miner, March 9, 1978: "Green light for James Bay lignite."

Northern Miner, November 23, 1978: "Dome Mines cash income soars with higher prices for gold."

Northern Miner, November 23, 1978: "Texasgulf plans extensive work on gold group."

Timmins Daily Press, January 1978: "Mine to close down." (Langmuir).

Timmins Daily Press, September 7, 1978: "Texasgulf Smelter to be ready in '81."

TABLE 1 MAPS AND REPORTS PERTAINING TO THE PORCUPINE MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORTS
- GR 161
- OGR 169
- OGR 171

MISCELLANEOUS PAPERS
- MP 78
- MP 82

MINERAL DEPOSITS CIRCULAR
- MDC 17

OPEN FILE REPORTS
- OFR 5253
- OFR 5255

COLOURED MAPS
- 2345
- 2410

PRELIMINARY MAPS
- P.1524
- P.1525
- P.1526
- P.1532
- P.1533
- P.1534

TABLE 2 **Exploration activity in 1978.**

Number on Figure	Individual or Company	Activity
1	Geophysical Eng. Limited	DD
2	Granges Expl. AB	DD
3	Ingamar Expl. Ltd.	ARA
4	Shell Can. Res. Ltd.	DD
5	Hollinger Mines Ltd.	geophysical surveys
6	Price Co. Ltd., The	DD
7	Tg. Can. Ltd.	Mag, HEM
8	Mattagami Lake Mines Ltd.	DD
9	Multi-Minerals Ltd.	DD
10	Kerr-Addison Mines Ltd.	DD
11	Cons. Shunsby Mines Ltd.	DD
12	Granges Expl. AB	DD
13	M. W. Res. Ltd.	DD
14	Amoco Canada Petroleum Co. Ltd.	DD
15	Rosario Resources Can.	DD
16	Shell Canada Resources Ltd.	DD
17	Hudson Bay Expl.	DD
18	Utah Mines Ltd.	DD, road construction
19	Amoco Can. Petroleum Co. Ltd.	DD
20	Meunier, D.	DD
21	Amax Minerals Expl.	HEM, Mag
22	Amoco Can. Petroleum Co. Ltd.	geophysical surveys
23	Noranda Expl. Co. Ltd.	GL
24	Hollinger Mines Ltd.	VLF
25	Tg Can. Ltd.	Mag
26	Shell Can. Resources Ltd.	DD
27	Shell Can. Resources Ltd.	DD
28	Prospection Ltd.	RA, AMag, AFMAG, Resistivity surveys
29	Shawinigan Eng. Co. Ltd.	foundation exploratory DD
30	Shell Can. Resources Ltd.	DD
31	Noranda Expl. Co. Ltd.	DD
32	Tg. Inc.	mineral exploration
33	Noranda Expl. Co. Ltd.	JEM, VEM, Mag
34	Geophysical Eng. Ltd.	DD
35	Extender Minerals of Can. Ltd.	bulk sampling, bench testing, assays
36	Brinex	DD
37	Amoco Can. Petroleum Co. Ltd.	DD
38	Mattagami Lake Mines Ltd.	mineral exploration
39	Nickel Rim Mines Ltd.	DD
40	Tg. Can. Ltd.	Mag, HEM
41	Noranda Expl. Co. Ltd.	DD
42	Shell Can. Resources Co. Ltd.	DD
43	Amax Minerals Expl.	HEM, Mag, VEM
44	Geophysical Engineering Ltd.	DD
45	Amoco Can. Petroleum Co. Ltd.	geophysical surveys
46	Rosario Resources Can. Ltd.	DD, pulse EM, HEM, IP, Mag, Grav
47	Shell Can. Resources Ltd.	DD
48	Noranda Expl. Co. Ltd.	Mag, HEM, VEM
49	Rosario Resources Can. Ltd.	DD
50	Shell Can. Resources Ltd.	DD, Mag
51	Noranda Expl. Co. Ltd.	GL
52	Bonhomme, J.	Mag, VEM
53	Hudbay Mining Ltd.	geophysical & geochemical surveys
54	Amoco Can. Petroleum Co. Ltd.	DD
55	Mattagami Lake Mines Ltd.	mineral exploration
56	Amax Minerals Expl.	HEM, VEM, Mag
57	Hollinger Mines Ltd.	geophysical surveys
58	Geophysical Eng. Ltd.	DD
59	Hollinger Mines Ltd.	DD
60	Noranda Expl. Co. Ltd.	DD, Mag, HEM
61	Teck Corp. Ltd.	DD
62	Geophysical Eng. Ltd.	mineral exploration
63	Noranda Expl. Co. Ltd.	DD
64	Lanteigne, J.	DD
65	Shell Can. Resources Ltd.	DD
66	Geophysical Eng. Ltd.	DD
67	Geophysical Eng. Ltd.	DD
68	Hollinger Mines Ltd.	DD
69	Noranda Expl. Co. Ltd.	Mag, HEM
70	Shell Canada Resources Ltd.	DD
71	J-Dex Expl. Ltd.	DD
72	Geophysical Eng. Ltd.	DD
73	Noranda Expl. Co. Ltd.	DD, GL
74	Shell Can. Resources Ltd.	DD
75	Western Mines Ltd.	DD, OVD
76	Geophysical Eng. Ltd.	DD
77	Geophysical Eng. Ltd.	DD
78	Rosario Resources Can. Ltd.	DD, pulse EM, HEM, IP, Mag, Grav
79	Shell Can. Resources Ltd.	DD
80	Shell Can. Resources Ltd.	DD
81	Clement, M.	mineral exploration
82	Ingamar Expl. Ltd.	ARA
83	Mattagami Lake Mines Ltd.	DD
84	Mattagami Lake Mines Ltd.	DD
85	Amax Minerals Expl.	HEM, VEM, Mag
86	Amoco Can. Petroleum Co. Ltd.	geophysical surveys
87	Geophysical Eng. Ltd.	DD
88	Meunier, D.	DD
89	Pamour Porc. Mines Ltd.	mineral exploration
90	Granges Expl. AB	HEM, B.D.
91	Amoco Can. Petroleum Co. Ltd.	DD
92	Geophysical Eng. Ltd.	DD
93	St. Joseph Expl. Ltd.	DD
94	Hollinger Mines Ltd.	VLF
95	Shell Canada Resources Ltd.	DD
96	Geoex Ltd.	rTr, GL
97	Allerston, R.	DD, rTr
98	Amoco Can. Petroleum Co. Ltd.	geophsyical surveys

TABLE 3 Assessment work and other information received in 1978.

Dec. 1, 1977 to Nov. 30, 1978

Porcupine Mining Division

Abbreviations

AEM - airborne electromagnetic survey
AFMAG - audio frequency magnetic survey
AMag - airborne magnetometer survey
ARA - airborne radiometric survey
ARes - airborne resistivity survey
DD - diamond drilling (The numbers following "DD" indicate the number of holes drilled and the total length drilled, respectively)
DDH - diamond drill holes
EM - electromagnetic survey
GC - geochemical survey
GL - geological survey
Grav - gravity survey
HEM - horizontal loop electromagnetic survey
IP - induced polarization electromagnetic survey
JEM - Crone JEM electromagnetic survey
Mag - magnetometer survey
OVD - overburden drilling (The numbers following "OVD" indicate the number of holes drilled and the total length drilled, respectively)
RA - radiometric survey
rTr - trenching
Seis - seismic survey
sTr - stripping
VEM - vertical loop electromagnetic survey
VHEM - combined vertical-horizontal loop electromagnetic survey
VLF - very low frequency electromagnetic survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Aitken Twp.	42B/16SE	Noranda Expl. Co. Ltd.	base metals	assessment	Mag.,HEM	1977	2.2518	T-1858
Atkinson Lake Area	32E/13	Hudson Bay Expl. & Dev.Co.Ltd.	base metals,gold	assessment	DD-1-150 ft.	1976	2.2243	T-1704
Belford Twp.	42B/9NW	Asarco Expl. of Can. Ltd.	base metals	assessment	AEM, AMag., ARes.	1977	2.2499	T-1870
Belford Twp.	42B/9NW	Geophys. Eng.Ltd.	base metals	assessment	DD-1-360 ft. DD-1-122.2 m.	1978		T-1853
Benton Twp.	41O/9NW	Granges Expl. A.B.	base metals	assessment	DD-1-204 ft.	1978		T-1793
Bond Twp.	42A/7NE 42A/10SE	Ingamar Expl.Ltd.	uranium	assessment	ARA	1978	2.2327	T-1878
Bradley Twp.	42J/11SW	Zaychuk, G.	gold, base metals	assessment	DD-2-208 ft.	1977		T-1828
Bristol Twp.	42A/5NE	Can. Nickel Co.Ltd.	gold, base metals	assessment	GL, assays, Mag.	1976,1977	2.2513,2.2476	T-1789
Bristol Twp.	42A/5NE	Spina Porc. Mines Ltd.	gold, base metals	not assessment	prospectus	1977		T-553
Burrell Twp.	42K/2SW	Shell Can.Res.Ltd.	base metals	assessment	DD-1-122.31 m.	1978		T-1860
Byers Twp.	42A/12NE	Cominco Ltd.	base metals	assessment	HEM	1977	2.2488	T-16
Calvert Twp.	42A/10N, 42A/15S	International Nickel Co. of Can. Ltd.	base metals	not assessment	DD-3-1,447 ft.	1974, 1975		T-1806
Carnegie Twp.	42A/11NW	Tg.Can. Ltd.	base metals	assessment	Mag, HEM	1977,1978	2.2677	T-1869
Carnegie Twp.	42A/11NW	Tg.Can.Ltd.	base metals	assessment	Mag, HEM	1977,1978	2.2645	T-1872
Carscallen Twp.	42A/5NE	Conwest Expl.Co. Ltd.	base metals	assessment	DD-4-1230 ft.	1977	2.2401	T-1658
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	Mag, HEM	1976	2.2353	T-1815
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag	1976,1977	2.2439	T-1819
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag	1977	2.2439	T-1820
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	Mag, HEM DD-1-437 ft.	1977,1978	2.2434	T-1824
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	Mag, HEM DD-1-419 ft.	1977,1978	2.2438	T-1825
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	Mag, HEM DD-1-507 ft.	1977	2.2434	T-1826

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag	1977	2.2462	T-1830
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag DD-1-356 ft.	1977,1977	2.2435	T-1832
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag, DD-1-517 ft.	1977	2.2435	T-1833
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag	1977	2.2436	T-1836
Casselman Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	Mag, HEM	1976,1977	2.2436	T-1838
Champlain Twp.	42B/14SW	Newkirk Mining Corp. Ltd.	base metals	not assessment	AEM, AMag	1957		T-1817
Chester Twp.	41P/12SW	Can.Crest Gold Mines Ltd.	gold, base metals	assessment	rTr	1977		T-1751
Chester Twp.	41P/12SW	Tg.,Can.Ltd.	base metals, gold	assessment	Mag, VLF	1977	2.2533	T-1842
Clergue Twp.	42A/10NW	International Nickel Co. of Can. Ltd.	base metals	not assessment	DD-5-3,683 ft.	1971,1972		T-493
Cunningham Twp.	41O/10NE	Cons. Shunsby Mines Ltd.	base metals	not assessment assessment	DD-6-791.8 ft. DD-5-1,236 ft.	1965 1978		T-2050
Deloro Twp.	42A/5NE	Spina Porc. Mines Ltd.	gold, base metals	not assessment	prospectus	1977		T-553
Denton Twp.	42A/5SE	Can.Nickel Co.Ltd.	base metals	assessment	DD-1-251 ft.	1977		T-1834
Denton Twp.	42A/5SE	Gambit Cons. Expl. Ltd.	base metals	assessment	Mag, VLF	1977	2.2611	T-1865
Denyes Twp.	41O/15SE	Mangotich,G.	base metals	assessment	VLF, VHEM	1977	2.2521	T-1722
Dore Twp.	41O/16SW	Granges Expl. A.B.	base metals	assessment	HEM	1977	2.2399	T-1791
Dore Twp.	41O/16SW	Granges Expl. A.B.	base metals	assessment	HEM	1977	2.2399	T-1807
Dore Twp.	41O/15SE	Rio Tinto Can. Expl. Ltd.	base metals	assessment	HEM, Mag	1977	2.2623	T-1862
Duff Twp.	42A/14SE	Amoco Can. Petroleum Co. Ltd.	base metals	not assessment	DD-3-1,333 ft.	1977,1978		T-1847
Duff Twp.	42A/14SE	Rosario Resources Can.	base metals	assessment	DD-2-643 ft.	1978		T-1827
Eldorado Twp.	42A/6SE	Utah Mines Ltd.	nickel, copper	assessment	DD-11-3,768.1 ft.	1977,1978		T-1785
Evelyn Twp.	42A/11NE	Allerston, R.	base metals	assessment	IP, Grav, Seis	1977	2.2485	T-1619
Evelyn Twp.	42A/11NE, 42A/10NW	Amoco Can. Petroleum Co.Ltd.	base metals	not assessment	DD-1-530 ft.	1977,1978		T-1848
Evelyn Twp.	42A/11NE	Amoco Can. Petroleum Co.Ltd.	base metals	not assessment	DD-2-1,072 ft.	1977,1978		T-1849
Geary Twp.	42A/13SE	Amax Minerals Expl.	base metals	assessment	HEM, Mag	1978	2.2694	T-1884
Geary Twp.	42A/13SE	Young Davidson Mines Ltd.	base metals	assessment	DD-4-2,300 ft. Mag.	1976,1977	2.2503	T-1783
Genoa Twp.	41O/9NE	Noranda Expl.Co. Ltd.	base metals	assessment	GL	1978	2.2730	T-1888
German Twp.	42A/10SW	Hollinger Mines Ltd.	gold	assessment	DD-1-1,809 ft.	1977		T-1627
German Twp.	42A/10SW	Spina Porc.Mines Ltd.	gold	not assessment	prospectus	1977		T-553
Godfrey Twp.	42A/5NE	Hollinger Mines Ltd.	base metals	assessment	VLF	1978	2.2648	T-1879
Godfrey Twp.	42A/6NW	Hollinger Mines Ltd.	base metals	assessment	VLF	1978	2.2648	T-1880
Godfrey Twp.	42A/5NE	Northim Mines Inc.'	base metals	assessment	DD-1-299 ft.	1976		T-1750
Godfrey Twp.	42A/5NE, 42A/12SE	O'Neill,E.B.	base metals	assessment	rTr	1975		T-1891
Godfrey Twp.	42A/5NE	Tg.Can.Ltd.	base metals	assessment	Mag	1978	2.2615	T-1867
Gowan Twp.	42A/11NE	Allerston, R.	base metals	assessment	DD-5-3,629.5 ft. IP, Grav, Seis	1977	2.2485	T-1619
Hanna Twp.	42A/14NE	Western Mines Ltd.	base metals	assessment	HEM, Mag DD-1-750 ft.	1975	2.2319	T-1693
Hayward Twp.	42B/12NE	Newkirk Mining Corp. Ltd.	base metals	not assessment	AEM, AMag	1957		T-1817

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Hopper Lake Area	32E/12	Noranda Expl. Co. Ltd.	base metals,gold	assessment	DD-2-969 ft.	1978		T-1700
James Bay Lowlands		Prospection Ltd.	uranium	assessment	GC, RA, AFMAG,GL	1977	83.1-125	T-1831
Jamieson Twp.	42A/11SW 42A/12SE	Asarco Expl. Co. of Can. Ltd.	base metals	assessment	OVD-14-1,887 ft.	1976,1977	2.2378	T-1746
Jamieson Twp.	42A/12SE	Pleno Mines Ltd.	base metals	not assessment	map showing DDH & assays	1954		T-544
Jessop Twp.	42A/11SW	MacLeod, K.	base metals	assessment	sTr	1977		T-1882
Keefer Twp.	42A/5SE	Galata, F.	base metals	assessment	sTr	1977		T-1556
Keith Twp.	42B/1NW	Mining Corp. of Can. Ltd.	gold	assessment	DD-1-274 ft.	1977		T-1646
Keith Twp.	42B/1NW	Noranda Expl. Co. Ltd.	gold, base metals	assessment	JEM, VEM, Mag	1977,1978	2.2707	T-1646
Kenogaming Twp.	42A/4NW	Amax Minerals Expl.	base metals	assessment	HEM, Mag	1977	2.2620	T-1868
Kenogaming Twp.	42A/4NW	Amax Minerals Expl.	base metals	assessment	HEM, VLF, Mag	1977	2.2701	T-1889
Kenogaming Twp.	42A/4W	Geophysical Eng. Ltd.	base metals	assessment	DD-2-460 ft.	1978		T-1854
Kidd Twp.	42A/11NW	Hollinger Mines Ltd.	base metals	assessment	HEM	1977	2.2737	T-1790
Lackner Twp.	41O/14SE	Multi-Minerals Ltd.	iron, phosphate	not assessment	prospectus	1978		T-2171
Langmuir Twp.	42A/7SW	Extender Minerals of Can. Ltd.	barite	assessment	bulk sampling, bench testing, assays	1978	2.2781	T-1894
Langmuir Twp.	42A/6SE	Noranda Expl.Co. Ltd.	base metals	assessment	Mag	1977	2.2631	T-1811
Langmuir Twp.	42A/6NE	Pamour Porc. Mines Ltd.	nickel, copper	assessment	GL, Mag,VLF	1977	2.2427	T-1673
Little Twp.	42A/15SW	Amoco Can. Petroleum Co. Ltd.	base metals	assessment	DD-6-3,035 ft.	1977,1978		T-1822
Little Twp.	42A/11NE	Amoco Can. Petroleum Co. Ltd.	base metals	not assessment	DD-2-1,072 ft.	1977,1978		T-1849
Little Twp.	42A/14SE	Dome Expl.(Can.) Ltd.	base metals	assessment	DD-7-3,080 ft.	1977		T-1766
Lizar Twp.	42O/15 42O/16	Nickel Rim Mines Ltd.	gold	assessment	DD-4-2,702 ft.	1978		T-1890
Loveland Twp.	42A/12NE	Cominco Ltd.	nickel, copper	assessment	HEM	1977	2.2488	T-16
Loveland Twp.	42A/12NE	Dome Expl.(Can.) Ltd.	base metals	assessment	HEM, Mag	1977	2.2596	T-1863
Loveland Twp.	42A/12NE	Tg.Can.Ltd.	base metals	assessment	Mag,HEM	1977,1978	2.2653	T-1873
Lower Detour L. Area	32E/12	Noranda Expl. Co. Ltd.	base metals,gold	assessment	DD-2-969 ft.	1978		T-1700
Lower Detour L. Area	32E/13	Noranda Expl. Co. Ltd.	base metals, gold	assessment	DD-1-531.2 ft.	1977		T-1729
Lower Detour L. Area	32E/13	Noranda Expl. Co. Ltd.	base metals, gold	assessment	DD-1-376.5 ft.	1977		T-1761
Macdiarmid Twp.	42A/11NW 42A/12NE	Amax Minerals Ltd.	base metals	assessment	AMag, GL, HEM, Mag, VEM	1977,1978	2.2585 2.2677 2.2690 2.2693	T-1866
Macdiarmid Twp.	42A/12NE	Dome Expl (Can.) Ltd.	base metals	assessment	HEM, Mag	1977	2.2596	T-1863
Macklem Twp.	42A/7NW, 42A/10SW	Spina Porc. Mines Ltd.	gold	not assessment	prospectus	1977		T-553
Mahaffy Twp.	42A/13SE	Rosario Resources Can. Ltd.	base metals	assessment	DD-6-3,124 ft. pulse EM, HEM, IP, Mag, Grav	1978	2.2711	T-1841
Mann Twp.	42A/14SE	Dome Expl.(Can.) Ltd.	base metals	assessment	EM, Mag DD-7-3,080 ft.	1976,1977	2.2291	T-1766
Mann Twp.	42A/14E	Noranda Expl.Co. Ltd.	base metals	assessment	Mag, HEM, VEM	1977, 1978	2.2549 2.2821	T-1871
Mann Twp.	42A/14SE	Rosario Resources Can.	base metals	assessment	DD-2-643 ft.	1978		T-1827

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Mann Twp.	42A/15SW	Shell Can. Resources Ltd.	base metals	assessment	Mag	1978	2.2593	T-1877
Marion Twp.	41O/9NE	Noranda Expl.Co.Ltd.	base metals	assessment	GL	1978	2.2730	T-1888
Matheson Twp.	42A/11SE	Bonhomme, J.V.	gold,base metals	assessment	Mag, VEM	1978	2.2662	T-261
McCart Twp.	42A/15SW	Amoco Can. Petroleum Co. Ltd.	base metals	assessment	DD-6-3,035 ft.	1977,1978		T-1822
McNaught Twp.	41O/14SE	Multi-Minerals Ltd.	phosphate, iron	not assessment	prospectus	1978		T-2171
Moberly Twp.	42A/13SE	Amax Minerals Expl.	base metals	assessment	HEM, VEM, Mag	1978	2.2691	T-1883
Moberly Twp.	42A/12NE	Amax Potash Ltd.	base metals	assessment	HEM, VEM, Mag	1978	2.2692	T-1892
Moberly Twp.	42A/12NW	Hollinger Mines Ltd.	base metals	assessment	HEM	1976,1977	2.2491	T-1788
Montcalm Twp.	42B/9SE 42B/9SW	Asarco Expl. Co. of Can. Ltd.	base metals	assessment	AEM	1977	2.2468	T-1840
Montcalm Twp.	42B/9NE	Geophysical Eng. Ltd.	nickel, copper	assessment	AEM, AMag	1977	2.2454	T-1835
Montcalm Twp.	42B/9NE	Geophysical Eng. Ltd.	nickel, copper	assessment	DD-1-556 ft.	1978		T-1852
Montcalm Twp.	42B/9NE	Hollinger Mines Ltd.	base metals	assessment	HEM, GL	1977	2.2543	T-1818
Montcalm Twp.	42B/9NE	Hollinger Mines Ltd.	base metals	assessment	DD-2-634 ft. VEM	1977,1978	2.2546	T-1850
Montcalm Twp.	42B/9NE	Noranda Expl.Co. Ltd.	base metals	assessment	Mag, HEM	1977,1978	2.2635	T-1804
Nova Twp.	42B/9SE 42B/9SW	Asarco Expl. Co. of Can.Ltd.	base metals	assessment	AEM	1977	2.2468	T-1840
Ogden Twp.	42A/6W	Carlson,H.D.	gold	assessment	VLF	1977	2.2720	T-1887
Oke Twp.	42A/13NW	Noranda Expl.Co. Ltd.	base metals	assessment	Mag,HEM	1977	2.2518	T-1857
Osway Twp.	41O/9	Noranda Expl.Co. Ltd.	base metals	assessment	DD-1-383 ft.	1978		T-2303
Parnell Twp.	42G/7NW	Lateyne, J.	base metals	assessment	DD-1-168 ft.	1978		T-1864
Penhorwood Twp.	42B/11NE	Geophysical Eng. Ltd.	base metals	assessment	DD-2-420 ft.	1978		T-1851
Penhorwood Twp.	42B/1E	Geophysical Eng. Ltd.	base metals	assessment	DD-2-460 ft.	1978		T-1854
Poulett Twp.	42B/9NE	Hollinger Mines Ltd.	base metals	assessment	DD-2-634 ft. VEM	1977,1978	2.2546	T-1850
Poulett Twp.	42B/9NE	Noranda Expl.Co. Ltd.	base metals	assessment	Mag, HEM	1977,1978	2.2635	T-1804
Poulett Twp.	42B/16SE	Noranda Expl.Co. Ltd.	base metals	assessment	Mag, HEM	1977	2.2518	T-1858
Puskuta Twp.	42B/14SW	Newkirk Mining Corp. Ltd.	base metals	not assessment	AEM, AMag	1957		T-1817
Raney Twp.	41O/15NW	J-Dex Expl.Ltd.	base metals	assessment	DD-2-300 ft.	1978		T-2180
Reaume Twp.	42A/14NE	Noranda Expl. Co. Ltd.	base metals	assessment	DD-1-163 ft. GL	1977,1978	2.2478	T-1760
Reaume Twp.	42A/14NE	Shell Can. Resources Ltd.	base metals	assessment	DD-1-117.3 m.	1978		T-1846
Reaume Twp.	42A/14NE	Western Mines Ltd.	base metals	assessment	HEM, Mag, VEM DD-2-1,106 ft.	1975, 1977, 1978	2.2319 2.2610	T-1693
Reeves Twp.	42B/1NE	Geophysical Eng. Ltd.	base metals	assessment	DD-2-420 ft.	1978		T-1851
Reid Twp.	42A/13SE	Rosario Resources Can. Ltd.	base metals	assessment	DD-6-3,124 ft. Pulse EM, HEM, IP, Mag, Grav	1978	2.2711	T-1841
Reid Twp.	42A/14SW	Rosario Resources Can. Ltd.	base metals	assessment	HEM, Mag.	1977,1978	2.2629	T-1874
Reid Twp.	42A/11NW	Tg. Can. Ltd.	base metals	assessment	Mag, HEM	1977,1978	2.2627	T-1869
Roblin Twp.	42A/4SE 41P/13NE	Wilson, D.V.	base metals	assessment	Mag, VEM, VLF	1977	2.2524 2.2573	T-1843
Rowlandson Twp.	42K/2SE	Shell Can. Resources Ltd.	base metals	assessment	DD-2-291.28 m. GL	1978	2.2717	T-1859

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Shaw Twp.	42A/6NE	Helpert, J.	base metals	assessment	Mag, VLF	1977	2.2539	T-1881
Sheraton Twp.	42A/7NE 42A/10SE	Ingamar Expl.Ltd.	uranium	assessment	ARA	1978	2.2327	T-1878
Sheraton Twp.	42A/7NW	Noranda Expl. Co. Ltd.	base metals	assessment	Mag, HEM	1977	2.2388	T-1816
Slack Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	DD-1-419 ft. Mag, HEM	1977,1978	2.2438	T-1825
Slack Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag	1977	2.2436	T-1836
Slack Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	Mag, HEM	1976,1977	2.2436	T-1838
Slack Twp.	42G/1SW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag DD-1-600 ft.	1977,1978	2.2436	T-1839
Strachan Twp.	42B/9SE 42B/9SW	Asarco Expl. Co. of Can. Ltd.	base metals	assessment	AEM	1977	2.2468	T-1840
Strachan Twp.	42B/9SE	Geophysical Eng. Ltd.	base metals	assessment	AEM, AMag	1977	2.2454	T-1835
Swanson Twp.	42G/1NW	Mattagami Lake Mines Ltd.	base metals	assessment	HEM, Mag DD-1-457 ft.	1977,1978	2.2437	T-1837
Swayze Twp.	41O/5SE	Mangotich,G.	base metals	assessment	VLF, VHEM	1977	2.2521	T-1722
Thorburn Twp.	42A/13SE	Amax Minerals Expl.	base metals	assessment	GL	1977	2.2678	T-1876
Thorburn Twp.	42A/12NE	Amax Potash Ltd.	base metals	assessment	HEM, VEM, Mag.	1978	2.2692	T-1892
Tisdale Twp.	42A/6NW	Meunier, D.	gold	assessment	DD-1-136 ft.	1978		T-1861
Tooms Twp.	41O/10NW	Granges Expl.AB	base metals	assessment	HEM	1977,1978	2.2676	T-1772
Tully Twp.	42A/11NE	Amoco Can.Petroleum Co. Ltd.	base metals	assessment	DD-1-502 ft.	1978		T-1823
Tully Twp.	42A/11NE	Amoco Can. Petroleum Co. Ltd.	base metals	not assessment	DD-2-1,089 ft.	1977,1978		T-1893
Tully Twp.	42A/11	St. Joseph Expl.Ltd.	base metals	assessment	HEM, Mag DD-4-502.61 m.	1977,1978	2.2387	T-1814
Tully Twp.	42A/14SE	Western Mines Ltd.	base metals	assessment	AEM	1977	2.2595	T-1885
Turnbull Twp.	42A/5NE	Conwest Expl.Co. Ltd.	base metals	assessment	DD-4-1,230 ft. HEM	1976,1977	2.2400	T-1658
Turnbull Twp.	32E/13	Northim Mines Inc.	base metals	assessment	DD-1-299 ft.	1976		T-1750
Wark Twp.	42A/11NW	Hollinger Mines Ltd.	base metals	assessment	VLF	1978	2.2718	T-1886
Watson Twp.	42B/9NW	Asarco Expl.of Can. Ltd.	base metals	assessment	AEM, AMag,ARes	1977	2.2499	T-1870
Watson Twp.	42B/9NW	Hudson Bay Expl. & Development Co.Ltd.	base metals	assessment	HEM, Mag	1977	2.2525	T-1845
Watson Twp.	42B/16SW	Noranda Expl.Co.Ltd.	base metals	assessment	Mag, VEM	1977	2.2516	T-1844
Whitney Twp.	42A/6NE	Alamo Petroleum Ltd.	talc, magnesite	assessment	Mag, IP, Res	1976	2.2466 2.2465	T-1829
Whitney Twp.	42A/6NE	Allerston, R.	talc, magnesite, base metals	assessment not assessment	VLF, Mag, IP, Res, AMag DD-10-2,886 ft.; Grav, HEM DD-1-250 ft.	1976,1977, 1978	2.2256 2.2464 2.2520 2.2628	T-1052
Whitney Twp.	42A/6NE	Hollinger Mines Ltd.	base metals	assessment	VLF	1977	2.2459	T-1821
Whitney Twp.	42A/6NE	Meunier, D.	base metals	assessment	Mag,VLF,GL	1977	2.2639	T-1875

TABLE 4 **Additions to regional diamond drill core library, 1978.**

Location	Company or Individual	Hole Number
Bradley Twp.	Zaychuk, G.	1 2
Cunningham Twp.	M. W. Resources Ltd.	78-2 78-4 78-5
Duff Twp.	Amoco Can. Petroleum Co. Ltd.	TO-77-3-1 TO-77-3-2 TO-77-3-3
Evelyn Twp.	Amoco Can. Petroleum Co. Ltd.	TO-77-5-2 TO-77-18-1 TO-77-18-2
Gowan Twp.	Newmont Mining Corp. of Can. Ltd.	G-77-1 G-77-2 G-77-3 G-77-4 G-77-5 G-77-6
Little Twp.	Amoco Can. Petroleum Co. Ltd.	TO-77-5-1 TO-77-6A-1 TO-77-6A-2
Mahaffy Twp.	Black River Mining Ltd.	64-1 64-2 64-3 64-4 64-5 64-6
Mahaffy Twp.	Duncan R. Derry Ltd.	1-13 8-1 8-2
Mahaffy Twp.	Phelps-Dodge Corp. of Can. Ltd.	6 152-7
Mahaffy Twp.	Rosario Resources Can. Ltd.	RM-1 RM-2 RM-4 RM-5 RM-6
Mahaffy Twp.	Teck Corp. Ltd.	T66-1 T-66-2
Mahaffy Twp.	United Porc. Mines Ltd.	1 3
McCart Twp.	Amoco Can. Petroleum Co. Ltd.	TO-77-6C-1 TO-77-6C-2 TO-77-12-1 TO-77-12-2
Reid Twp.	Caltor Syndicate	72-1 72-2 72-4
Reid Twp.	Chance Mining & Expl. Co. Ltd.	B-2 R-1 R-2
Reid Twp.	Rosario Resources Corp. Ltd.	RM-3
Tully Twp.	Amoco Can. Petroleum Co. Ltd.	TO-77-5A-1 TO-77-5A-2 TO-77-8-1
Whitney Twp.	Allerston, R.	AR-2 AR-3 AR-4

1978 Report of Kirkland Lake Resident Geologist

H.L. Lovell[1] and F.R. Ploeger[2]

CONTENTS

TABLES

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INTRODUCTION

Exploration activity for gold increased considerably. Exploration for silver was restricted by removal of the Gowganda-Elk Lake-Silver Centre area from the recording of any new mining claims until the issue of the Bear Island Indian caution is settled. Exploration for copper-zinc approximately maintained the modest rate that prevailed in 1977, including several extensive airborne geophysical surveys. Exploration for asbestos, nickel, and uranium was minimal (see Figure 1).

The following table of statistics was compiled for the Larder Lake Mining Division, which, with the

[1]Resident Geologist, Ontario Ministry of Natural Resources, 4 Government Road East, Kirkland Lake, P2N 1A2, telephone (705) 567-5242.

[2]Resource Geologist.

Cobalt area, forms the Kirkland Lake Resident Geologist's area.

TABLE 1 CLAIMS RECORDED AND ASSESSMENT WORK CREDIT RECEIVED LARDER LAKE MINING DIVISION.

	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophys. Surveys (Man Days)	Geological Surveys (Man Days)
1978	1 710	2 065	5 348	32 602	38 100	8 887
1977	1 826	2 834	5 703	37 101	45 436	1 802
1976	2 350	2 979	6 712	47 723½	42 147	6 220
1975	2 916	5 010	7 341	45 880	38 047	6 738
1974	4 757	2 296	9 435	40 678	55 716	4 441

In the Cobalt area, 70 claims were staked, and 36 cancelled.

RESIDENT GEOLOGIST'S ACTIVITIES

Staff consisted of a Resident Geologist and a Resource Geologist. For six months a contract geologist and for two months a mining technologist worked on a special data series project for the "Kirkland Lake Initiatives Program", a Federal-Provincial program designed to aid mineral exploration.

Activities included:

1. Completion of a geological map and Miscellaneous Paper on Bayly Township.
2. Completion of a study of the Ross gold mine.
3. Preparation of data series maps for 20 townships.
4. Examination of more than 40 mineral properties.
5. Evaluation of mineral resource potentials in respect of three lake developments and three park plans.
6. Evaluation of the mineral resource potential for the Kirkland Lake Resident Geologist's area, as part of the Ministry of Natural Resources' Strategic Land Use Plan for northeastern Ontario.
7. Examination and collection of representative samples of 1 500 m of diamond drill core.
8. Visiting five geological survey parties of the Ontario Geological Survey during the field season.
9. Conducting field trips for three Junior Ranger camps.
10. Participation in organizing a field trip for the Geological Association of Canada and the Geological Society of America in connection with Toronto '78.
11. Guiding geological field trips in the Kirkland Lake and Cobalt areas for explorationists.
12. Responding to inquiries from the mining and exploration industries, government and university personnel, and the general public. Government agencies dealt with included various Groups of the Ministry of Natural Resources; the Ministry of Transportation and Communications; the Ministry of Industry and Tourism; the Ministry of Housing; Ontario Hydro; the Ministry of Education; and Energy Mines and Resources Canada.
13. Compilation of a map showing the locations of airborne geophysical surveys, on file at the Kirkland Lake Resident Geologist's office (see Figure 3, Table 2).

MINING ACTIVITY

Nine mines, eight mills, and one refinery operated during 1978, producing gold-silver bullion, by-product copper ore, silver-cobalt concentrate, refined silver, iron ore pellets, asbestos fibre, and barite. In addition many sand and gravel pits operated.

Cobalt Area

AGNICO-EAGLE MINES LIMITED

Beaver-Temiskaming Mine

Exploration including several thousand feet of diamond drilling underground was continued, and a small amount of silver ore was mined primarily from the 1,600-foot level.

Coniagas-Tretheway Mine

Open-cut mining of silver ore continued throughout the year, employing front-end loaders and trucks.

Penn Mill

The Penn Mill operated from May until year's end. Production of silver in concentrate increased substantially over 1977.

CANADAKA MINES LIMITED

Bailey Mine

Mining of developed silver ore on the Bailey property was completed in 1978.

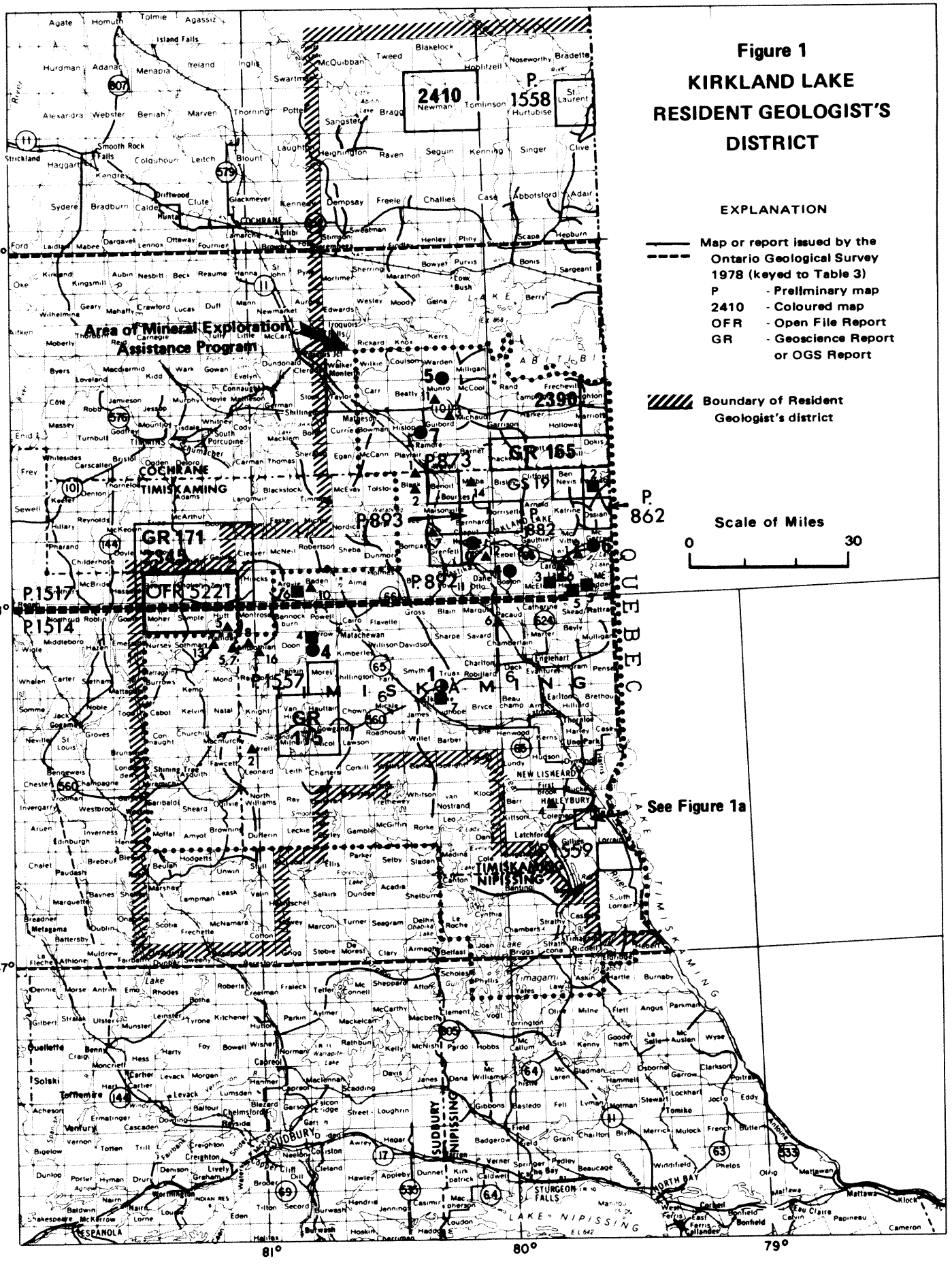
Figure 1
KIRKLAND LAKE
RESIDENT GEOLOGIST'S
DISTRICT
EXPLANATION
Map or report issued by the Ontario Geological Survey 1978 (keyed to Table 3)
P - Preliminary map
2410 - Coloured map
OFR - Open File Report
GR - Geoscience Report or OGS Report
Boundary of Resident Geologist's district
Scale of Miles
0
30
Area of Mineral Exploration Assistance Program
COCHRANE
TIMISKAMING
NIPISSING
SUDBURY
NEW LISKEARD
HAILEYBURY
NORTH BAY
STURGEON FALLS
ESPANOLA
See Figure 1a
49°
48°
47°
81°
80°
79°

EXPLANATION

● Producing Mines (see figure 3)
1. Adams Mine (Dominion Foundries and Steel Ltd.. . . . . Fe
2. Agnico-Eagle Mines Ltd.
a. Coniagas-Tretheway mine. . . . . Ag,Co
b. Beaver-Timiskaming mine. . . . . Ag,Co,Pb,Cu
3. Canadaka Mines Ltd.
a. Bailey mine . . . . . Ag,Co,Ni
b. Conisil-South Giroux mine . . . . . Ag,Co,Ni
c. Deer Horn mine (waste dump) . . . . . Ag
d. Kerr Lake mine (waste dump) . . . . . Ag
e. Lawson mine (no production) . . . . . Ag
f. University mine. . . . . Ag
4. Extender Minerals of Canada Ltd. . . . . barite
5. Hedman Mines Ltd.. . . . . serpentine filler
6. Kerr Addison Mines Ltd.. . . . . Au,Ag
7. Pamour Porcupine Mines Ltd. - Ross mine . . . . . Au,Ag,Cu
8. Teck Corporation Ltd. - Silverfields mine. . . . . Ag,Co
9. Willroy Mines Ltd. - Macassa mine . . . . . Au,Ag

◑ Mine under development
1. Northern Silver Fox Resources, Inc. . . . . Ag,Co,Cu
2. Waldag Silver Mining Co. Ltd.. . . . . Ag

✪ Refinery
1. Canadian Smelting and Refining (1974) Ltd. . . . . Ag

▲ Properties under evaluation or active exploration
1. Agnico-Eagle Mines Limited (Raven River mine) . . . . . Au
2. Card Lake Copper Mines Limited. . . . . Au
3. Cominco Ltd. . . . . Au
4. Conwest Exploration Co. Ltd.. . . . . base metals
5. Essex Minerals Co. . . . . base metals
6. Falconbridge Copper Ltd. (Hearst Tp.). . base metals
7. Falconbridge Copper Ltd. (Halliday Tp.) . . . . . Au,base metals
8. Inco Ltd.. . . . . Au
9. Kerr Addison Mines Ltd.. . . . . Au
10. Manitou Lake Gold Mines, Inc. . . . . Au
11. Munro-Croesus gold mine . . . . . Au
12. Newmount Exploration of Canada Ltd. . . . . Au
13. Northgate Explorations Ltd.. . . . . base metals
14. Rio Tinto Canadian Exploration Ltd. . . base metals
15. St. Joseph Explorations Ltd. . . . . Ag,base metals
16. United Asbestos, Inc.. . . . . asbestos

■ MEAP projects (project no. in parentheses)
1. Canadaka Mines Ltd. - Deer Horn Prop. (C.G. 142) . . . . . Ag
2. Conwest Exploration Company Ltd. (K.L. 96) . . . . . base metals
3. Falconbridge Copper Ltd. (K.L. 102) . . base metals
4. Hill, R.A. (C.G. 136) . . . . . barite
5. MacGregor, R.A. (K.L. 95, K.L. 97) . . . base metals
6. Mid-North Engineering Services Ltd. (C.G. 111, C.G. 138) . . . . . base metals
7. Northern Silver Fox Resources, Inc. (C.G. 139) . . . . . Ag,Co,Cu

COBALT AREA

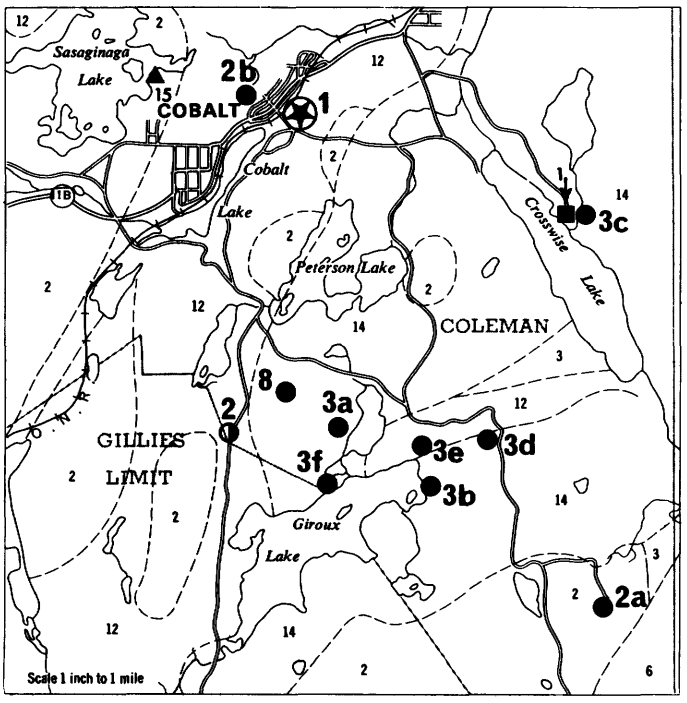

Figure 1a (from ODM Map 2188)

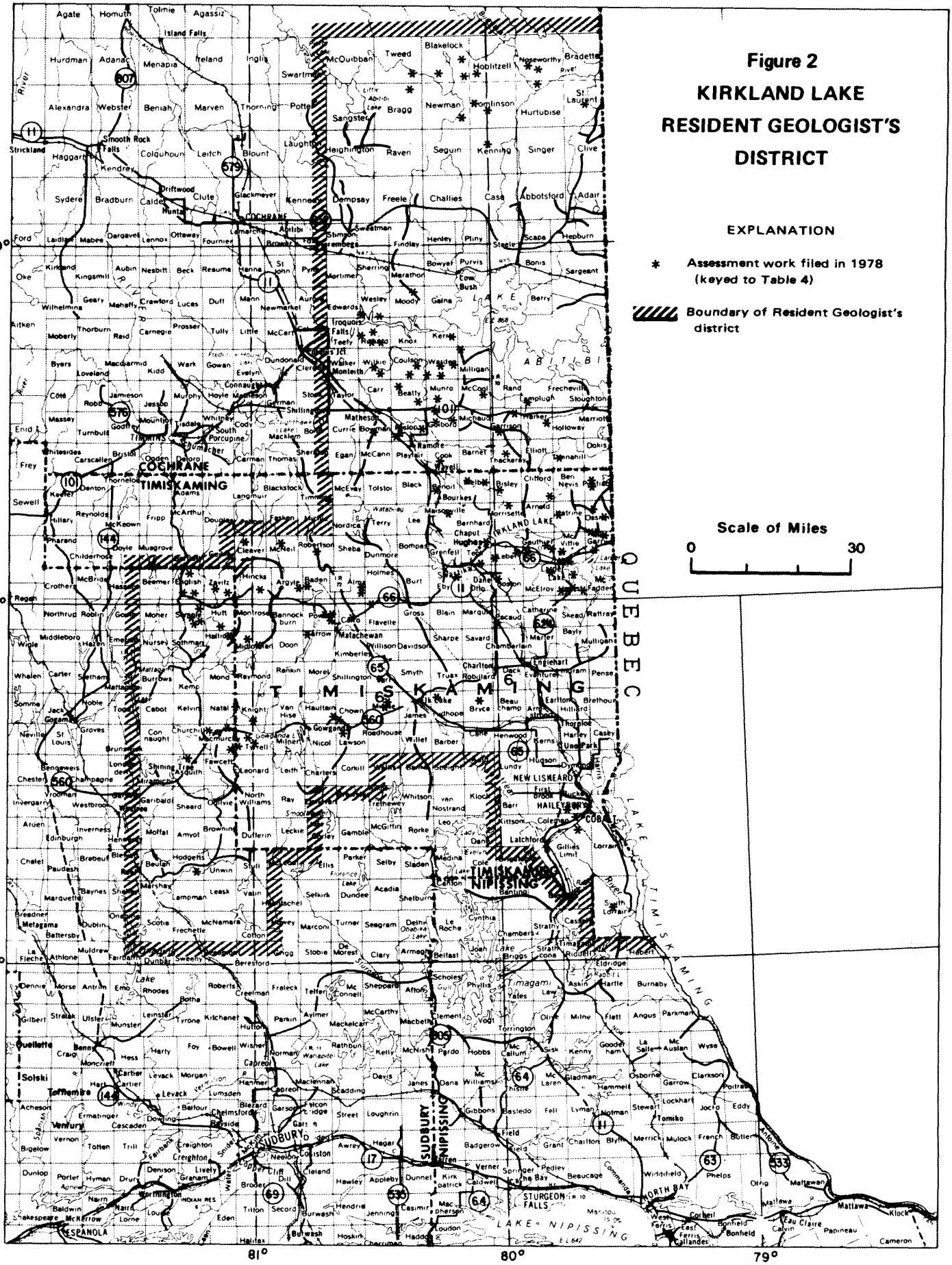
Figure 2
KIRKLAND LAKE
RESIDENT GEOLOGIST'S
DISTRICT
EXPLANATION
* Assessment work filed in 1978 (keyed to Table 4)
Boundary of Resident Geologist's district
Scale of Miles
0
30
49°
48°
47°
81°
80°
79°
QUEBEC
ONTARIO
COCHRANE
TIMISKAMING
NIPISSING
SUDBURY
KIRKLAND LAKE
NEW LISKEARD
HAILEYBURY
COBALT
TIMMINS
SUDBURY
NORTH BAY
STURGEON FALLS
ESPANOLA
LAKE NIPISSING
LAKE TIMISKAMING

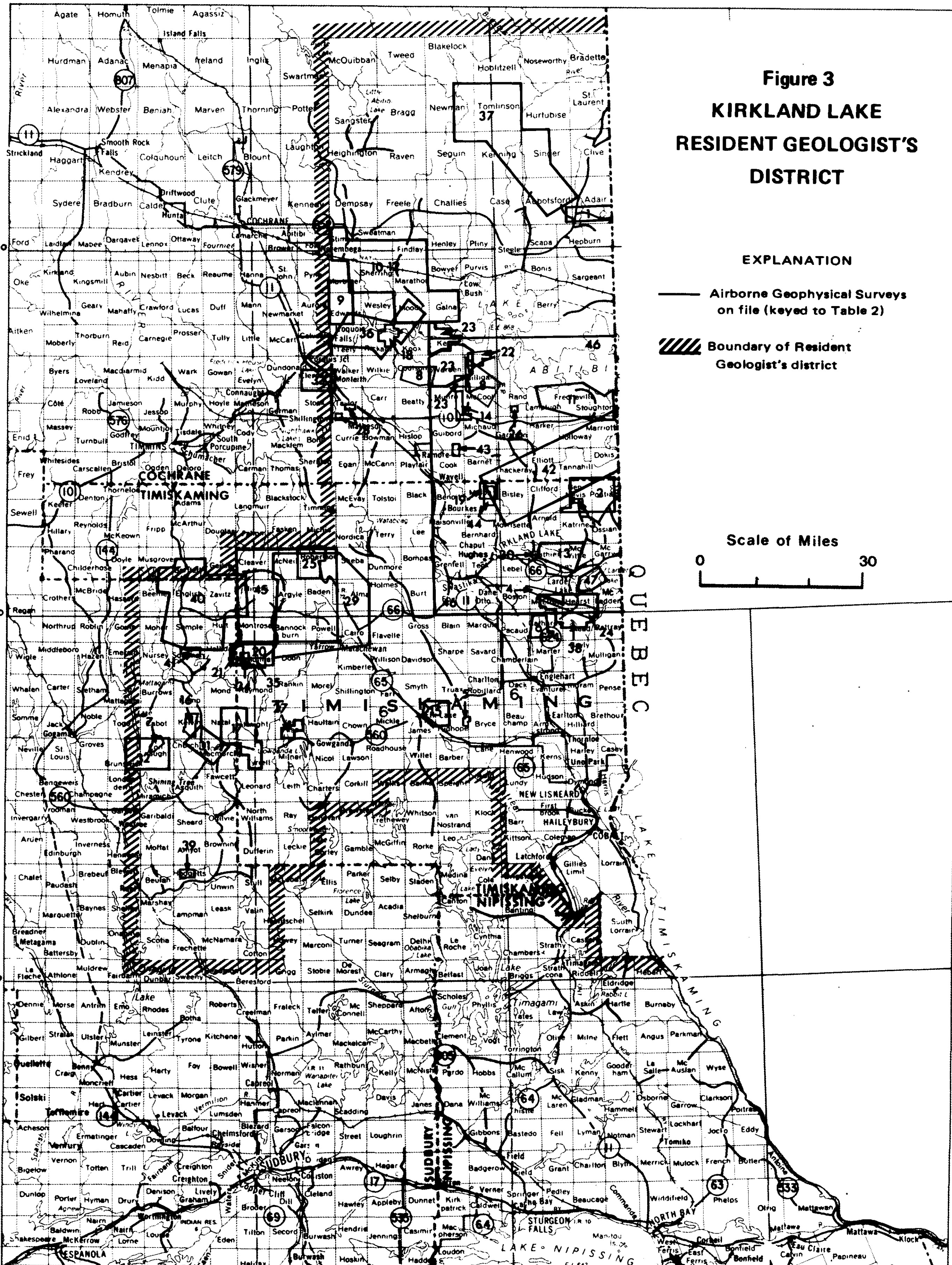

Figure 3
KIRKLAND LAKE RESIDENT GEOLOGIST'S DISTRICT

EXPLANATION

Airborne Geophysical Surveys on file (keyed to Table 2)

Boundary of Resident Geologist's district

NORTHERN – KIRKLAND LAKE

Conisil-South Giroux Mine

Some silver ore was mined, and on the 535-foot level an exploration drift was driven northeast about 1,000 feet, terminating on the Hargrave claim.

University Mine

Some ore was produced, and exploration was carried out underground, mainly on the 291-foot level.

Kerr Lake Mill

Silver ore from the underground operations described above, in addition to the Deer Horn, Kerr Lake, and several other mine dumps, were concentrated at the Kerr Lake mill.

Deer Horn, Drummond, Bursary, Lawson, and Cleopatra

PAST PRODUCERS OF SILVER

Exploration consisting of diamond drilling and geological mapping was carried out on these properties.

TECK CORPORATION LIMITED

Silverfields Mine

Production at the rate of about 250 tons per day continued during 1978; at this rate the ore reserves are adequate for about two years of production.

The diabase caprock over the ore was explored by 11 diamond drill holes from surface and by sub-drifting underground.

Waldag Mine

The Waldag shaft was dewatered and geological mapping was done on the first level and on the three winze levels. Cobalt-bearing veins with sparse associated silver were indicated only in the shaft area.

Silver Summit Mill

As was the practice during previous years, the Silverfields mine production was processed into silver concentrates at the mill on the nearby Silver Summit property.

CANADIAN SMELTING AND REFINING (1974) LIMITED

In 1978 St. Joseph Explorations Limited bought the part-ownership of Intsel of Canada Limited, thereby acquiring complete ownership of the silver refinery at Cobalt. Concentrates obtained mainly from nearby Cobalt mines were refined into bars of "reduced" (about 99 percent) silver and by-product copper residue and arsenic trioxide. In addition, silver is recovered from lead anode dross from the Texasgulf refinery at Timmins.

Elk Lake Area

NORTHERN SILVER FOX MINES LIMITED

The shaft at the former Big Jackpot silver mine was dewatered, and the 100-foot level was explored. A 25 kg sample of silver-bearing material was tested in Cobalt using an experimental recovery process.

Kirkland Lake Area

DOMINION FOUNDRIES AND STEEL LIMITED

Adams Mine

Production of iron ore from all four open pits, i.e. the South, Central, and North pits and the new Peria pit amounted to more than 1,200,000 tons of pellets, which were shipped to Dofasco steel plants in Hamilton. As mining progressed, small additions resulting from recalculations and limited exploration maintained ore reserves sufficient for upwards of 25 years production.

KERR ADDISON MINES LIMITED

Production of gold ore averaged about 20,000 tons per month. At a planned reduced rate of production, reserves are sufficient for mining into 1980. By the end of the year, the number of employees was reduced to 380.

WILLROY MINES LIMITED

Macassa Division

Production and milling was increased from about 300 to about 325 tons of gold ore per day. Stoping was carried out on the 2,400-foot level east of the Macassa shaft, and long drifts were driven southwestward on the 4,200 level for exploratory purposes and on the 4,750-, 5,000-, 5,150-, 6,300-, and 6,450-foot levels for explora-

tion and development. Ore reserves in November were about 385,000 tons grading about 0.5 ounce of gold per ton (G. Nemcsok, personal communication).

Matachewan Area

EXTENDER MINERALS OF CANADA LIMITED

Open-cut mining of barite ore in Yarrow Township was carried out from when the snow cover melted in the spring until the snow cover in the following winter exceeded about 0.3 m. The mill in Powell Township operated all year around. A truck haulage road to the Browning Lake barite deposit in Cairo Township was 90 percent completed in 1978.

UNITED ASBESTOS INCORPORATED

To test asbestos fibre quality, a pilot mill was operated at the minesite by Kilborn Engineering for The Clarkson Company Limited from November 1977 until February 1978.

Matheson-Holtyre Area

HEDMAN MINES LIMITED

Open-pit mining of serpentine filler continued during the relatively snow-free months, and the ore was trucked to the mill in Matheson throughout the year except for a two-month period during which the mill was shut down.

PAMOUR PORCUPINE MINES LIMITED

Ross Mine

Dismantling of the gold mill at the Ross mine was completed; the gold-silver-copper ore was trucked to Schumacher Division Mill in Timmins. The Ross mine shaft was deepened and a station was cut for a level to be developed at 3,150 feet in 1979. The open pit west of the mine dry produced 62,000 tons of ore, and 178,000 tons came from underground. Their combined total production of 240,000 tons of ore grading approximately 0.14 ounce of gold and 0.3 ounce of silver per ton and 0.21 percent copper exceeded all previous annual rates of production in the history of the Ross mine since start-up in 1935 (P. Baleck, personal communication).

[1] For location see Figure 2.

PROPERTY EXAMINATIONS

E. Bruno Gold Occurrence (1)[1] (Black Township)

Six claims of the original S. Henderson group, in north-central Black Township 30 km northwest of Kirkland Lake, were staked by Ernest Bruno of Ramore. Narrow shear zones and fractures striking generally north and dipping steeply are in grey to black, slightly magnetic (i.e. iron-rich) tholeiitic basalts and porphyritic diorite. Most veins and lenses are narrow, i.e. less than a few cm wide, in zones less than 0.7 m wide and 10 m long. Gangue minerals are white quartz and carbonate, and rare subhedral to anhedral feldspar typically localized adjacent to greenish black, chloritic slip surfaces along vein walls. Metallic minerals in the veins are pyrite and sparse chalcopyrite. In places the wall-rocks have been "bleached" to a pale colour. Three grab samples taken by the writer (assayed by Swastika Laboratories Limited) contained 0.03, 0.04 and 1.06 ounces of gold per ton.

The principal host rocks are of the Kinojevis Group and are comparable to the tholeiitic host rocks of Card Lake Copper Mines Limited in Black Township, where some success was achieved in 1978 in locating gold mineralization across moderate widths (The Northern Miner, October 19, 1978, p.A3). Additional work could include stripping of soil and fresh blasting of known gold-bearing zones. Subsequent efforts should be diverted to tracing favourable fracture zones and shears, some of the shears being strata-bound e.g. confined to tops of flow units. Some of the tracing can be done using appropriate electromagnetic methods.

A. Byberg Gold Occurrence (2) (Tyrrell Township)

The group consists of six claims situated 20 km west of Gowganda. Bulldozer stripping of soil on claim 5967 by Andy Byberg in 1978 has exposed the following rock types, textures, and relationships: greenish black, iron-rich, tholeiitic basalt; well pillowed, greenish grey, magnesium-rich tholeiitic basalt, with sulphides and patches of quartz-carbonate between some pillows; flow-top breccia and hyaloclastite; exhalative graphitic, cherty tuff interflow bands with a few blebs of chalcopyrite and malachite staining of nearby fractures and shear planes; feldspar porphyry dikes, with white weathered surfaces and buff coloured fresh surfaces.

White and blue quartz-carbonate veins (some of which contain gold) cut all rock types. Gold-bearing irregular quartz-carbonate patches are present in cherty bands that exist between several of the flows. Gold also was obtained in assays of wall-rocks, the significant

feature of which is the presence of disseminated fine-grained pyrite.

One km north of the recently bulldozed area, beside the bush road, is green carbonate rock, the projected extension of which, according to Ontario Geological Survey Map 2365 of Tyrrell Township, would be northeast of, i.e. stratigraphically below, the Byberg gold occurrences. The rock units are of the same general type that host the Kerr Addison gold ore i.e. Kinojevis Group-type tholeiites, Piche Group-type komatiites (many of them altered to green carbonate rocks), and exhalative cherty and carbonate sediments. Future work should include geophysical surveys designed to delineate strata containing gold-bearing pyrite similar to Kerr Addison "flow" ore.

J. Croxall, A. Allsopp, and P. Harrington Gold Occurrence (3) (Eby and Otto Townships)

These claims, which are 6 km south of the former Swastika gold mine, were held formerly by Todora Kirkland Prospecting Syndicate. Early exploration included limited diamond drilling, considerable pitting and trenching, and the sinking of the Cheltonia shaft to 37 m depth. In 1978, diamond drilling was done on the western claims by Patrick Harrington and soil stripping and rock trenching were done on the eastern claims by Jim and Ernie Croxall and Arnold Allsopp.

The outcrops are of: pillow-topped, mafic volcanic flows; chlorite-graphite-pyrite-cherty interflow sedimentary units; jasper-magnetite ironstone; green carbonate rocks; whitish talcose schist; greenish talc-chlorite-magnesite-dolomite schist; diorite; diabase; and syenite porphyry. Quartz-carbonate (magnesite or dolomite) veins cut all rock types, but are most numerous in green (coloured by chrome-bearing muscovite) carbonate rocks and interflow units. Carbonate veins cutting mafic volcanic rocks contain blebs of chalcopyrite and bornite a maximum of 2 cm in diameter.

The stratigraphic unit most favourable for gold may be silicified tuff containing disseminated, fine-grained pyrite. This silicified tuff was exposed in an area that is 120 m at 320 degrees from the 100 m station on the baseline that was cut in 1978 trending 080 degrees magnetic. At this location the silicified tuff stratigraphically underlies green carbonate rock. Geophysical surveying should be done that is both capable of following the generally east-trending schistose layers in the green carbonate rock, and sensitive enough to detect the disseminated pyrite in the silicified tuff.

D. James Gold Occurrence (4) (Hearst Township)

These six claims were part of the Tovarich Larder Gold Mines Limited group, situated 13 km west of the gold producer of Kerr Addison Mines Limited. The Tovarich Larder claims group was tested by several thousand feet of diamond drilling in 1943 and 1944, but large areas remained relatively unexplored. James staked claims in the late fall of 1977. In 1978 he extended known showings and prospected new areas by power stripping of soil, and by rock trenching using a plugger and blasting material and hand mucking.

Outcrops are of Early Precambrian ultramafic to mafic flows and tuffs, coarse to fine clastic sediments, and thin bands of ironstone. These strata are cut by dioritic and syenitic (including lamprophyre) rocks. Gold is found in syenitic and green carbonate rocks, associated with pyrite, quartz veins and pervasively silicified areas. Other metallic mineralization present is hematite (in the syenite), chalcopyrite, and galena. The quartz veins contain considerable carbonate where they cut carbonate rock and pink feldspar where they cut syenite. A character sample from reddish syenite porphyry cut by quartz stringers containing fine- to medium-grained pyrite yielded an assay of 0.15 ounce of gold and 0.4 ounce of silver per ton (D. James, personal communication).

As the current stripping has uncovered additional areas of green carbonate rock and silicified syenite, two such areas being widely separated and on the edges of beaver meadows along the brook, further efforts of this kind and subsequent assaying for gold may be warranted, preferably guided by suitable geophysical prospecting.

J. Larche and A. Rousseau Zinc-Copper-Gold-Lead-Silver Occurrence (5) (Falconbridge Copper Option)

The claims are 30 km west of Matachewan. Basic prospecting resulted in the discovery of zinc and gold along a strike-length of 600 m. Falconbridge Copper Mines Limited thereupon explored the zone systematically, culminating with diamond drilling. The mineralized zone was exposed at intervals by backhoeing, both across and along strike. The bedrock surface was pressure hosed with water to remove any remaining soil. The country rock is sericitic carbonate-bearing rhyolitic breccia that strikes east and dips northwards. Numerous amygdules indicate deposition in fairly shallow water. The principal host rocks are felsic volcanic rocks, and lenses of banded and massive cherts. Economic minerals are sphalerite and native gold, galena and associated silver, and chalcopyrite. The

economic minerals are concentrated for the most part along fractures.

H. Laskowski Gold Occurrence (6) (Pacaud Township, Concession I, Lot 10)

Intermittently since 1973, Hans Laskowski has used his own diamond drill and plugger and blasting to probe for gold in a small east-central part of the Round Lake granitic batholith at a location 20 km south of Kirkland Lake. Rock types present include trondhjemite or granodiorite, reddish syenite, mafic inclusions, and a mafic dike. By assaying several dozen samples over the years, widespread gold mineralization has been indicated, with concentrations in areas of 'ghost' inclusions of possible roof pendants. The gold seems to be associated specifically with quartz-carbonate veins bearing pyrite and minor amounts of chalcopyrite and molybdenite. The quartz veins are of various strikes and dips, the largest being 60 cm wide. In 1978, a rock trench opened up a nest of steeply dipping and gently west-dipping white and blue quartz veins. The veins contain chalcopyrite blebs and galena cubes, and cut wall-rocks that contain disseminated pyrite and have molybdenite along slip surfaces.

This part of the Round Lake granitic batholith is in the central deepest downdropped block of the Lake Timiskaming Rift Valley (Gibb and Boeckel 1970), and so can be expected to represent upper parts of the granite and therefore to contain more roof pendants. Thus, its gold content may be compared to occurrences peripheral to the granite, in the Boston Creek, Wawbewawa, and Charlton areas. Relatively weakly metamorphosed "greenstones" are present 2 km to the east of the Laskowski claims, on a claim belonging to W. Rodgers, where talc-chlorite schist and green carbonate rock are present in addition to the Round Lake "granite".

Future work should identify more clearly the association of the gold, whether concentrated mainly in epigenetic quartz veins or in pyritic wall-rocks, and whether the gold is related to and originated in the 'greenstone' inclusions.

C. Shea, W. Cooper, W. Sullivan Gold Occurrence (7) (Grenfell Township)

Intermittently since 1937, Ches Shea of Sesekinika has prospected for gold in an area of Grenfell Township south of, and on the opposite side of Highway 11 from the Northwood Camp for Crippled Children, 20 km northwest of Kirkland Lake. The country rocks are of the Kinojevis Group (L. Jensen, personal communication), and are for the most part tholeiitic basalts. Attempts to develop gold mines have been unsuccessful in this area between the Larder Lake-Cadillac Fault (followed approximately by Highway 66) and the Porcupine-Destor Fault (followed approximately by Highway 101) near the Ross mine of Pamour Porcupine Mines Limited at Holtyre.

Prospecting in the past, consisting of stripping, rock trenching, and sampling of white quartz-carbonate veins of a great variety of attitudes, resulted in erratic assays ranging from trace to more than one ounce of gold per ton. However, recently, more consistent gold concentrations in drill intersections across moderate widths have been reported by Card Lake Copper Mines Limited (The Northern Miner, October 19, 1978, p. A3) in Black Township 15 km north of the Shea gold occurrence. In addition, backhoe work on the Shea claims has uncovered basaltic host rocks yielding grab samples that assayed approximately 0.3 ounce of gold per ton in a zone of disseminated, fine-grained pyrite (W. Cooper, personal communication).

Stairs Property (8) (Midlothian Township)

The Stairs property is located 30 km west of Matachewan. The No.1 decline shaft exposes an Early Precambrian stratigraphic section that changes westward, from sedimentary rocks at the gold mine to felsic tuffs and ultimately to coarse pyroclastics north of Halliday Lake.

Bedding at the mine strikes west, dips steeply, and faces to the north. Cobbles and pebbles of the conglomerate host rock consist of: sodic rhyodacite breccia, vein quartz with chalcopyrite and tetrahedrite, rusty brown iron-rich carbonate rock, carbonaceous i.e. "graphitic" tuffs and slates, sulphide minerals (including colloform pyrite and marcasite), mafic volcanic rocks and green chrome-bearing muscovite.

West of and stratigraphically below the conglomerate, is whitish grey felsic ash rock and lapilli-tuff with clasts consisting of laminated chert, more massive black chert, and sericitic and chloritic fragments. Outcrops at the Campbell Lake landing campsite are of white siliceous tuff with much carbonate in the matrix. Farther west, north of Halliday Lake, is coarse rhyolitic breccia. At Mac Lake, and stratigraphically below the adit conglomerate, is a zone of graphitic "massive sulphide" rock. South of the cottage at the former campsite, the outcrop on the south bank of the creek is limestone.

RECOMMENDATIONS FOR EXPLORATION

The typical silver ores of the Cobalt area and vicinity occur as narrow, sub-vertical, high-grade carbonate veins occupying fractures in the Nipissing Diabase or in the adjacent Early Precambrian 'greenstone' or Middle

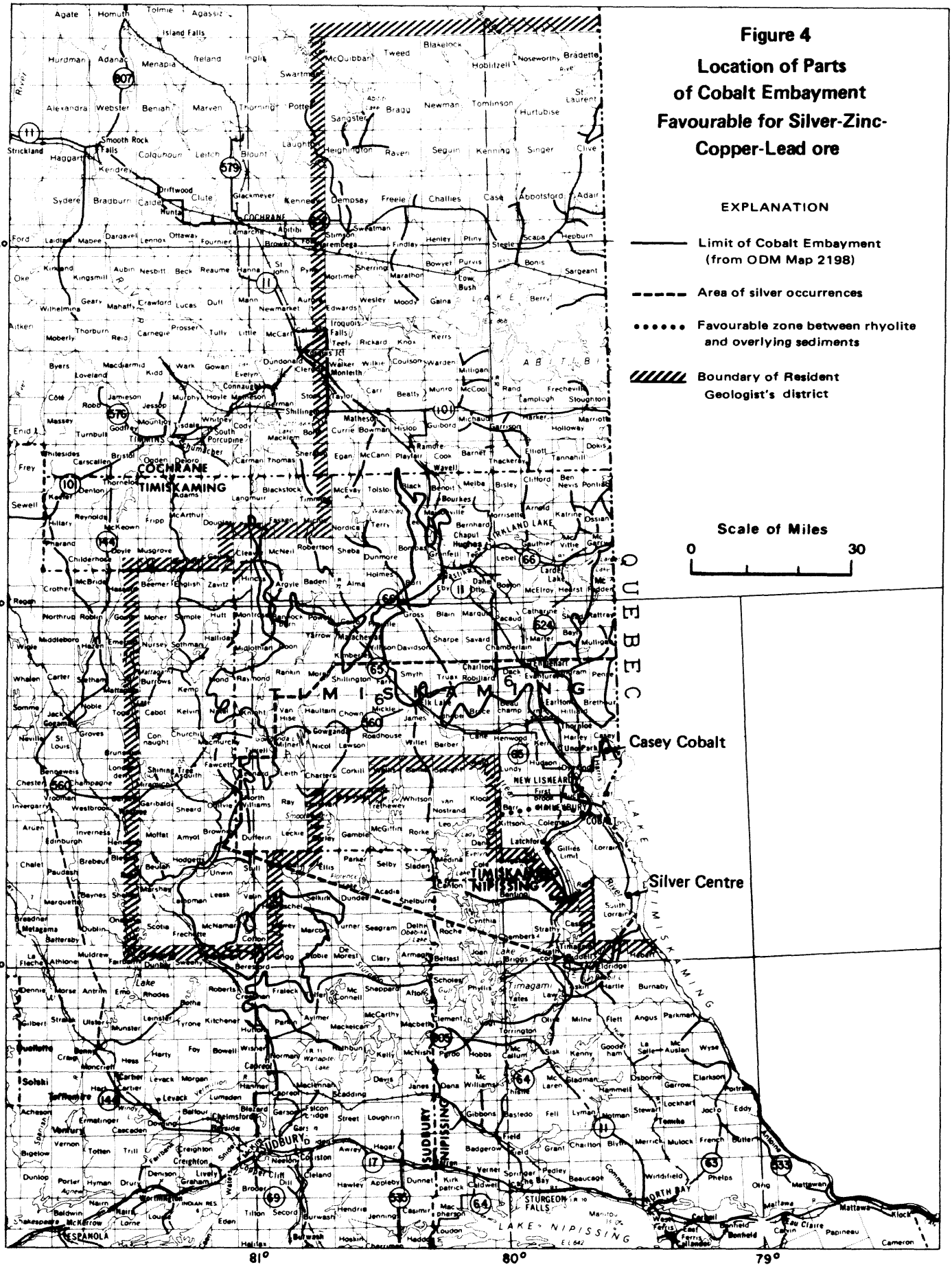
Figure 4
Location of Parts
of Cobalt Embayment
Favourable for Silver-Zinc-
Copper-Lead ore
EXPLANATION
Limit of Cobalt Embayment
(from ODM Map 2198)
Area of silver occurrences
Favourable zone between rhyolite
and overlying sediments
Boundary of Resident
Geologist's district
Scale of Miles
0
30
Casey Cobalt
Silver Centre
QUEBEC
COCHRANE
TIMISKAMING
NIPISSING
SUDBURY
49°
48°
47°
81°
80°
79°

Precambrian sedimentary rocks of the Gowganda Formation (Coleman Member). They are confined to a 5,000 km^2 area in the eastern and northern parts of the Cobalt embayment, the richest occurring at Cobalt, Silver Centre, Casey Cobalt, Elk Lake, and Gowganda.

Also in the Cobalt area silver is found in mudstone of the Gowganda Formation (Coleman Member) below the Nipissing Diabase or its projected horizon where removed by erosion, and in the basal 30 m above the unconformity with the Early Precambrian 'greenstone'. The silver appears to be concentrated within discrete beds within the mudstone and is associated with sphalerite and galena. Some is present as the mineral mckinstryite. The sulphides occur as discrete grains that may be interpreted as detrital, a thesis that is reinforced by the presence in one locality of a boulder in conglomerate, 0.4 m in diameter, composed principally of chalcopyrite, presumably derived from a basement source. Base metal sulphides have been found within the Early Precambrian rocks of the area, e.g. the Penn Cobalt lead-zinc-copper deposit (Thomson 1961b, p.71) and the LaRose copper occurrence (Thomson 1961a, p.93).

The above descriptions, although sketchy, give rise to the speculative suggestion that the silver of the carbonate veins of the area may have originated from polymetallic sulphide deposits in the Early Precambrian basement, and was remobilized as a result of thermal metamorphism related to the intrusion of the Nipissing Diabase. If this is the case, it may be that the silver-bearing carbonate veins associated with the diabase could serve as "pathfinders", indicating the presence of silver-bearing sulphide deposits of the Sturgeon Lake or Texasgulf type in the older formations at depth. In addition to the old silver mining camps, favourable geographic locations for silver-zinc-copper-lead deposits in Early Precambrian basement rocks, as indicated by numerous silver occurrences shown on the Ontario Geological Survey Compilation Maps 2205 (Pyke, Ayres, and Innes 1973) and 2361 (Card and Lumbers 1977), might thus include the Gowganda-Smoothwater Lake area, the Cassels-Riddell Townships area, and the Barr-Firstbrook-western Coleman Townships extension of the Cobalt area (see Figure 4).

Testing the "basement" silver source hypothesis would require geophysical aids such as:

1. Gravity surveys to detect Nipissing Diabase feeders, as illustrated by comparing the Timmins-Senneterre gravity map (Gibb, Boeckel, and Horne 1969) with its accompanying geological map.
2. Seismic surveys to attempt to determine depths to the unconformity between the gently dipping Middle Precambrian (mostly Coleman Member) cover rocks and the steeply dipping Early Precambrian basement "Keewatin" volcanic rocks (not Timiskaming Group metasediments or "Algoman" granitic rocks).
3. Very Low Frequency or other suitable deep penetrating electromagnetic methods to attempt to delineate the favourable contact between any basement felsic metavolcanics and stratigraphically overlying basement metasediments, both of which dip steeply.
4. Mercury detection methods to locate vapours emanating from metallic deposits and escaping via fractures and faults in basement and cover rocks.

The following geological exploration methods are suggested:

1. Trace to their sources in Early Precambrian basement rocks the chalcopyrite, sphalerite, and galena-bearing boulders, cobbles, pebbles, and sand grains in Middle Precambrian conglomerates, wackes, and mudstones within 30 m above the unconformity, by plotting dispersion trains and current ripple directions.
2. Locate the chemically precipitated sphalerite, galena, and silver-bearing minerals in limy mudstone that originated as lake bottom deposits filling Early Precambrian "trough" depressions i.e., paleovalleys.
3. By means of detailed surface mapping, identify basal members of the Middle Precambrian (mostly Coleman Member sedimentary rocks) and their steepened dips and slump features, in order to locate underlying Early Precambrian basement topographic highs. Some of these highs are composed of erosion-resistant felsic metavolcanics which may contain economic metals deposits.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Work by D.R. Pyke progressed on the regional stratigraphy and structure of western parts of the Timmins-Kirkland Lake area, including the Sinclair Lake area.

Work by L.S. Jensen continued on the regional stratigraphy and structure of the Timmins-Kirkland Lake area, and the Kirkland Lake-Larder Lake area.

The Burntbush-Detour Lakes area north of Lake Abitibi was mapped by G.W. Johns.

McFadden and Rattray Townships south of the gold mine of Kerr Addison Mines Limited were mapped by Z. Mandziuk.

Reconnaissance compilation mapping was begun by J. Wood as the first phase of further detailed studies in the Cobalt area.

The Quaternary geology of the Englehart area was mapped by J.D. Morton and R.C.F. King.

Quaternary geological mapping of the New Liskeard area, begun by J.D. Morton, R.C.F. King, and M.W. Kalin in 1977 was completed in 1978.

Quaternary geological mapping of the Larder Lake area was completed by C.L. Baker, and Quaternary geological mapping of the Kirkland Lake area was begun.

Reconnaissance work on chromium-bearing rocks across Ontario by P.J. Whittaker included examinations of rocks from Midlothian Township west of Matachewan, and from Steele Township north of Lake Abitibi.

A quantitative analysis of mineralization in northeast Ontario by P.A. Umar using 26 variables predicted favourable target areas for gold mineralization in the Timmins-Kirkland Lake area.

RESEARCH BY OTHER AGENCIES

1. D. Gamble, Laurentian University
   Trace elements in the quartz veins, and effects of wall-rock alteration (major elements) in the Macassa gold-silver mine at Kirkland Lake.
2. R.S. Hyde, McMaster University
   Timiskaming Group Sedimentary rocks of the Kirkland Lake-Larder Lake area.
3. L.A. Tihor, McMaster University
   Gold distribution in the Kirkland Lake-Larder Lake area, with emphasis on Kerr-Addison-type ore deposit.
4. L.S. Jensen, University of Saskatchewan
   Archean rocks of the area from Lake Abitibi to Kirkland Lake.
5. A. Hartlein, University of Toronto
   The Silverfields mine at Cobalt.
6. M. Jackson, University of Toronto
   Mafic volcanic rocks of Lava Flow Mountain, Ramore area.
7. I. Smith, University of Toronto
   The Kinojevis Group tholeiite-Blake River Group calc-alkaline contact near Ramore.

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TABLE 3 MAPS AND REPORTS PERTAINING TO THE KIRKLAND LAKE RESIDENT GEOLOGIST'S DISTRICT, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NATURAL RESOURCES, IN 1978 (Figure 6).

OGS REPORTS
- Report 165
- Report 171
- Report 175

OGS STUDY
- Study 19

MISCELLANEOUS PAPERS
- MP 75
- MP 77
- MP 78
- MP 81
- MP 82

OPEN FILE REPORTS
- OFR 5221
- OFR 5236

MISCELLANEOUS PUBLICATION
- Ontario Mineral Review

MINERAL POLICY BACKGROUND PAPER
- No. 4

MINERAL DEPOSITS CIRCULAR
- MDC 17

COLOURED MAPS
- Map 2345
- Map 2390
- Map 2410

PRELIMINARY MAPS
- P.862
- P.873
- P.882
- P.892
- P.893
- P.1514
- P.1517
- P.1557
- P.1558
- P.1559

TABLE 2 Airborne geophysical surveys.

LARDER LAKE MINING DIVISION

NO.	CLIENT	CONTRACTOR	TYPE	YEAR	TP. OR FILE NO.
1	Canadian Javelin Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1965	Abbotsford, Adair, Hepburn
2	Amax Exploration Inc.	Seigel Associates Ltd.	Mag, EM	1971	Ben Nevis, Pontiac, Katrine
3	Cominco Ltd.	Scintrex Ltd.	EM	1971	Ben Nevis
4	Knox	Aerophysics of Canada Ltd.	EM	1957	Boston, McElroy
5	Raylloyd Mines and Exploration Ltd.	Barringer Research	EM	1968	Bryce, Tudhope
6	Moncrieff Uranium Mines Ltd.	Questor Surveys Ltd.	EM	1970	Catharine
7	Bardyke Mines Ltd.	Lundberg Exploration Ltd.	Mag	1956	Connaught
8	Union Carbide Canada Mining Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Coulson, Milligan, McCool, Warden, Rand
9	Canadian Javelin Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Edwards, Mortimer
10	Glen Lake Silver Mines Ltd.	Hunting Survey Corporation	Mag, EM	1962	Mortimer, Edwards, Sherring, Wesley, etc.
11	Patino Mining Corporation, The	Questor Surveys Ltd.	EM	1971	Frecheville, Lamplugh, Stoughton, Marriot
12	North American Rare Metals Ltd.	Hunting Survey Corporation	Mag, EM	1962	Galna, Marathon, Moody, etc.
13	Upper Canada Mines Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Gauthier, McVittie
14	Consolidated Ranwick Uranium Mines Ltd.	Aeromagnetic Surveys Ltd.	Mag, Rad	1954	Guibord, Munro, Michaud
15	Corridor Mines Ltd.	Spartan Aero Ltd.	Mag, EM	1971	James, Tudhope, Truax
16	Timiskaming Nickel Ltd.	Huntec (Lockwood Survey)	Mag, EM	1968	Kelvin
17	Timiskaming Nickel Ltd.	Huntec (Lockwood Survey)	Mag, EM	1968	Knight, Natal, Tyrrell, Macmurchy
18	Biltaurum Mines Ltd.	Lundberg Exploration Ltd.	EM	1952	Knox, Rickard
19	Boland-Bell	Canadian Aero Mineral Surveys Ltd.	Mag, Em	1965	Melba
20	Laroma Midlothian Mines Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1963	Midlothian
21	Stairs Exploration	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1963	Midlothian
22	H. H. Wright Syndicate	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Milligan
23	Kennco Explorations (Canada) Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Munro, Milligan, Warden, Kerrs, McCool
24	Canadian Johns Manville Co. Ltd.	Hunting Survey Corporation	Mag	1964	Skead, McElroy
25	Denison Mines Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1965	McNeil, Robertson
26	Keevil Mining Group Ltd.	Canadian Aero Mineral Surveys Ltd.	EM	1964	Rand
27	Sutherland, W. D.	Huntec (Lockwood Survey)	Mag, EM	1968	Van Hise
28	Taylor Gold Mines Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Taylor
29	Geoscientific Prospectors	Mining Geophysics Ltd.	Mag		Powell, Cairo, etc.
30	Satellite Metal Mines Ltd.	M. J. Boylen Eng. Associates	Mag, Rad	1968	Gauthier
31	Hudson Bay Expl. & Dev. Co. Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Macmurchy, Kelvin, Natal, Churchill
32	Collins, R., Collins, Y., Marino, L., McKinnon, D., Todd, B.	Geoterrex Ltd.	Mag, EM	1971	Connaught, Brunswick
33	Alexo Extension Mines Ltd.	Canadian Aero Mineral Surveys Ltd.	Mag, EM	1964	Taylor, Walker, Clergue, Stock
34	Timiskaming Nickel Ltd.	Huntec (Lockwood Survey)	Mag, EM	1968	Midlothian
35	Canadian Johns Manville Co. Ltd.	Survair Ltd.	Mag	1969	Midlothian
36	Cominco	Questor Surveys Ltd.	Mag	1975	Edwards, Knox, Moody, Rickard, Teffy, Wesley
37	Dome Exploration (Canada) Ltd.	Kenting Earth Sciences Ltd.	Mag	1975	Abbotsford, Case, Newman, Singer, Tomlinson
38	Superior Northwest Inc.	Dighem Limited	Mag, EM	1976	Hearst, McElroy, McFadden, Skead
39	Metron Exploration Ltd.	Dighem Limited	EM	1976	Hodgetts
40	Granges Exploration Canada A.B.	Questor Surveys Ltd.	Mag, EM	1973	English, Beemer, Zavitz, Bartlett, Hincks, Semple, Hutt
41	Granges Exploration Canada A.B.	Questor Surveys Ltd.	EM	1975	Sothman
42	New Insco Mines Ltd.	Dighem Limited	Mag, EM	1974	Bisley, Clifford, Elliot, Tannahill, Dokis
43	Tagliamonte, F. & Fedora, J. A.	Dighem Limited	Mag, EM	1973	Guilbord, Cook
44	Here Fault Copper Limited	Dighem Limited	Mag, EM	1973	Melba
45	Ministry of Natural Resources	Questor Surveys Ltd.	Mag, EM	1974	Cleaver, McNeil; Robertson, Hincks, Argyle, Baden, Montrose, Powell, Bannockburn
46	Ontario Ministry of Natural Resources Department of Energy & Mines	Resource Geophysics & Geochemistry Division, Geological Survey of Canada.	Mag	1975	Kirkland Lake - Abitibi Lake Area
47	Geophysical Eng. Ltd.	Dighem	EM	1975	Hearst, McFadden, McVittie, McGarry

TABLE 4 Assessment work and other information received in 1978.

Kirkland Lake Resident Geologist's District

Abbreviations

A	-	assay values	IP	-	induced polarization	Ag	-	silver
AEM	-	airborne EM	Mag (2)	-	magnetometer (number of areas covered by survey)	asb	-	asbestos
AM	-	airborne Mag	MEAP	-	Mineral Exploration Assistance Program	Au	-	gold
ARa	-	airborne radiometric	OSC	-	Ontario Securities Commission	Co	-	cobalt
Asses.	-	assessment work	Ov DH	-	overburden drill hole	Cu	-	copper
C	-	correspondence	Pros.	-	prospectus	Mo	-	molybdenum
DDH (2)	-	diamond drill hole (number of holes)	R	-	resistivity	Ni	-	nickel
DH (perc.)	-	percussion drill holes	Ra	-	radiometric	Pb	-	lead
EM (2)	-	electromagnetic (number of areas covered by survey)	rTr	-	rock trenching	U	-	uranium
Gc	-	geochemical	sTr	-	soil trenching or stripping	Zn	-	zinc
GL	-	geological	u/g	-	underground work			
Gr	-	gravity	VEM	-	vertical loop EM			
HEM	-	horizontal loop EM	VLF-EM	-	very low frequency EM			
			XN	-	section (drill hole)			

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	TORONTO FILE NO.
Alma	42-A-2	Sheedy, Robert "Beaverdam Group"		Asses.	HEM	1977	2.2501
Alma, Holmes	42-A-1, 2	Sheedy, Robert & King, Henry (Brookbank Claims)		Asses.	rTr, sTr, HEM (2), A rTr	1977 1978	2.2481
Argyle	42-A-2	Mid-North Engineering Services Ltd.		MEAP CG-111	VLF-EM (2), Mag	1976-77	2.2128
Argyle	42-A-2	Mid-North Engineering Services Ltd. (Argyle-Input Property; New Kelore Mines Ltd.)		MEAP CG-138	HEM (2)	1978	2.2128
Asquith	41-P-11	Sullivan, Wm. J.	Au	Asses.	DDH (2)	1978	
Baden	41-P-2	Manitou Lake Gold Mines Inc. (see also Hames, C. M.)	Au	O.S.C. Asses.	Pros., DDH (7), A, GL (3), Mag	1977	2.2606
Beatty	42-A-9	Argyll Gold Mines Ltd.	Au	Donation	C	1947	
Beatty	42-A-9	Canadian Johns Manville Co. Ltd.	Asb	Donation	report	1951	
Benoit, Cook	42-A-8	Noranda Exploration Co. Ltd.		Donation	GL, Gc, VEM, Mag	1972	
Bisley	32-D-5	Rio Tinto Canadian Exploration Ltd.		Asses.	DDH	1978	
Blakelock	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group B"		Asses.	HEM (3)	1977	2.2445
Blakelock	42-H-8, 9	Hudson Bay Exploration & Development Co. Ltd. "Group C"		Asses.	HEM (2)	1977	2.2430
Blakelock	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group F"		Asses.	HEM (2)	1977	2.2445
Boston	32-D-4	Parsons, G. E.		Asses.	Mag, GL, ra GL, Mag (2)	1977 1978	2.2442 2.2608
Bowman	42-A-7, 8, 9, 10	Foster, Walter		Asses.	DDH	1978	
Bragg	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group L"		Asses.	HEM	1977	2.2397
Bryce	41-P-9	Campbell, E. E. (Norite Exploration Option)	Au	Donation	GL (2) A	1965 1975	
Bucke	31-M-5	Armstrong; Jack (Schneider claim)		Asses.	DDH	1978	
Bucke	31-M-5	Merit Explorations Inc.		Asses.	DDH (4)		
Bucke	31-M-5	Merit Explorations Inc.		Asses.	DDH	1978	
Bucke	31-M-5	Merit Explorations Inc.		see under Coleman Township			
Bucke, Coleman	31-M-5	Merit Explorations Inc.		Donation	Pros.	1978	
Bucke, Coleman	31-M-5	Saint Joseph Explorations Ltd. ("Sas Lake Group")	Cu, Zn, Ag	Asses.	Gc (2), report (2)	1977	2.2509

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	TORONTO FILE NO.
Cairo	41-P-15, 16	Welsh, George S.		Asses.	GL	1976	
Cairo, Flavelle	41-P-15, 16	Welsh, George S.		Asses.	Mag (2)	1976	2.2061
Catharine, Marter	31-M-13	Allsopp, Arnold (Cath-Mart Property)	Cu, Zn, Ag	Asses.	sTr, VLF-EM (2)	1977	2.2450
Chown	41-P-10	New Morrison Mines Ltd.		see under Nicol Township			
Cleaver	42-A-2, 3	Imperial Oil Enterprises Ltd. (see also Robertson, Hincks Township)		Asses.	Mag, HEM	1976	
Clifford	32-D-5	Noranda Exploration Co. Ltd.		Asses.	DDH (4), A, XN (4)	1977	2.2385
Clifford	32-D-5	Noranda Exploration Co. Ltd. (Croxall Option)	Cu, Au	Asses.	GL	1977	2.2551
Coleman	31-M-5	Canadaka Mines Ltd. (Deer Horn Prop.)		MEAP CG-142	DDH	1978	MEAP CG-142
Coleman	31-M-5	Canadian Smelting & Refining (1974) Ltd.		Donation	Smelting	1977	
Coleman	31-M-5	Merit Explorations Inc.		see under Bucke Township			
Coleman, Bucke	31-M-5	Merit Explorations Inc.		O.S.C.	Pros.	1977	
Coleman	31-M-5	Roy Silver Mines Ltd.	Co, Ag	Donation	Report	1953	
Coleman	31-M-5	St. Joseph's Explorations Ltd. (Burton Option)		Asses.	Mag, HEM	1978	2.2733
Coleman	31-M-5	Saint Joseph Explorations Ltd. ("Sas Lake Group")		see under Bucke Township			
Cook	42-A-8	Amax Potash Ltd.		Asses.	GL	1978	2.2643
Cook	42-A-8	Noranda Explorations Co. Ltd.		see under Benoit Township			
Coulson	42-A-9	Amax Exploration Inc.		Asses.	GL	1978	2.2646
Eby	42-A-1	Harrington, Patrick		Asses.	DDH (2)	1978	
Edwards	42-A-15	Cominco Ltd. (GAP Project) War 1 Grid		Asses.	Mag, HEM, Gr DDH	1977	2.2419
Edwards	42-A-15	Cominco Ltd. (GAP Project) War 2 Grid		Asses.	Mag, HEM, Gr	1977	2.2419
Edwards	42-A-15	Cominco Ltd., Go 1, War 3 Grid		see under Wesley Township			
English	42-A-3	Essex Minerals Co. Ltd. South Central, Block I	Cu, Pb, Zn	Asses.	Mag (2), HEM (2), GL	1977	2.2504
English	42-A-3	Essex Minerals Co. Ltd. South Central, Block II	Cu, Pb, Zn	Asses.	Mag (2), HEM (2), GL	1977	2.2504
English	42-A-3	Essex Minerals Co. Ltd. South Central, Block III	Cu, Pb, Zn	Asses.	Mag (2), HEM (2), GL	1977	2.2504
Farr	41-P-16	Roy Silver Mines Ltd.	Ag, Co	Donation	DDH (6), DDH (3) Report, u/g A, u/g, C	1953-56 1953 1954	
Fawcett	41-P-11	Getty Mines Limited "Foley Lake Groups A, B, C"		see under Tyrrell Township			
Flavelle	41-P-15, 16	Welsh, George S.		see under Cairo Township			
Garrison	32-D-5	Amax Exploration Inc.		Asses.	GL	1978	2.2646
Garrison	32-D-5, 12	Brydges Gold Mines Ltd. (see also Inspiration Mining & Development Co. Ltd.; Consolidated Mining & Smelting of Canada Ltd.; Wright-Hargreaves Mines Ltd.; "Garrison")	Au	Donation	C	1935	
Gauthier, Lebel	32-D-4	International Nickel Co. of Canada Ltd.	Au	Asses.	Mag (13), GL (6)	1977	2.2441, 2.2531
Gauthier, Lebel	32-D-4	International Nickel Co. of Canada Ltd.	Au	Asses.	DDH (4)	1978	
Gauthier	32-D-4	Lacasse, Lucien and MacGregor, R. J. (see also MacGregor, R. J.)		Asses.	VLF-EM	1978	2.2736
Gauthier	32-D-4	MacGregor, R. A. (see also Lacasse, Lucien and MacGregor, R. J.)		Asses.	VLF-EM	1978	2.2624
Gauthier	32-D-4	Queenston Gold Mines, Ltd.	Au	Asses.	Annual Report	1977	
Gauthier	32-D-4	Wadasa Gold Mines Ltd. (see also Kirkland Larder Mines Ltd.; Grant-Duffet)	Au	Donation	Report	1949	

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	TORONTO FILE NO.
Gillies Limit (North Part)	31-M-5	Teck Corporation		Asses.	Mag, VLF-EM	1978	2.2744
Guibord, Munro	42-A-9	Blake, Fred		Asses.	VLF-EM	1977	2.2522
Guibord	42-A-8, 9	Cominco (Gib Property)		Asses.	DDH (8), GL OV DH (32)	1978	2.2515
Guibord	42-A-8, 9	Nawroski, Lillian		Asses.	sTr	1977	
Halliday, Hutt	41-P-14	Essex Minerals Co. Ltd. South Central, Block VII	Cu, Pb, Zn	Asses.	GL, Mag (3) HEM (4)	1977	2.2504
Halliday	41-P-14	Falconbridge Copper Ltd. "Larche Rousseau Option"		Asses.	DDH (7)	1978	
Halliday	42-P-14	Northgate Exploration Ltd. (Allerston Option)		Asses.	DDH (6)	1978	
Halliday	41-P-14	Stairs Exploration and Mining Co. Ltd. (see also Sherwood Gold Mines Ltd.; Rio Tinto Canadian Explorations Ltd.; Regan Property)		see under Midlothian Township			
Harker	32-D-5, 12	Harlight Gold Mines Ltd. (see also McRae)	Au	Donation	C	1946	
Harker	32-D-5, 12	Ontario Cryderman Gold Mines Ltd. (see also Tumac Mining and Development Co.; Hanson, A.)	Au	Donation	sTr	1940	
Haultain	41-P-10	New Morrison Mines Ltd.		see under Nicol Township			
Haultain	41-P-10	Roy Silver Mines Ltd.	Ag, Co	Donation	DDH (11), A (2), u/g, A	1951	
Hearst	32-D-4	Colex Exploration Inc.		Asses.	VLF-EM	1978	2.2697
Hearst, McElroy	32-D-4	Falconbridge Copper Ltd. (see also D. Lowe) "Larder Lake Project"	Cu, Zn	MEAP KL-102	project, DDH (5), A, XN (5), plan section	1978	MEAP KL-102
Hearst	32-D-4	Kozdas, Anton		Asses.	sTr sTr	1977 1978	
Hearst	32-D-4	Lowe, D.	Cu, Au	Asses.	sTr, rTr, GL	1977	
Hearst, Skead	32-D-4	MacGregor, R. A. (A1-F1)		Asses.	Mag, VLF-EM	1978	2.2624
Hearst, Skead	31-M-13 32-D-4	MacGregor, R. A. "Group D1"	Cu, Zn	MEAP KL-95	VLF-EM, Mag, Gc (6)	1978	MEAP KL-95
Hearst, Skead	32-D-4 31-M-13	MacGregor, R. A. "Group F1"	Cu, Zn	Asses.	Mag, VLF-EM	1977	2.2508
Hearst, McVittie	32-D-4	MacGregor, R. A. (Group 2)		Asses.	VLF-EM, Gc	1978	2.2624
Hearst	32-D-4	MacGregor, R. A. (Group 2) (adjoining Martin Bird G.M.L.)		Asses.	VLF-EM, Mag	1978	2.2665
Hearst, McFadden	32-D-4	MacGregor, R. A. "Group 3"		MEAP KL-97	Mag, VLF-EM (2), Gc (3)	1977	MEAP KL-97
Hearst	32-D-4	Noranda Exploration Co. Ltd.		Donation	GL	1973	
Hearst	32-D-4	Petrin; Mortson	Au	Donation	GL	1978	
Hearst	32-D-4	Sudbury Contact Mines Ltd.		Asses.	DDH	1978	
Hincks	42-A-2, 3	Imperial Oil Enterprises Ltd. (see also Cleaver & Robertson)		Asses.	Mag, HEM	1976	
Hislop	42-A-8, 9	Birch, W. T.	Au	Donation	C	1934	
Hislop	42-A-8, 9	Lefebre, F.		Donation	C	1947	
Hislop	42-A-8, 9	Noranda Exploration Co. Ltd.		Asses.	Mag, HEM, GL	1978	2.2696
Hislop	42-A-8, 9	Vimy Gold Mines Ltd. (see also Dowson, W. C. H.)	Au	Donation	C	1937, 1947	
Hislop	42-A-8, 9	Weir, J.; Weir, F. (see also Birch, W. T.)	Au	Donation	C	1934	
Hoblitzell	32-E-12 42-H-9	Hudson Bay Exploration & Development Co. Ltd. "Group A"		Asses.	HEM	1977	2.2444
Hodgetts	41-P-3, 6	Card Lake Copper Mines Ltd.	Cu	Asses.	DDH (3), XN	1977	
Holmes	42-A-1, 2	Sheedy, Robert & King, Henry (Brookbank Claims)		see under Alma Township			
Hurtubise	32-E-5	Hudson Bay Exploration & Development Co. Ltd. "Group B-7"		Asses.	HEM (2)	1977	

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	TORONTO FILE NO.
Hutt, Semple	41-P-14	Essex Minerals Co. Ltd. East Central, Block V	Cu, Pb, Zn	Asses.	Mag (2), HEM (2), GL	1977	2.2504
Hutt	41-P-14	Essex Minerals Co. Ltd. South Central, Block VII		see under Halliday Township			
Katrine	32-D-4, 5	Noranda Exploration Co. Ltd.		Donation	GL, Gc	1972	
Kenning	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group O"		Asses.	HEM (2)	1977	2.2429
Kerrs, Warden	42-A-9, 16	Denison Mines Ltd.	Au	Asses.	Gc (3), Mag (2), reports (2)	1976-77	2.2463
Knight, Natal	41-P-10, 11	Getty Mines Limited "Arthur Lake Group"	Cu, Zn, Pb	Asses.	Gc (2), Mag, Turam-EM	1977	2.2374
Knight	41-P-10, 11	Getty Mines Limited "West Montreal River Group"		see under Tyrrell Township			
Lamplugh	32-D-12	Canadian Johns-Manville Co. Ltd. "Hunch Option"	asb	Asses.	Mag, VEM	1977	2.2408
Lawson	41-P-10	New Morrison Mines Ltd.		see under Nicol Township			
Lawson	41-P-10	Powerful Mine		Donation Donation	C GL	1953-62 1963	
Lebel	32-D-4	International Nickel Company of Canada Ltd.		see under Gauthier Township			
Lebel	32-D-4	International Nickel Company of Canada Ltd.	Au	see under Gauthier Township			
Lebel	32-D-4	Labine, M. J., Duranseau, Y. (see also Dane Copper Mines Ltd.; Nucleonic Mines Ltd., Gray, J. J.)		Asses.	Mag	1977	2.2552
Maisonville	42-A-1	Wolfe Lake Mines Ltd. (Lakeland Gold Mines)	Au	Donation	u/g	1978	
Marter	31-M-13	Allsopp, Arnold (Cath-Mart Property)		see under Catharine Township			
Melba	42-A-8	Here Fault Copper Ltd.	Cu, Zn	Asses.	DDH (3), DDH, A, XN	1977	
Melba	42-A-8	Rio Tinto Canadian Exploration Ltd.		Asses.	HEM (8), Mag (4)	1978	2.2600
Melba	42-A-8	Rio Tinto Canadian Exploration Ltd.		Asses.	DDH	1978	
Mickle	41-P-9, 10	Mickle Silver Mines Ltd.	Ag, Co	Donation	C	1934	
Mickle	41-P-9, 10	Welsh Silver Mines Ltd. (see also Sheedy, Robert)		Asses.	rTr sTr	1978 1977	
Midlothian, Halliday	41-P-14, 15	Stairs Exploration and Mining Co. Ltd. (see also Sherwood Gold Mines Ltd.; Rio Tinto Canadian Explorations Ltd.; Regan Property)	Au	Donation	C report	1965 1963	
Midlothian	41-P-14, 15	United Asbestos Inc.		Asses.	Gr	1976	
Milligan	42-A-9	Denison Mines Ltd.	Au	see under Kerrs Township			
Moody	42-A-16	Cominco Ltd. - Gap Project		Asses.	DDH (2), Mag (2), HEM (2), Gr (2)	1977	2.2416
Morrisette	32-D-4, 5	Rio Tinto Canadian Exploration Ltd. (Black River Project)		Asses.	DDH (4), Mag, HEM	1978	2.2599
Munro	42-A-9	Amax Exploration Inc.		Asses.	GL	1978	2.2651
Munro	42-A-9	Blake, Fred		see under Guibord Township			
Munro	42-A-9	Canadian Johns-Manville Co. Ltd.	Asb	Donation	C, Gr A	1949 1950	
Munro	42-A-9	Hedman Mines Ltd. (see also Dyman Prospecting Syndicate)		see under Warden Township			
McCool	42-A-9	Amax Potash Limited		Asses.	GL	1978	2.2658
McElroy	32-D-4	Falconbridge Copper Ltd. (see also D. Lowe) "Larder Lake Project"		see under Hearst Township			
McFadden	32-D-4	MacGregor, R. A. "Group 3"		see under Hearst Township			
McGarry	32-D-4	Kerr Addison Gold Mines Ltd.	Au	Donation Asses.	C report	1941 1977	
McGarry	32-D-4	Noranda Exploration Co. Ltd.		Asses.	HEM (2), Mag	1977	2.2547
McGarry	32-D-4	Ram Petroleums Ltd.		Asses.	Mag (2)	1977	2.2550

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	TORONTO FILE NO.
McGarry	32-D-4	Ram Petroleums Ltd.		Asses.	Turam-EM	1978	2.2702
McGarry	32-D-4	Walker, James	Au	Asses.	DDH	1978	
McGarry	32-D-4	Walker, James	Au	Asses.	DDH (2)	1978	
MacMurchy	41-P-11	Decker, Albert		Asses.	rTr, sTr	1977	
MacMurchy	41-P-11	Getty Mines Limited "Big Four Lake Group"		Asses.	Gc (2), Mag, Turam EM	1977	2.2374
MacMurchy	41-P-11	Getty Mines Limited "Foley Lake Groups A, B, C"		see under Tyrrell Township			
McNeil	42-A-2	Noranda Exploration Co. Ltd.		Asses.	DDH	1978	
McVittie	32-D-4	MacGregor, R. A. (Group 2)		see under Hearst Township			
McVittie	32-D-4	Swansea Gold Mines Inc.	Au	Asses.	DDH	1976	
Natal	41-P-11	Getty Mines Limited "Arthur Lake Group"		see under Knight Township			
Newman	42-H-8	Dome Exploration (Canada) Ltd.		Asses.	DDH (2)	1977	
Newman, Tomlinson	42-H-8, 32-E-5	Dome Exploration (Canada) Ltd.		Asses.	Mag, HEM (2)	1975 1976	2.2376
Newman, Tomlinson	42-H-8, 32-E-5	Dome Exploration (Canada) Ltd.		Asses.	DDH (10)	1978	
Newman	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group N"		Asses.	HEM	1977	2.2428
Nicol, Haultain, Chown, Lawson	41-P-10	New Morrison Mines Ltd.		Asses.	GL	1958	
Noseworthy	32-E-12	Hudson Bay Exploration & Development Co. Ltd. "Group B-4"		Asses.	HEM (2)	1977	2.2527
Noseworthy	32-E-12	Hudson Bay Exploration & Development Co. Ltd. "Group B-6"		Asses.	HEM (2)	1977	
Ossian	32-D-4	Minedel Mines Ltd. (see also Ossian Gold Mines Ltd.)	Cu, Zn, Pb, Au	O.S.C.	Pros.	1977	
Ossian	32-D-4	Noranda Exploration Co. Ltd.		see under McGarry Township			
Ossian	32-D-4	Noranda Exploration Co. Ltd.		Asses.	DDH	1978	
Otto	42-A-1	Noranda Exploration Co. Ltd.		Donation	GL, DDH	1976	
Pacaud	32-D-13	Laskowski, Hans	Au	Asses.	DDH (2)	1978	
Pontiac	32-D-5	Conwest Exploration Co. Ltd.		MEAP KL-96	GL, HEM (2), DDH (5), A	1977	2.2581
Pontiac	32-D-5	Noranda Exploration Co. Ltd.		Donation	GL	1975	
Pontiac	32-D-5	Ram Petroleums Ltd.		Asses.	Mag, Turam-EM	1978	2.2745
Powell	41-P-15	Amax Exploration Inc.		Asses.	HEM, VLF-EM, Mag	1977	2.2710
Powell	41-P-15	Copper Lake Explorations Ltd.		Asses.	IP (3) & Profiles (15)	1975-76	2.2250
Powell	41-P-15	Welsh, George Stanley		Asses.	rTr	1974	
Powell	41-P-15	Yandel Jr., Dr. F.	Au	Asses.	Mag, VLF-EM, GL	1977	2.2453
Rattray, Skead	31-M-13	MacGregor, R. A. (Rattray Group)	Cu, Zn	Asses.	Mag (2), VLF-EM	1977	2.2508
Rickard, Wesley	42-A-9, 10, 15, 16	Cominco Ltd. Go 2, Grid		Asses.	DDH, Gr, HEM (3), Mag	1977	2.2417
Rickard	42-A-10	Cominco Ltd. (GAP Project) Kard 1, Grid		Asses.	Mag, HEM (4), Inclinometer survey	1977	2.2418
Rickard	42-A-9, 10	Cominco Ltd. (GAP Project) Kard 2, 3 Grid		Asses.	Mag, HEM (3), Gr (2)	1977	2.2418
Rickard	42-A-9	Cominco Ltd. (GAP Project) Kard 4, Grid		Asses.	Mag, HEM, Gr	1977	2.2418
Rickard	42-A-9	Twindyke Mines Limited (see also Rickard Gold Mines Limited; Riczone Mines)	Au	Donation	GL (5), Gr (4), u/g, A, Pros., DDH (3), rTr, C	1978	
Robertson	42-A-2	Imperial Oil Limited (see also Hincks & Cleaver Townships; Larche, J. P.)		Asses.	DDH, Mag, HEM	1976-77	

LOCATION	NTS	FILE NAME	COMMODITY SOUGHT	TYPE OF REPORT	TYPE OF WORK	YEAR	TORONTO FILE NO.
Saint Laurent	32-E-5	Asarco Exploration Co. (Canada) (see "R. S. Gray prop" and Patten River Project)	Cu, Ni	Donation	report	1978	
Semple	41-P-14	Essex Minerals Co. Ltd. East Central, Block IV	Cu, Pb, Zn	Asses.	Mag (2), HEM (2), GL	1977	2.2504
Semple	41-P-14	Essex Minerals Co. Ltd. East Central, Block V		see under Hutt Township			
Semple	41-P-14	Essex Minerals Co. Ltd. Central South, VI	Cu, Pb, Zn	Asses.	Mag (2), HEM (2), GL	1977	2.2504
Skead VI 5	31-M-13	Kozdas, Anton		Asses.	sTr	1978	
Skead	31-M-13E	MacGregor, R. A.		Asses.	GL	1978	2.2752
Skead	32-D-4	MacGregor, R. A. (A1-F1)		see under Hearst Township			
Skead	31-M-13	MacGregor, R. A. "Group D1"		see under Hearst Township			
Skead	31-M-13	MacGregor, R. A. "Group F1"		see under Hearst Township			
Skead	31-M-13	MacGregor, R. A. (Rattray Group)		see under Rattray Township			
Skead	32-D-4	Noranda Exploration Co. Ltd.		Donation	GL	1973	
South Lorrain	31-M-3, 4	Roy Silver Mines Ltd.	Co, Ag	Donation	Report	1953	
South Lorrain	31-M-4	St. Joseph Exploration Ltd.		Asses.	Mag, HEM	1978	2.2719
Tannahill	32-D-5	Clarke, Ronald M.		Asses.	sTr	1977	
Teck	42-A-1	Lakeshore Mines Ltd.		Donation	u/g	1978	
Teck	42-A-1	Sylvanite Gold Mines Ltd. (Erie Canadian Mines Ltd.)	Au	Donation	C	1937	
Thackeray	32-D-5	Amax Minerals Explorations (Matheson claims)		Asses.	GL	1978	2.2650
Tomlinson	42-H-8, 32-E-5	Dome Exploration (Canada) Ltd.		see under Newman Township			
Tomlinson	42-H-8, 32-E-5	Dome Exploration (Canada) Ltd.		see under Newman Township			
Tudhope	41-P-9	Northern Silver Fox Resources Inc.	Ag, Co, Cu	MEAP CG-139	Mag, VLF-EM	1978	MEAP CG-139
Tweed	42-H-8	Hudson Bay Exploration & Development Co. Ltd. "Group J"	Cu, Zn, Au	Asses.	HEM	1978	2.2370
Tyrrell	41-P-10, 11	Getty Mines Limited "Cripple Lake Group"		Asses.	Gc (2), Turam-EM	1977	2.2374
Tyrrell, Fawcett, MacMurchy	41-P-10, 11	Getty Mines Limited "Foley Lake Groups A, B, C"		Asses.	Gc (6), Mag (2), Turam-EM	1977	2.2374
Tyrrell	41-P-10, 11	Getty Mines Limited "Hare Lake Group"		Asses.	Gc (2), Mag, Turam-EM	1977	2.2374
Tyrrell, Knight	41-P-10, 11	Getty Mines Limited "West Montreal River Group"		Asses.	Gc (2), Mag, Turam-EM	1977	2.2374
Warden	42-A-9	Amax Potash Ltd.		Asses.	GL	1978	2.2652
Warden	42-A-9	Denison Mines Ltd.		see under Kerrs Township			
Warden, Munro	42-A-9	Hedman Mines Ltd. (see also Dyman Prospecting Syndicate)	Asb	Donation	C, report report	1954 1960	
Warden	42-A-9	Noranda Exploration Co. Ltd.		Asses.	DDH, Mag, VLF-EM	1978	2.2714
Wesley, Edwards	42-A-15, 16	Cominco Ltd., Go 1, Ward 3 Grids		Asses.	Mag (2), Gr, HEM (3)	1977	2.2417
Wesley	42-A-15, 16	Cominco Ltd., Go 2 Grid		see under Rickard Township			
Wilkie	42-A-9, 10	Hollinger Mines Ltd. "Group 1"	Cu, Au	Asses.	HEM	1977	2.2460
Wilkie	42-A-9, 10	Hollinger Mines Ltd. "Group 2"		Asses.	VLF-EM, DDH	1977	2.2557
Yarrow	41-P-15	Hill, Robert A.		MEAP CG-136	rTr	1978	MEAP CG-136
Zavitz	42-A-3	Aspen Exploration Inc. (see Vantage Mining Co. Ltd.)		O.S.C.	Pros.	1977	
Zavitz	42-A-3	Rio Tinto Canadian Exploration Ltd. (R. & R. Option)		Asses.	DDH (8)	1976	

1978 Report of Northeastern Regional Geologist and Sault Ste. Marie Resident Geologist

P.E. Giblin[1] and E.J. Leahy[2]

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TABLES

FIGURES

INTRODUCTION

Mining activities during 1978 were highlighted by the continuing major expansion programs in Elliot Lake of Denison Mines Limited and of Rio Algom Limited.

In contrast with the mining scene, claim staking and exploration activity continued their decline of the past several years.

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REGIONAL GEOLOGIST'S ACTIVITIES

Staff in the Sault Ste. Marie office consists of G. Nivins, Secretary; E.J. Leahy, Resource Geologist; G. Bennett, Geologist (Ontario Geological Survey); and the writer. Bennett was engaged in field work as noted above. Activities of the rest of the staff are described below.

E.J. Leahy and the writer were involved in a wide variety of Ministry land use planning projects and administrative matters.

A map of bedrock topography of the City of Sault Ste. Marie was completed and is in press. The map, in conjunction with the previously published map of drift thicknesses, provides data useful in construction and municipal water supply projects.

Examinations were made of several active and inactive prospects. Mapping of the Heyden area, 15 km (10 miles) north of Sault Ste. Marie was completed (F, Figure 1). Preliminary geological maps at the scale of 1 inch to ¼ mile of the Heyden area, of the adjoining Ile Parisienne-Goulais Point area, and of the Sandy Islands-Rudderhead Point area (G and H, respectively, Figure 1) were completed, and it is intended to publish these sheets in 1979.

E.J. Leahy carried out mapping in Villeneuve Township, (J, Figure 1), 65 km (40 miles) north of Thessalon, to determine the cause of an aeromagnetic anomaly. This work is described by Leahy in the following section.

Investigation of an Aeromagnetic Anomaly in Villeneuve Township, by E.J. Leahy

Nine days were spent in 1978 in the field investigating a broad east-west-trending aeromagnetic anomaly in central Villeneuve Township, approximately 64 km (40 miles) north of Thessalon. Previous geological surveys that included this township were all of a reconnaissance nature and no known data could be related to the anomaly (see Harding 1950; Thurston *et al.* 1971; ODM-GSC Geophysics Paper 2228, 1963). It was felt

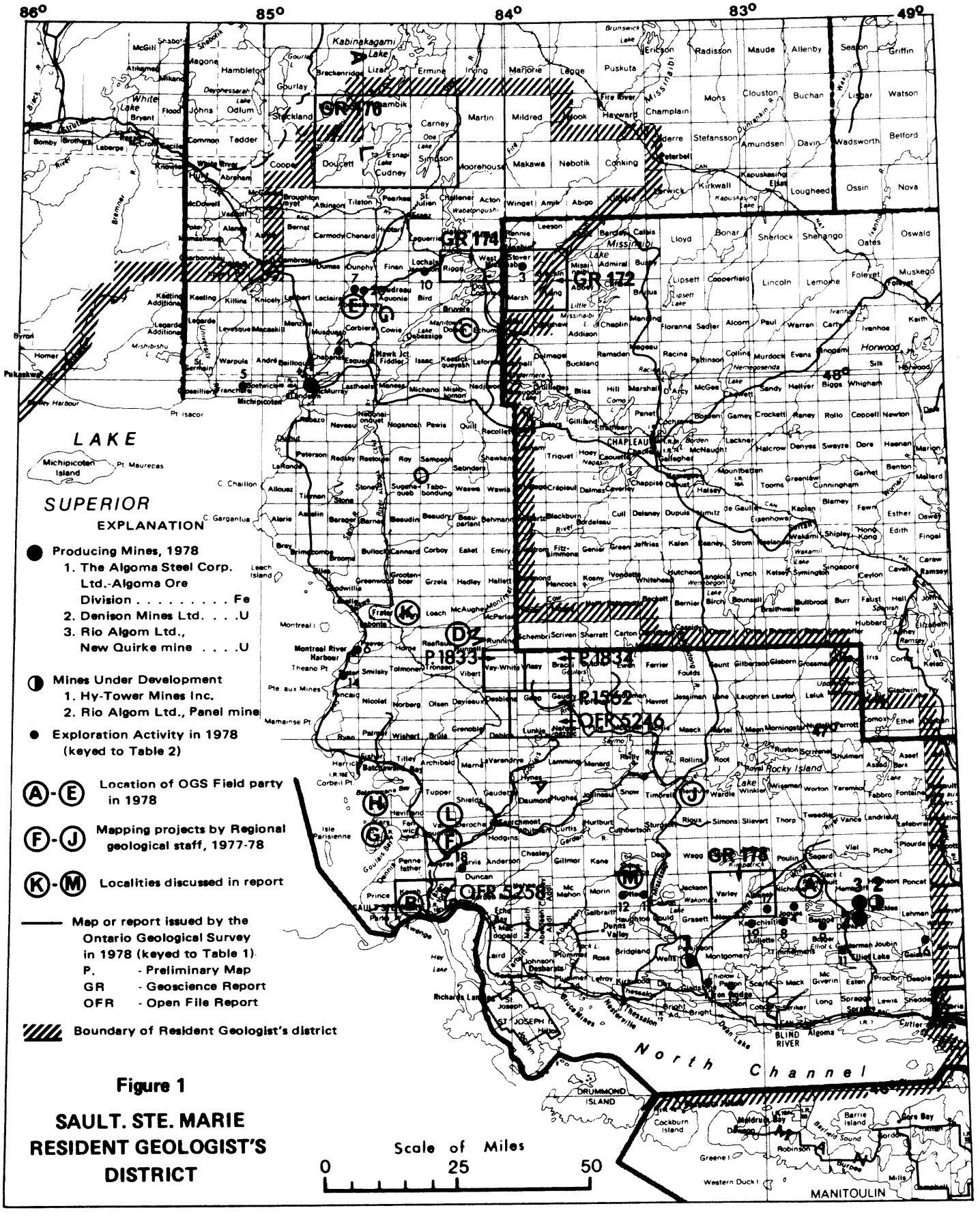

Figure 1

SAULT. STE. MARIE RESIDENT GEOLOGIST'S DISTRICT

that the anomaly might be due to something related to the Seabrook Lake Carbonatite just 9 miles north of the anomaly and connected to it by a north-south topographic linear, or, to a small remnant of 'greenstone' just south of the anomaly.

The anomalous area was found to be underlain by a body of coarse-grained to porphyritic dark pink coloured monzonite whose edges were very closely defined by the 59,800 gamma aeromagnetic contour, and with some areas within the zone reaching over 60,000 gammas. The mafic minerals, hornblende and biotite, were estimated to comprise 10 to 25 percent of the rock, and these usually contained a small core of magnetite. This magnetite content would appear to be the cause of the airborne magnetic anomaly: a small hand magnet was attracted to most field samples. Routine checks were made of the samples collected with an ultraviolet light and a scintillometer. No fluorescent minerals were found and above background radioactivity was determined as due to potassium. Etching with hydrofluoric acid, followed by staining with potassium cobaltinitrate, to determine feldspars, showed the rock to contain about equal proportions of potassic and plagioclase feldspars. Quartz content was estimated at around 2 percent. The monzonite has a weakly developed foliation indicated by subparallelism of feldspar phenocrysts and the mafic minerals.

The rocks south of the monzonite are migmatites which are strongly foliated in a generally east-west direction. One small area of massive amphibolite gneiss with minor quartz-mica schist is found between the monzonite and the migmatite (see map).

The rocks north of the monzonite were grouped together for mapping purposes as granitic rocks. They are generally a pale pink to grey, have a much higher quartz content and less conspicuous mafic mineral content, and are finer grained than the monzonite from which they were quite easily distinguished in the field. For the most part they are probably granodiorites and quartz-monzonites. Foliation was generally lacking in these rocks.

All of the above rocks are cut by numerous diabase dikes normally striking northwest. Two small lamprophyre dikes, believed to be younger than the diabase, were also seen.

The sequence of rocks occurring in Villeneuve Township, as described above, is very similar to that mapped by D. Rogers in the Biscotasing area about 60 miles (96 km) to the northeast (Rogers 1962).

No mineralization of economic significance was observed in the area mapped. Several small veinlets of purple fluorite with green epidote were seen in roadcuts in the monzonite. All pegmatite veins seen in the area were composed only of quartz and feldspars.

MINING ACTIVITY

The Algoma Ore Division of The Algoma Steel Corporation Limited continued production of iron ore at Wawa, producing 1,674,430 gross tons of sinter during 1978.

Denison Mines Limited and Rio Algom Limited continued production of uranium oxide at Elliot Lake. Both companies continued their major expansion programs, which were described in last year's annual report.

Hy-Tower Mines Incorporated constructed buildings and installed machinery in preparation for processing diabase talus for aggregate, and for mining and milling copper-bearing vein material in Parkinson Township.

Prace Mining Limited carried out hand-cobbing of argentiferous galena from a development muck stockpile.

Rengold Mines Limited is reorganizing and refinancing with the object of reopening the company's gold mine at Renabie.

EXPLORATION ACTIVITY

Exploration activity in 1978 was directed largely towards uranium, with work concentrated principally in the Quirke Syncline of the Elliot Lake area. Some drilling and prospecting were also carried out in the Montreal River uranium area.

A new discovery of gold was made in Otter Township, 65 km (40 miles) east of Sault Ste. Marie, and is discussed in a following section of this report entitled "Recent Developments and Suggestions to Prospectors". Gold deposits in the Wawa-Renabie area attracted some exploration work, and a long-dormant tungsten occurrence in the Wawa area was restaked. In comparison with previous years, very little work was directed towards base-metal deposits.

Table 2 presents a summary of exploration activities in the district, and the locations of the activities are illustrated in Figure 1.

RECENT DEVELOPMENTS AND SUGGESTIONS TO PROSPECTORS

1. Uranium, Larson Township (K, Figure 1)

In 1977 E.P. McDonough and colleagues carried out an airborne reconnaissance spectrometer survey in the Larson Township area, followed by ground investigation and trenching of one relatively accessible anomaly.

Larson Township is located about 100 km (60 miles) north of Sault Ste. Marie. It was formerly known as Township 27, Range 16.

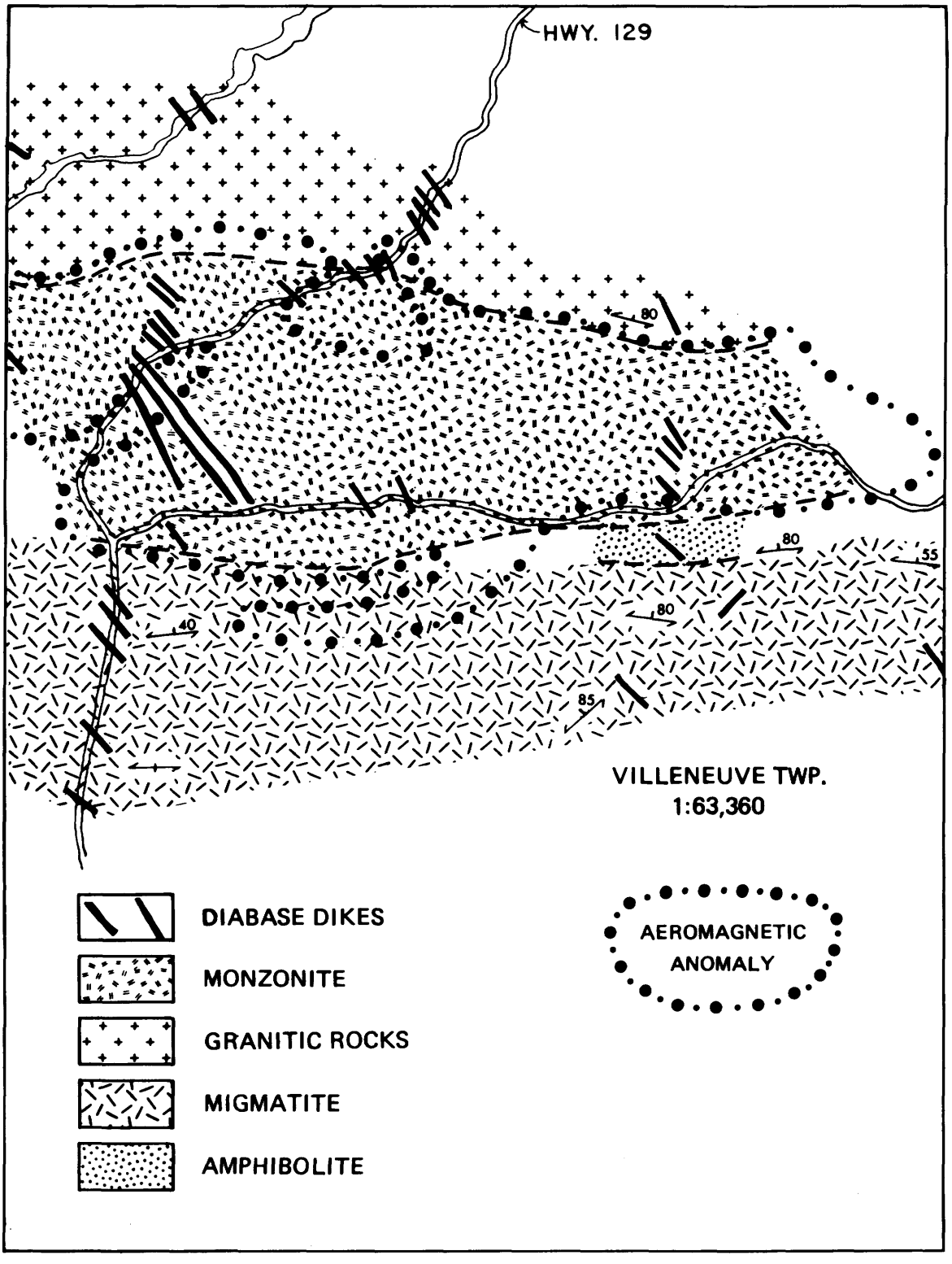

Figure 2 – Villeneuve Township

The township has not been mapped at any scale by government geological surveys, and the general geology is known only from a very limited reconnaissance survey conducted in 1961 by geologists of the Algoma Central Railway (Algoma Central Railway, 1964; and files, Regional Geologist's Office, Sault Ste. Marie).

The township is underlain by granitic and migmatitic rocks, which have been intruded by diabase dikes. In general, the dikes strike northwestward.

The area trenched by McDonough in 1977 is located near the east shore of a small unnamed pond 2.4 km (1.5 miles) northwest of Little Agawa Lake and 0.8 km (0.5 miles) south of Delores (Lionel) Lake. The trenches are in the vicinity of a uranium occurrence shown on the Algoma Central Railway's geological map of the area. The writer examined the trenches in the summer of 1978.

Radioactivity is most commonly associated with pegmatitic patches in granitic and migmatitic rocks. The radioactive mineral has not been identified to date, and laboratory work is being undertaken to identify it. Accessory minerals noted in the pegmatitic zones include biotite, garnet, pyrite, pyrrhotite, and magnetite. From the limited exposures available, the pegmatitic zones appear to consist of irregular segregation zones rather than well defined dikes.

Narrow veins of dark grey quartz, commonly carrying abundant pyrite, cut some of the pegmatite zones and are also radioactive.

Samples collected by E.P. McDonough from the trenches analyzed from 0.5 to 4.4 lbs. per ton U_3O_8 and 0.2 to 3.8 lbs. per ton ThO_2 (McDonough 1978, p.10).

Anomalous radioactivity also occurs in one locality in a coarse-grained massive granitic rock, but no analyses of this material are available.

Reconnaissance work by McDonough indicates that anomalous radioactivity is widespread in the area (McDonough 1978).

The work to date has not been directed towards a detailed evaluation of the known showings, but rather has been of a reconnaissance nature designed to confirm the presence of uranium mineralization in the area, and to outline a general area of anomalous radioactivity.

The showings indicate that the mineralization is different in character from the well known small pitchblende vein deposits that are associated with diabase dikes in the Montreal River Harbour area, approximately 25 km (15 miles) to the southwest. The nature of the mineralization at the McDonough showing suggests the possibility of finding large low-grade uranium deposits in the area.

Although the area lying north of the Montreal River and east of the Algoma Central Railway has not, in general, received much attention from prospectors, several other uranium occurrences are known.

The Algoma Central Railway geological map (Algoma Central Railway 1964) shows another uranium occurrence located 0.5 km (0.3 miles) south of the ore trenched by McDonough. No information about this occurrence is available.

Uranium occurrences are known from the western part of Larson Township and the adjoining township to the west, near the railway (Lang 1952; Lang *et al.* 1962; Giblin and Leahy 1967; Robertson 1968; and Regional Geologist's Files, Ontario Ministry of Natural Resources, Sault Ste. Marie).

About 1950, low-grade uranium mineralization was found in McAughey Township, about 16 km (10 miles) southeast of the McDonough occurrence. In 1978 E.C. Grunsky found anomalously radioactive areas along the Montreal River fault zone, and recommended further prospecting along the north shore of the river, particularly in the southwest part of McAughey Township (Grunsky 1978, p.97).

The widespread occurrence of anomalous radioactivity and the presence of several uranium occurrences suggest that the area north of the river and east of the railway merits further prospecting.

2. Uranium, Vankoughnet Township (L, Figure 1)

A previously undocumented occurrence of uranium mineralization within a major fault zone suggests that the fault zone may offer a target for further prospecting.

The valley of the Goulais River extends eastward across Vankoughnet Township, about 25 km (15 miles) north of Sault Ste. Marie. The relatively flat, drift-covered valley is underlain by Jacobsville Formation sandstones of probable Cambrian age. The north edge of the valley is marked by a prominent ridge of sedimentary rocks of the Huronian Gowganda and Lorrain Formations.

Previous mapping by Hay (1964) suggested that fault contacts existed between the three formations in the southeastern part of the township. Recent, more detailed, mapping by E.J. Leahy and the writer has confirmed this, and suggests that the fault zone extends northwest across the remainder of the township, and that the steep south-facing face of the ridge represents a fault-line scarp (for general geology see maps by Hay 1964; Hay and Frarey 1975; or Giblin and Leahy 1967).

Where exposed in Sections 26 and 35, the fault zone is marked by intense brecciation and silicification of Lorrain Formation quartzite.

W.J. Richards, prospector, Sault Ste. Marie, guided the writer to a previously undocumented radioactive occurrence situated within the fault zone. Evidently Richards discovered the occurrence of radioactivity at this site in the early 1950s when examining a rust-stained

part of an outcrop. No exploration work has been carried out on the occurrence.

An outcrop of brecciated, silicified quartzite of the Lorrain Formation lies on the common border of Sections 26 and 35, Vankoughnet Township, at the southwestern corner of Section 26, just east of an all-weather township road. Near the east end of an outcrop anomalous radioactivity occurs in at least three parallel zones.

The radioactive zones consist of narrow limonite-stained fractures which are filled by very fine grained, dark-coloured material, which has been shown by X-ray diffraction analysis to consist essentially of quartz and feldspar, and by tiny breccia fragments of quartzite. Black, fine-grained, chloritic gouge-like material comprises the margin of at least one of the zones, and has a thickness of about 1 cm (0.4 inches).

The radioactive zones range in thickness from about 5 to 15 cm (2 to 6 inches), and can be traced on strike for about 6 m (20 feet). The three parallel zones occur on a steep hillside across a horizontal distance of about 12 m (40 feet). The zones strike 290 degrees, and dip 30 to 35 N.

Three samples collected by the writer from the thickest zone analyzed 40, 67, and 87 ppm U_3O_8, with less than 10 ppm ThO_2 in each. Laboratory work to date has not succeeded in identifying the radioactive mineral or minerals.

Although the analysis values are too low to be of economic importance in themselves (despite the fact that leaching has probably removed some uranium), the occurrence is of significance in demonstrating the presence of uranium mineralization within, and controlled by, a major fault. This suggests that other sections of the fault zone may warrant prospecting.

Although the fault zone is buried west of the uranium occurrence, its trace has been reasonably well defined by our recent work (Heyden area geological map, scale 1 inch to ¼ mile, in preparation; manuscript copy available for inspection in Regional Geologist's Office, Sault Ste. Marie). To the east of the Heyden map-area, the fault zone appears to continue into Deroche Township (Bennett *et al.* 1975).

3. Gold, Otter Township (M, Figure 1)

Late in 1977 a new discovery of gold mineralization in Otter Township was announced. Otter Township lies 65 km (40 miles) east of Sault Ste. Marie. The new discovery has not yet been seen by the writer.

The presence of veins carrying cobalt-silver-bismuth-nickel-gold mineralization in the eastern part of the township, east of Burden Lake, has been known for many decades (e.g. Burrows 1913; Knight 1915, p.238-239). Previous assays have all returned very low values in gold.

Evidently the new discovery was made in a similar type of vein material. Assay results of 1.22 oz. gold per ton over 4 feet, and of 0.9 oz. gold per ton over 3 feet were reported (Northern Miner, December 7, 1978).

The previously known veins occur in Nipissing Diabase, and the new discovery appears to occur in the same host rock.

The former Havilah Mine produced gold from a vein deposit in Nipissing Diabase in Galbraith Township, about 16 km (10 miles) southwest of Otter Township.

It may be that the Nipissing Diabase in this area is locally enriched in gold, as appears as in certain areas near Sudbury, and that prospecting for gold deposits associated with the diabase is warranted. In addition, other known occurrences of cobalt and associated elements in the general area may merit re-examination: many of these do not appear to have been assayed for gold. Several cobalt occurrences are noted by Knight (1915). The more significant ones described by Knight, and other more recently discovered occurrences are shown on the geological compilation map of the area (Giblin and Leahy 1967).

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

G. Bennett carried out studies of Huronian volcanic rocks and of Elliot Lake Group sedimentary rocks between Sault Ste. Marie and Sudbury (A, Figure 1).

W.R. Cowan completed mapping of the surficial geology of the Sault Ste. Marie area (B, Figure 1). In addition, test borings were carried out at 24 sites within the city to provide data on sand and gravel resources. Lithologic logs and a location plan have been published (Cowan and Leyland 1978).

M.J. Downes mapped the Lake Matchinameigus area located about 50 km northeast of Wawa, consisting of Dolson and Echum Townships and small parts of some adjacent townships (C, Figure 1).

E.C. Grunsky mapped the Grey Owl Lake area, located 90 km north of Sault Ste. Marie (D, Figure 1).

P. Studemeister and A.C. Colvine carried out detailed mapping of the Gutcher Lake Stock and spatially related mineral deposits in Abotossaway Township, 30 km northeast of Wawa (E, Figure 1).

Brief descriptions of the results of their work are presented in Summary of Field Work, 1978, Ontario Geological Survey Miscellaneous Paper 82, and in the reference for Cowan and Leyland, 1978.

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TABLE 1 MAPS AND REPORTS PERTAINING TO THE SAULT STE. MARIE MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

GEOSCIENCE REPORTS
GR 172
GR 174
GR 176
GR 178
MISCELLANEOUS PAPERS
MP 78
MP 82
PRELIMINARY MAPS
P.1562
P.1833
P.1834
OPEN FILE REPORTS
OFR 5245
OFR 5246
OFR 5254
OFR 5258
MINERAL DEPOSITS CIRCULARS
MDC 17

TABLE 2 Exploration activity in 1978.

The following is a list of individuals and companies known to be engaged in exploration within the Sault Ste. Marie Mining Division in 1978, and the type of work undertaken in each case.

Number on Figure 1	Individual or Company	Activity
1	E. Blanchard	Trenching, gold prospect, Otter Township.
2	Canabec Exploration Inc.	Drilling, gold prospect, Chabanel Township.
3	Carbrew Explorations Ltd.	Drilling, geological and geophysical surveys, Stover Township.
4	Cominco Ltd.	Drilling, Jogues Township.
5	Cominco Ltd.	Staking, tungsten prospect, Franchere Township.
6	Dejour Mines Ltd.	Drilling, uranium prospect, Rix Township.
7	Ego Mines Ltd.	Geological survey, copper-gold prospect, Abotossaway Township.
8	Fort Norman Explorations Inc.	Drilling, uranium prospect, Jogues Township.
9	Fort Norman Explorations Inc.	Airborne magnetic, electro-magnetic and VLF electro-magnetic surveys, Beange, Gould, Grasett, Gunterman, Jogues, Parkinson and Wells Townships.
10	Gulf Minerals Canada Ltd.	Drilling, base-metal prospect, Jacobson Township.
11	Long Lac Mineral Exploration Ltd.	Drilling, uranium prospect, Gunterman Township.
12	McKee Copper Inc.	Trenching, copper prospect, Otter Township.
13	Midpines Explorations Inc.	Drilling (late 1977), copper prospect, Gladstone Township.
14	Moncrieff Uranium Mines Ltd.	Drilling, uranium prospect, Slater Township.
15	Pellerin, U.	Trenching (late 1977), copper prospect, Patton Township.
16	Questmont Mines Ltd.	Drilling by Geophysical Engineering Ltd., uranium prospect, Gaiashk Township.
17	Raylloyd Mines and Explorations Ltd.	Drilling, uranium prospect, Kamichisitit Township.
18	David S. Robertson and Associates Ltd.	Drilling (1977), geological surveys (1977-78), uranium prospect, Jarvis and Duncan Townships.
19	Shell Canada Resources Ltd.	Drilling, uranium prospect, Kamichisitit Township.
20.	United Canso Oil and Gas Ltd.	Drilling, copper-gold prospect, Abotossaway Township.

TABLE 3 Assessment work and other information received in 1978.

Sault Ste. Marie Mining Division

Abbreviations

A	- Airborne	IP	- Induced Polarization
Assess.	- Assessment Work	Mag	- Magnetometer
CS	- Core Samples	OSC	- Ontario Securities Commission
D	- Donated by Company or Individual	Pros.	- Prospectus
DDH	- Diamond Drill Hole	RA	- Radioactive, Radiometric
DN	- Dip Needle Survey	SA	- Assaying
EM	- Electromagnetic	Tr	- Trenching
G	- Ground	U	- Underground Development
GL	- Geological	VLF	- Very Low Frequency

Township or Claim Map Area	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File No.	Local File No.
Abotossaway	Ego Mines Ltd.		Assess.	GEM, GMag	1976,77	2.2375	SSM-1908
			Assess.	GMag	1977	2.2486	
		Cu, Au	Assess.	2 DDH (503')	1977		
			Assess.	GL, IP, Res.	1977	2.2679	
			Assess.	GL	1978	2.2779	
Aweres	Robertson & Associates Ltd.		Assess.	AMag & ARA	1977	2.2532	SSM-1934
Beange	Consolidated Orlac Mines Ltd.		D	GL Maps	1955		SSM-1921
	Fort Norman Explorations Inc.		Assess.	AEM, Mag & VLF EM	1978	2.2681	SSM-1962
Chabanel	Canabec Explorations Inc.	Au	OSC	GL & Pros.	1977		SSM-1953
Day	Shaft Location		D	Loc. Map Cu Showing	1978		SSM-1973
Finan	Gulf Minerals Canada Ltd.		Assess.	GEM	1977	2.2471	SSM-1892
Gaiashk	Questmont Mines Ltd.	U	Assess.	3 DDH (2539')	1978		SSM-1886

Township or Claim Map Area	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File No.	Local File No.
Gapp	Centralgoma Iron Mines Ltd.	Fe	D	GMag & DN	1945		SSM-1968
Gladstone	Midpines Explorations Ltd.	Cu	Assess. D	1 DDH (354') GL, Pros.	1977 1977		SSM-1912
Gould	Fort Norman Explorations Inc.		Assess.	AEM, Mag & VLF EM	1978	2.2681	SSM-1962
Grasett	Fort Norman Explorations Inc.		Assess.	AEM, Mag & VLF EM	1978	2.2681	SSM-1962
Gunterman	Fort Norman Explorations Inc.		Assess.	AEM, Mag & VLF EM	1978	2.2681	SSM-1962
Jacobson	Gulf Minerals Canada Ltd.		Assess. Assess.	18 DDH (6819') GEM	1977,78 1977	2.2471	SSM-1892
Jarvis	Robertson & Associates Ltd.	 U	Assess. Assess.	AMag & ARA 5 DDH (509.4')	1977 1977	2.2532	SSM-1934 SSM-1969
Jogues	Cominco Ltd.		Assess.	3 DDH (303') CS	1978		SSM-1552
	Fort Norman Explorations Inc.	 U	Assess. Assess.	AEM, Mag & VLF EM 3 DDH (2372.5') CS	1978 1978	2.2681	SSM-1962 SSM-1915
Juillette	Imperial Oil Ltd.	U	Assess.	ARA	1977	2.2494	SSM-1961
Kamichisitit	Imperial Oil Ltd.	U	Assess.	ARA	1977	2.2494	SSM-1961
	Shell Canada Resources Ltd.		Assess.	1 DDH (1206.05m)	1978		SSM-1966
	Superior Northwest	U U U	Assess. Assess. Assess.	CS 1 DDH (245') 1 DDH (476')	1978 1977 1976		SSM-1757
Keating Add'l.	Noranda Exploration Co. Ltd.		Assess.	GEM & Mag	1977	2.2630	SSM-1935
Labonte	MacGregor, R. A.		Assess. Assess.	Geochem. GMag	1976 1977	2.2270 2.2588	SSM-1911
Lake Huron, North Channel	Conwest Exploration Co. Ltd.	U	D	2 DDH (7019')	1976,77		SSM-1824
Ley	Wartime Metals Controller	Mn	D	GL	1942		SSM-1919
Long	New Kelore Mines Ltd.		D	Map, Vert. Sec.	1956		SSM-184
Nouvel	Superior Northwest Inc.	U	Assess.	1 DDH (518')	1976		SSM-1757
Otter	McKee Copper Inc.	Cu	Assess.	Tr	1978		SSM-1309
Parkinson	Fort Norman Explorations Inc.		Assess.	AEM, Mag & VLF EM	1978	2.2681	SSM-1962
Patton	Midpines Explorations Ltd.	Cu	D	GL, Pros.	1977		SSM-1912
	Pellerin, U.		Assess.	Tr	1978		SSM-1695
Raimbault	Consolidated Morrison Expl'ns.Ltd.		Assess.	2 DDH (1492')	1976		SSM-1852
	Consolidated Orlac Mines Ltd.		D	Maps: GL, Vert. Sec.	1955		SSM-1921
Rix	Moncrieff Uranium Mines Ltd.	U	Assess.	1 DDH (116')	1977		SSM-1916
Slater	Advance Murgor Explorations Ltd.	U	Assess.	GRAD, GL	1976	2.2343	SSM-1918
	Moncrieff Uranium Mines Ltd.	U U U U U	Assess. Assess. Assess. Assess. D Assess.	4 DDH (2761') GEM, GL, RA Geochem. GEM, RA, GL Maps 3 DDH (2184')	1978 1977,78 1978 1978 1978 1976	 2.2510 2.2587 2.2540 	SSM-1958 SSM-1917 SSM-1958
	Mosher, C.		Assess.	Tr	1976,77		SSM-1914
	Scott, R.		Assess.	Tr	1976		SSM-1913
	Streamside Mines Incorporated	Cu	Assess. Assess.	CS Geochem.	1978 1975	 2.2688	SSM-1775
Striker	New Kelore Mines Ltd.		D	Map, Vert. Sec.	1956		SSM-184
Timmermans	Imperial Oil Ltd.	U	Assess.	ARA	1977	2.2494	SSM-1961
Wells	Fort Norman Explorations Inc.		Assess.	AEM, Mag & VLF EM	1978	2.2681	SSM-1962
Wlasy	Centralgoma Iron Mines Ltd.	Fe	D	GMag, DN	1945		SSM-1968
Plan M-8, Abbie Lake	Noranda Explorations Co. Ltd.		Assess. Assess.	GEM & Mag GEM & Mag	1977 1977	2.2598 2.2630	SSM-1935
Plan M-12, David Lake	Noranda Explorations Co. Ltd.		Assess.	GEM & Mag	1977	2.2598	SSM-1935
Plan M-7, Mishibishu Lake	Noranda Explorations Co. Ltd.		Assess.	GEM & Mag	1977	2.2630	SSM-1935
Plan M-13, Pukaskwa Rivér	Noranda Explorations Co. Ltd.		Assess. Assess.	GEM & Mag GEM & Mag	1977 1977	2.2598 2.2630	SSM-1935

1978 Report of Sudbury Resident Geologist

W.O. Karvinen[1] and R. Horst[2]

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INTRODUCTION

The low level of exploration activity experienced in recent years continued in 1978. Claim staking was well below normal at 645 claims recorded (Sudbury Mining Recorder, personal communication); no significant discoveries were made.

Continued soft metal prices during the year resulted in a six-week shutdown by both Falconbridge Nickel Mines and INCO Metals Company. No new mines were brought into production but a total of seven copper-nickel mines were phased out of production in late 1977 and early 1978. Increased demand for stone resulted in the examination of the quarry potential of several new properties.

[1]Resident Geologist, Ontario Ministry of Natural Resources, 1112 The Kingsway, Sudbury, P3B 2E5.
[2]Resource Geologist.

RESIDENT GEOLOGIST'S ACTIVITIES

During the year, the Sudbury office was staffed by: W. O. Karvinen, Resident Geologist; Y. M. Paquette, Secretary; and Rae Horst, Resource Geologist, who commenced duties in October 1978.

In addition to normal duties, the staff was engaged in the following projects:

1. supervision of detailed mapping and lithogeochemical studies of carbonate rock in the Timmins area
2. regional reconnaissance of building and decorative stone in the Resident Geologist's district
3. examination and sampling of potentially metal-rich Proterozoic sedimentary rocks between Cobalt and Sudbury.

MINING AND MILLING ACTIVITIES

Mining and milling of copper-nickel ores by the two major operators at Sudbury were greatly reduced because of the cutbacks initiated late in 1977 and the summer shutdowns. In addition, a strike which began on September 16, 1978, completely halted all operations at INCO Metals Company for the remainder of the year.

Copper-Nickel

Nickel, copper, iron, platinum group metals, gold, silver, cobalt, selenium, and tellurium were produced from the milling and refining of ores from 11 mines owned by INCO Metals Company and Falconbridge Nickel Mines Limited in the Sudbury area (Figure 3).

Apart from the completion of INCO's new rolling mill, designed to produce nickel and cupro-nickel alloy strip for coinage, there were no significant changes in that company's production methods. Four mines, the Creighton No.3, the Victoria, the Crean Hill, and the Copper Cliff North were phased out of production early in the year as planned.

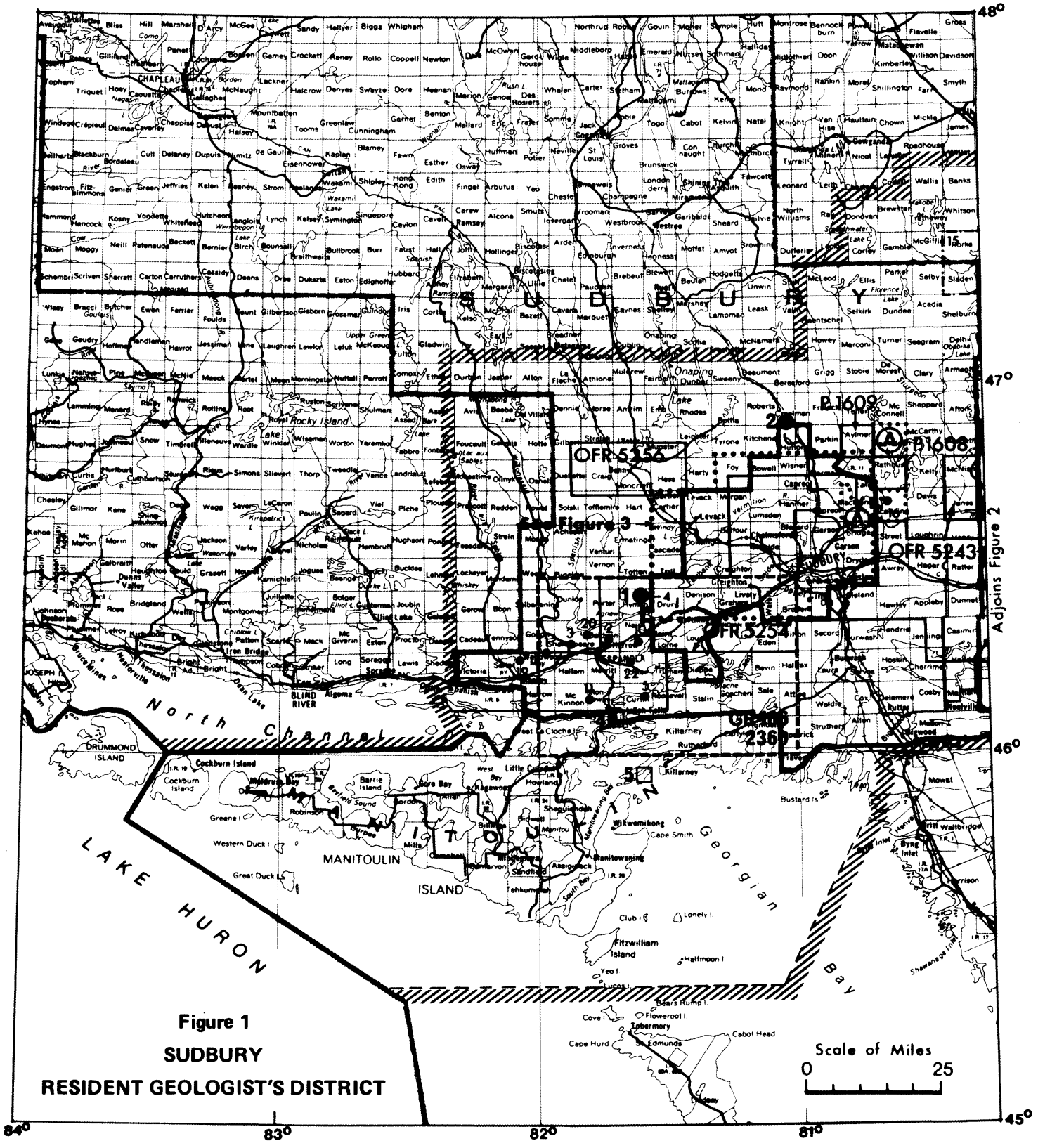


Figure 1
SUDBURY
RESIDENT GEOLOGIST'S DISTRICT

EXPLANATION

- Exploration activity in 1978 (keyed to Table 2)
- Location of Geological Branch field party in 1978
- Boundary of Resident Geologist's district
- Map or report issued by the Ontario Geological Survey (keyed to Table 1)
  - P. - Preliminary Map
  - 2360 - Coloured Map
  - GS - Geoscience Study or OGS Study
  - OFR - Open File Report
  - GR - Geoscience Report or OGS Report

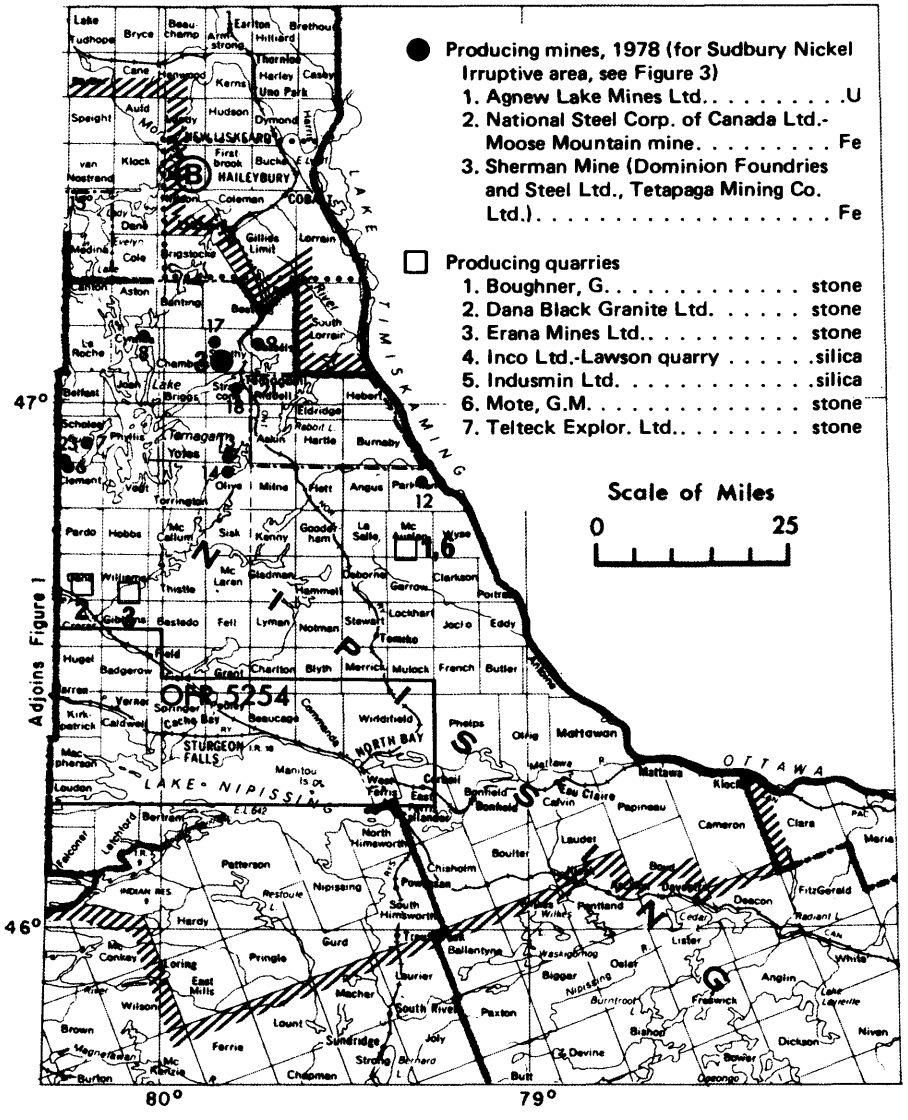
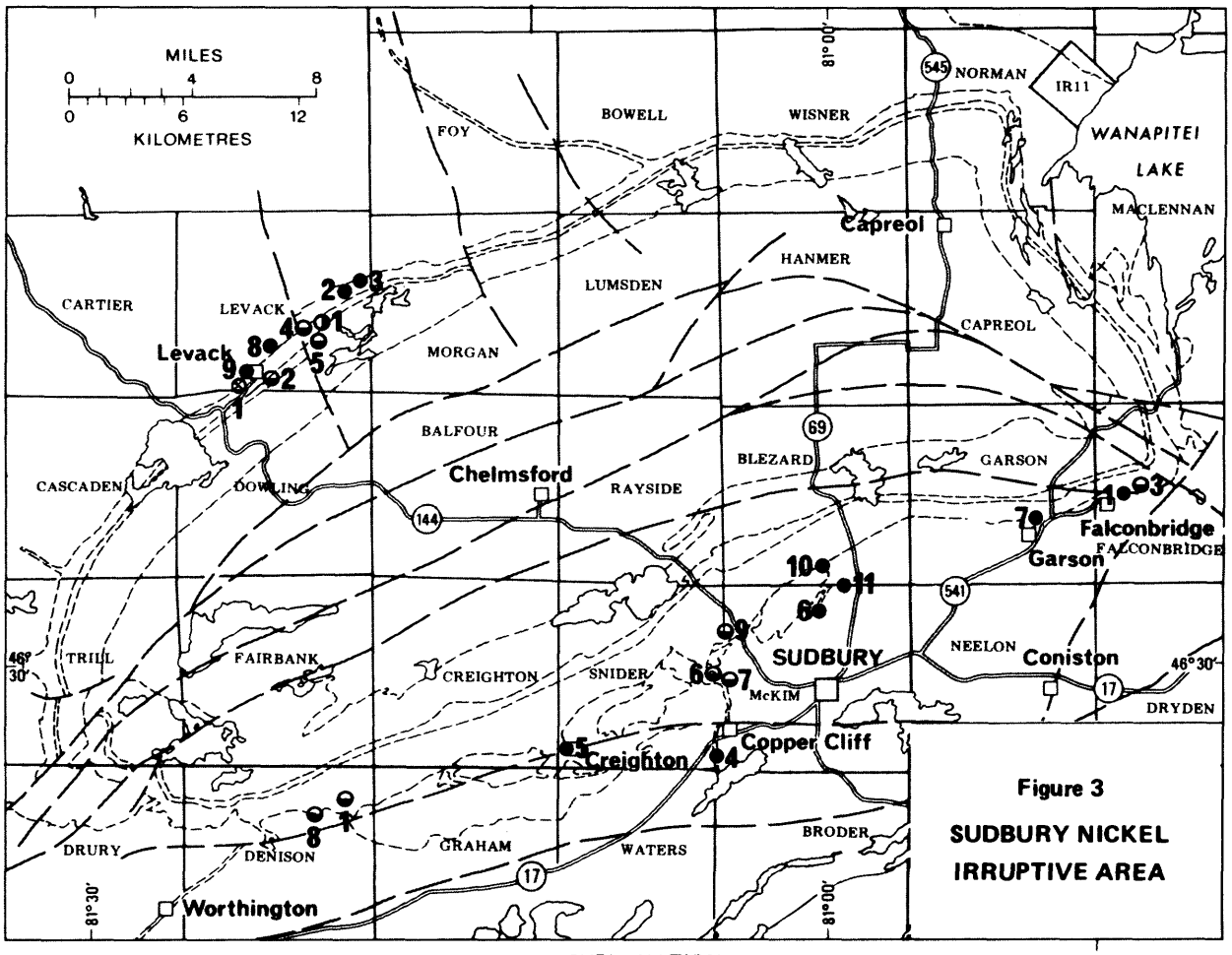


Figure 2

SUDBURY RESIDENT GEOLOGIST'S DISTRICT



EXPLANATION

● Producing mines

1-2. Falconbridge Nickel Mines Ltd. . . . . Ni,Cu,Pt,Co,Au,Ag
1. Falconbridge mine
2. Strathcona mine

3-11. Inco Metals Company . . . . . .Ni,Cu,Pt,Se,Te, Co,Au,Ag,Fe
3. Coleman mine
4. Copper Cliff South mine
5. Creighton mine
6. Frood mine
7. Garson mine
8. Levack mine
9. Levack West mine
10. Little Stobie mine
11. Stobie mine

◑ Mine under development

Falconbridge Nickel Mines Ltd.
1. Fraser mine

⊖ Mine on care and maintenance basis

1-5. Falconbridge Nickel Mines Ltd.
1. Lockerby mine-produced until June 1978.
2. Onaping mine
3. Falconbridge East mine-minor development work
4. Fecunis mine-prior to July 1978 on care and maintenance basis
-traded to Inco Metals Co. after July 1978.
5. North mine-very minor production early in 1978

6-9. Inco Metals Company
6. Clarabelle No.2 open pit
7. Copper Cliff North mine
8. Crean Hill mine
9. Murray mine-closed end of 1978

⊘ Other

Falconbridge Nickel Mines Limited
1. Hardy open pit-past producer-closed but still drawing from surface stockpile.

Falconbridge Nickel Mines Limited recorded its 50th year of continuous production. A major change in the company's processing complex at Falconbridge was the completion of its $83-million Smelter Environment Improvement Project (SEIP) which was initiated to totally revamp and modernize their existing smelter facility. The SEIP installation consists of two large electric smelting furnaces each with its own fluid bed roaster. Ore is received as a slurry from the concentrator and fed into the roasters. Sulphur dioxide gas from the roasters is diverted to the acid plant, whereas the roasted product is conveyed to the electric furnaces. The resulting products are copper-nickel matte, sulphuric acid, and slag. The plant is designed to smelt 2,000 tons of concentrate per day.

This new facility will greatly reduce sulphur dioxide emisions into the atmosphere as well as improve efficiency.

As of 1977, Falconbridge had reserves of 80,670,000 tons grading 1.46 percent nickel and 0.77 percent copper in the Sudbury area (Canadian Mining Journal, May, 1978). The company ceased operations at three mines early in the year, leaving only two active mines (Falconbridge and Strathcona) in production.

Iron

The two iron mines in the district experienced a brisk demand for iron pellets, mainly because of production slowdowns in major iron producing areas (e.g. Labrador). Both the Moose Mountain Mine (National Steel Corporation of Canada Limited) located 25 km north of Sudbury, and the Sherman Mine of Dominion Foundries and Steel Limited near Temagami were in continuous production during 1978.

Uranium

The only uranium producer in the district, the Agnew Lake mine, which commenced operations in mid-1977, attained only 46 percent of its expected production target during the first three-quarters of 1978 (Northern Miner, November 23, 1978). During this period a total of 280,000 lbs. of uranium oxide was produced. Inadequate availability of ore for leaching and a low rate of recovery are listed as the main reasons for the poor performance (Northern Miner, November 23, 1978).

Industrial Minerals

High-quality quartzite of the Lorrain Formation was quarried for use as a flux by INCO Metals Company from the Lawson Quarry, located about 65 km southwest of Sudbury.

From April to November, Indusmin Limited also quarried silica from a very pure quartzite of the Bar River Formation on Badgeley Island in Georgian Bay. Since the commencement of production in 1970, the quarry has produced an average of about 400,000 tons annually. The product is used mainly in the manufacture of glass as well as in the steel industry.

Decorative stone was quarried intermittently by four different operators in the district. At least two dozen quarry permits were issued to companies and individuals interested in quarrying industrial minerals, building stone, or decorative stone, however, very little if any production occurred on these properties.

"Black Granite" for building facings and tombstones was quarried by Dana Black Granite Limited and Erana Mines Limited in a large black to grey anorthosite mass located near River Valley, about 65 km east of Sudbury.

Colourful muscovite quartz-feldspar schist was quarried by two separate operators, G. Mote and G. Boughner, in McAuslin Township, about 40 km north of North Bay. The rock is used for decorative wall facings, fireplaces, and driveways.

EXPLORATION ACTIVITIES

Due to increased interest in major discovery areas such as northern Saskatchewan, the level of uranium exploration activity in the district declined considerably from previous years. Modest exploration of the favourable Lower Huronian (Matinenda Formation) rocks westward from the east end of Agnew Lake in Hyman Township, to the Spanish River in Dunlop Township, was continued by a few companies. The C. Springer uranium prospect in Baldwin Township, which was optioned and drilled late last year by the Glencair Mining Company Limited, was not actively explored in 1978. However, the property owner, Conrad Springer, discovered additional uranium mineralization outside the Glencair option on the south shore of Agnew Lake. Three diamond drill holes into the best zone returned some good intersections of uranium mineralization (C. Springer, personal communication).

In Nairn Township, near Wabagishik Lake, a new radioactive showing in pyritic, gritty quartzite of the Pecors Formation, was optioned by Hollinger Mines Limited from W. Alanen, D. Rastall, and E. Crick. To date only geophysical work has been carried out (Alanen, personal communication).

To the northeast of Sudbury, limited geophysical and prospecting work was done on known uranium properties in Parkin, Roberts, and Grigg Townships.

Renewed interest in gold resulted in the examination of several known prospects. In Scadding Township, west of Ashigami Lake, six diamond drill holes put down by

P. McLean have intersected values of gold in Middle Huronian sedimentary rocks (McLean, personal communication). South of Espanola, several of the past-producing gold mines and known prospects were examined during the year. Late in the summer, International Obaska Mines Limited announced their intention to dewater the former McMillan Gold mine located south of Espanola in Mongowin Township (Northern Miner, August 24, 1978). However only surface prospecting and geophysics were carried out.

Apart from the continuing programs of INCO and Falconbridge within and near the Nickel Irruptive, base metal exploration was very limited. Hollinger Mines Limited and St. Joseph Exploration Limited carried out modest geophysical and geological-drilling programs respectively in Cassels and Strathcona Townships near Temagami.

Early in the year, Gull Lake Energy Resources announced that a minimum of 1,500 feet of diamond drilling would be done to explore the southeast zone of their iron prospect in Scholes Township to a depth of 1,000 feet (Northern Miner, January 12, 1978; January 19, 1978).

Union Carbide Exploration Corporation spent part of the summer re-assessing the Foster Township tungsten showing located about 12 km east of Espanola. The program included detailed mapping, sampling, and scheelite content determinations.

A summary of exploration activity in the district is provided in Table 2.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Two head office geological mapping projects were carried out in the district. B. Dressler mapped Scadding, Maclennan, and Mackelcan townships (A in Figure 1). J. Wood covered several townships in the area of Cobalt (B in Figure 1). Geologists of the Mineral Deposits Section were involved in studies of nickel (D. G. Innes), copper-lead-zinc (A. Colvine), and nonmetallic minerals (B. Smith and M. Vos) in the district. The Engineering and Terrain Geology Section drilled 10 holes on Manitoulin Island to gain information on Silurian dolomites. In addition, that Section was involved in the supervision of contracts to study engineering conditions in the area as well as in the compilation of an aggregate inventory of the greater Sudbury area (OGS MP82). The Geophysics-Geochemistry Section contracted Barringer Research Limited to carry out a geochemical orientation survey over three areas of known mineralization in the Sudbury area.

TABLE 1 MAPS AND REPORTS PERTAINING TO THE SUDBURY MINING DIVISION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

ONTARIO GEOLOGICAL SURVEY REPORT
Report 166
MISCELLANEOUS PAPERS
MP 76
MP 77
MP 78
MP 82
OPEN FILE REPORTS
OFR 5236
OFR 5243
OFR 5254
OFR 5256
COLOURED MAPS
2360
PRELIMINARY MAPS
P.1608
P.1609

TABLE 2 Exploration activity in 1978.

The following is a list of companies and individuals known to have conducted exploration within the Sudbury Resident Geologist's district in 1978, exclusive of exploration work on the Sudbury Nickel Irruptive. The numbers correspond to the numbered areas on Figures 1 and 2.

Number on Figure	Individual or Company	Activity
1.	Alexander, A. J.	Stripping, drilling, Gough Township
2.	Allard, J.	Trenching, Baldwin Township
3.	Blue, P. G.	Drilling, blasting, manual rock and overburden removal, gold prospect, Shakespeare Township
4.	Continental Diamond Drilling	Diamond drilling, Hyman Township
5.	Elliot, A.	Line-cutting, staking, sampling, geophysical survey, Curtin Township
6.	Foubert, A.	Diamond drilling, copper prospect, Clement Township
7.	Gull Lake Energy Resources	Diamond drilling, iron prospect, Scholes Township
8.	Hardie, A.	Prospecting, copper-silver prospect, Cynthia Township
9.	Hollinger Mines Limited	Geophysical and geological surveys, base and precious metal prospect, Cassels Township
10.	Hollinger Mines Limited	Geophysical work, uranium prospect, Nairn Township
11.	International Obaska Mines Limited	Prospecting,geophysics, McMillan Gold Mine, Mongowin Township
12.	Iron City Mines	Drilling, blasting, excavations, nickel-iron prospect, Parkman Township
13.	Keith, H.	Prospecting, drilling, trenching, copper-nickel prospect, Law Township
14.	Keith, J.	Prospecting, copper prospect, Olive Township
15.	Langride, J.	Prospecting, Rorke, Leo, Sladen and Medina townships
16.	McLean, P.	Diamond drilling, gold prospect, Scadding Township
17.	Rivet, R. J.	Drilling, blasting, Strathy Township
18.	St. Joseph Exploration Ltd.	Diamond drilling, base metal prospect, Strathcona Township
19.	Shunck, R. A.	Diamond drilling, uranium-copper prospect, Salter Township
20.	Springer, C.	Line-cutting, stripping, diamond drilling, uranium prospect, Baldwin Township
21.	Thompson, S.	Prospecting, Askin, Riddell, Hartle, Eldridge, Hebert and Burnaby townships
22.	Union Carbide Exploration Corporation	Detailed mapping, sampling, scheelite content determinations, tungsten prospect,Foster Township
23.	Vaillancourt, R. A.	Diamond drilling, blasting, cutting lines, prospecting, Clement Township

TABLE 3 Assessment work and other information received in 1978.

A - Airborne
Assess. - Assessment Work
DD 5-1800' - 5 Diamond Drill holes totalling 1800'
EM - Electromagnetic Survey
GL - Geological Survey
GP - Geophysical Survey
IP - Induced Polarization
Mag - Magnetometer Survey
RA - Radiometric Survey
Tr - Trenching
Geoch. - Geochemical Survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Baldwin	41 I/5	Allard, John		Assess.	Tr	1978		
Baldwin	41 I/5	Burns & Associates	U	Assess.	GP,RA	1977	2.2528	
Baldwin	41 I/5	Mid-North Engineering Ltd.	U	Assess.	GP,EM	1977	2.2583	
Baldwin	41 I/5	Springer, Conrad	U	Assess.	DD 4-866.5'	1978		
Baldwin, Hyman	41 I/5	Consolidated Morrison Explorations Ltd.	U	Assess.	DD 2-286'	1978		
Baldwin, Hyman, Nairn, Porter	41 I/5	Consolidated Morrison Explorations Ltd.	U	Assess.	GL,DD 8-4709'	1977		
Cassels	31 M/4	Hollinger Mines Ltd.	base metals	Assess.	GP-EM	1978	2.2687	
Cassels	31 M/4	Silver Lead Mines Ltd.	base metals	Prospectus		1977		
Chambers	31 M/4	Voyager Explorations Ltd.	base metals	Assess.	GP,EM,Geoch.	1978	2.2749	
Clement	41 I/6	Foubert, Adelor	Cu,Fe	Assess.	DD 1-102'	1978		
Clement	41 I/6	Vaillancourt, Royal A.	Cu	Assess.	DD 2-229'	1978		
Ellis	41 P/7	Demonsky, Peter J.	Asbestos	Assess.	GL	1978	2.2741	
Howey, Grigg	41 P/2	MacAdams, Wilfred	U,(Cu)	Assess.	GP,RA	1978		
Howey, Grigg	41 P/2	MacAdams, Wilfred	U	Assess.	GP,RA	1977	2.2704	
Hutton	41 I/14	Amax Minerals Exploration	U	Assess.	GL,GP,RA	1976	2.2496	
Hyman	41 I/5	Consolidated Morrison Explorations Ltd.	U,(Ni)	Assess.	DD 1-142'	1978		
Hyman	41 I/5	Rose, Ed	U	Assess.	GL	1978	2.2470	
Kelly	41 I/15	Duncan R. Derry Ltd.		Assess.	GL	1978	2.2498	
Kitchener	41 I/14	Miron, Ted		Assess.	Tr	1978		
Macbeth	41 I/16	Pelican Mines Ltd.	Au,Ag	Assess.	GL	1978	2.2641	
Mattawan	31 L/7	Bischoff, Carl T.		Assess.	Tr	1977		
May, Hallam	41 J/1	Cable Copper Mines Ltd.	Cu	Prospectus		1978		
May, Salter	41 J/1	Shunck, Raymond	U	Assess.	GP,RA	1977	2.2409	
McAuslan	31 L/14	Haberer, Joseph	stone	Assess.	Tr	1977		
Moncrieff, Craig, Hess,Munster,Ulster	41 I/13	Chevron Standard Ltd.	base metals	Assess.	GL	1976	2.2280	
Moncrieff	41 I/13	Hollinger Mines Ltd.	U	Assess.	GP,Mag,GL	1976	2.2484	
Mongowin	41 I/4	Burns Exploration Corp., Ike	U	Assess.	GP,RA	1977	2.2456	
Mongowin,McKinnon, Merritt	41 I/4	Mongowin-Sudbury Explorations Ltd.	Cu,Ni	Assess.	GP,EM,Mag	1976	2.2221	
Nairn	41 I/5	Alanen, Wm.	Ni	Assess.	DD 2-205'	1977		
Parkin	41 I/15	Rio Tinto Canadian Exploration Ltd.	base metals	Assess.	GP,EM,Mag	1978	2.2671	
Phyllis, Scholes	41 I/16	Gull Lake Iron Mines Ltd.	Fe	Prospectus	GL,DD 3-3778'	1977		
Roberts, Creelman	41 I/14	Erana Mines Ltd.	U	Assess.	GP,RA	1976	2.2306	
Salter	41 J/1	Babcock, G. H.	Cu	Assess.	GP,EM	1976	2.2228	
Salter	41 J/1	Shunck, Raymond	U,Cu	Assess.	GP,Mag,EM	1977		
Salter, May	41 J/1	Shunck, Raymond	U,Cu	Assess.	GP,Mag,EM	1978		
Scadding	41 I/10	Watt, D. R.	base metals	Assess.	DD 14-2478'	1978		
Shakespeare	41 I/5	Blue, Peter G.	Cu		Assay	1978	2.2795	
Shakespeare	41 I/5	Blue, Peter G.	Cu		Assay	1977	2.2473	

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Shakespeare	41 I/5	Kerr Addison Mines Ltd.	U	Assess.	GP,RA	1978	2.2582	
Shakespeare,Gough, Salter,Victoria	41 I/5	Kerr Addison Mines Ltd.	U	Assess.	GP,RA,GL	1976	2.2294	
Stobie	41 P/2	Pollock, J. A.	U	Assess.	GL, Assay	1976	2.2273	
Strathcona	31 M/4	Cliffs of Canada Ltd.	Fe	Assess.	DD 1-368'	1978		
Strathcona	31 M/4	St. Joseph Explorations Ltd.	base metals	Assess.	GP,EM,Mag	1977	2.2360	
Strathcona	31 M/4	St. Joseph Explorations Ltd.	base metals	Assess.	GL	1977	2.2519	
Strathcona	31 M/4	St. Joseph Explorations Ltd.	base metals	Assess.	DD 3-1308'	1978		
Strathcona	31 M/4	St. Joseph Explorations Ltd.	base metals	Assess.	GL	1978	2.2672	
Strathcona	31 M/4	St. Joseph Explorations Ltd.	base metals	Assess.	GP,Mag	1978	2.2680	
Strathy	31 M/4	Hollinger Mines Ltd.	base metals	Assess.	GL	1977	2.2545	
Strathy	31 M/4	Hollinger Mines Ltd.	base metals	Assess.	GP,EM,GL	1977	2.2586	
Strathy	31 M/4	Hollinger Mines Ltd.	base metals	Assess.	GP,EM,Mag	1977	2.2569	
Strathy	31 M/4	Hollinger Mines Ltd.	U?	Assess.	DD 1-200', GP,EM	1978		
Strathy	31 M/4	Hollinger Mines Ltd.	base metals	Assess.	GP,EM	1978	2.2633	
Strathy	31 M/4	Hollinger Mines Ltd.	base metals	Assess.	GL	1978	2.2545	
Tilton	41 I/6	Aspen Explorations Inc.	U	Prospectus		1977		
Turner	41 P/2	Aggressive Mining Ltd.	U	Assess.	GP,Mag	2.2607		
Turner	41 P/2	Aggressive Mining Ltd.	U	Assess.	Geoch,RA	1978	2.2591	
Van Nostrand	41 P/8	Mortimer, C. H.	Au,Ag, base metals	Assess.	Tr	1978		
Victoria, Shedden, Shakespeare	41 J/1	Kerr Addison Mines Ltd.	U	Assess.	GP,Mag	1977		

1978 Report of Algonquin Regional Geologist

J.R. Trusler[1] and D.J. Villard[2]

CONTENTS

TABLES

FIGURES

INTRODUCTION

Exploration in the Algonquin Region in 1978 remained at the level reached in 1977. Exploration for uranium predominated with a significant interest being shown for zinc, copper, and calcium carbonate.

Government surveys again added a substantial amount to the geological information of the Region.

REGIONAL MINERAL RESOURCE COORDINATOR'S ACTIVITIES

In 1978, the position of Regional Geologist was changed to that of Regional Mineral Resource Coordinator to reflect a role in administration and increased responsibilities related to mineral production and development. This has substantially reduced the time available for the traditional Resident Geologist's function. Approximately 50 to 60 percent of the time available was spent on administration, supervision of staff, attendance at staff meetings, and providing mineral resource information for government activities at all levels, particularly land use planning. Field work was devoted mostly to problems related to the aggregate industry and the assessment of mineral resource potential in park reserves and proposed parks. A few mineral prospects and quarries were visited and a rapid assessment of mineral collecting activity in the Bancroft area was performed.

The field inventory of sand and gravel pits in the Region was completed in 1978 with the help of seven Experience '78 students; 2,104 pits, each ¼ acre or more in areal extent, were identified, of which 1,004 were considered active. The total cumulative regional production of aggregates is approximately 124,300,000 tons of sand, gravel, and crushed stone. An aggregate demand analysis for the Region is currently underway. This study will establish, on a local municipal basis, the requirements for aggregate to the year 2025. Those areas having insufficient sand and gravel will be identified for further study and for input into land use planning.

A study into the impact of mineral collecting on tourism was conducted in the Bancroft area. It was determined that more than 60 percent of the tourists visiting Bancroft are interested in mineral collecting and that a significant number of the other tourists become interested in mineral collecting while in Bancroft. About 25 percent of the mineral collectors are from the United States. The collectors commented that the quality of collecting is declining and suggested

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[2]Resource Geologist, Huntsville.

EXPLANATION

- ● Producing mines, 1978
  1. Chromasco Ltd. . . . . Mg,Ca,Ti,Sr,Ba,Zr
  2. Indusmin Ltd. . . . . neph. syenite
  3. Madawaska Mines Ltd. . . . . U
  4. Sobin Chemicals (Canada) Ltd.. . . . . neph. syenite
- • Exploration activity (keyed to Table 2)
- * Assessment work filed in 1978 (keyed to Table 2)
- \+ Claim staking in 1978
- —— Map or report issued by the Ontario Geological Survey in 1978
  P. - Preliminary Map
  OFR - Open File Report
- ▨ Boundary of Algonquin Region

several ways of rectifying this problem.

In 1977, the Ministry of Transportation and Communications banned Muskoka-Haliburton area aggregates for use in concrete exposed to freeze-thaw conditions in the presence of de-icing chemicals. This decision was due to the suspected linkage of these aggregates with concrete scaling on area structures. The Regional Mineral Resource Coordinator is investigating this problem with the Ministry of Transportation and Communications.

Reconnaissance investigation of the entire Parry Sound 'greenstone' belt and detailed examination of base metal showings in Cowper Township were initiated in 1978. The Spider Bay-Spider Lake area, in Cowper Township, part of the Blackstone Harbour park reserve, contains several existing polymetallic sulphide deposits associated with felsic volcaniclastic rocks. Detailed mapping of Cowper Township is planned for the summer of 1979.

A program involving the field check of abandoned mines sites in the Parry Sound District was conducted by two Experience '78 students. Location, access, and condition of the sites were determined in each case.

In the Bancroft area, summer students checked location and access of mineral collecting sites. This information may eventually be used in an accurate and comprehensive mineral collecting guidebook for the Bancroft area.

The inventory of quarries continued, with 22 quarries being visited. This project will continue on a low key basis due to the large number of indicated quarries, many of which have not been operated in over 50 years. A map showing the quarries visited to date, their status, and the type of material removed, is available for viewing in the Algonquin Regional office.

The Regional Mineral Resource Coordinator was capably assisted by Resource Geologists D. Shaver and D. Villard.

MINING ACTIVITY

The Madawaska mine operated continuously throughout 1978, maintaining a capacity production of 1,500 tons per day based on a five-day mine and mill work week. Estimated production for 1978 is 560,000 lbs. of uranium oxide (Thomas 1978). Proven and probable reserves are sufficient to maintain the operation at capacity for six years.

Nepheline syenite is produced at Nephton in Methuen Township by Indusmin Limited and from Blue Mountain in Methuen Township by Sobin Chemicals (Canada) Limited. Magnesium is produced from high purity dolomitic marble deposits near Haley Station in Ross Township by Chromasco Limited. Chromasco is presently expanding the crushing and calcining capacity to

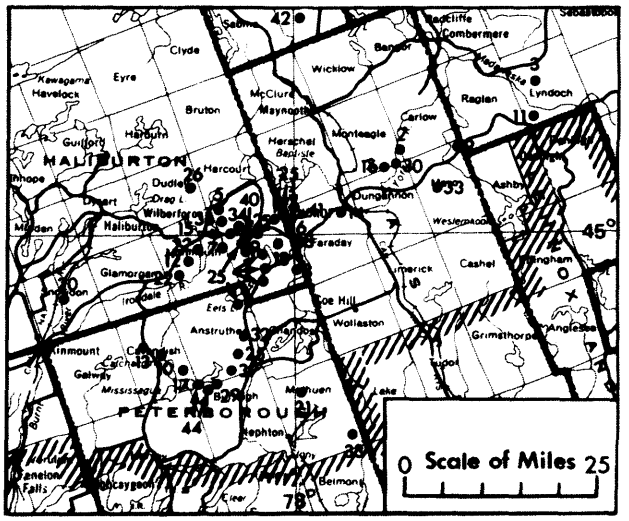


Figure 2

over 13,000 tons/annum. Three Magnetherm furnaces will then be added to the present horizontal retort system. A clay deposit near Arnprior is being mined by Dochart Brick and Tile Company Limited for production of tile.

Most of the remaining operating quarries in the Region produce veneer and flagstone with lesser production of marble for stucco dash and decorative stone.

Sodalite from the Princess quarry and rose quartz and beryl from Quadville were produced for mineral collectors again this year.

EXPLORATION ACTIVITY

Staking activity remained at the same level as 1977 with 646 claims staked. Figure 1 shows the area of staking activity. Exploration for uranium continued at a steady rate with particular attention being paid to the townships just west of Bancroft, Butt, and Freeman Townships, and the southern part of Renfrew County. An interesting occurrence in marble is being examined by Jorex Limited in Somerville and Lutterworth Townships. Exploration for zinc continued, with Renfrew County being one of the more interesting areas. The Parry Sound 'greenstone' belt received moderate attention with several companies involved in reconnaissance geological mapping. An extensive airborne geophysical survey was flown during the summer in this area.

Little additional work has been carried out by Goshawk Mines Limited on its vermiculite deposit in Cavendish Township. The company is awaiting the approval of a lease before arranging financing to carry out further

exploration and development.

RECOMMENDATIONS FOR EXPLORATION

Zinc in marble remains an attractive exploration possibility in the eastern part of the Region. This area is within a mineralized 'belt' stretching from Kingston, Ontario to Maniwaki, Quebec. There are numerous zinc occurrences in this 'belt', the most notable being the Long Lake zinc mine. The potential for a large deposit does exist if one considers that one of the largest zinc deposits (Balmat-Edwards) in the United States is in the Grenville Supergroup of rocks of similar age. Using the Long Lake zinc mine as an exploration model, geochemistry (soil, rock, and stream sediment), and the mapping of carbonate stratigraphy would appear to be the best exploration techniques.

In the Parry Sound District, investigations have shown the association of copper-zinc deposits with felsic fragmental rocks. Although these felsic volcanic rocks have not been definitely identified in other areas of the District, several additional copper deposits have been found and the continuity of sinuous stratigraphic units of mafic volcanic rocks has been recognized. Modern geophysical and other prospecting methods have not been extensively applied to this area and it is possible that many excellent base metal prospects may exist.

In the search for uranium, one should note that stratigraphy has been shown to be a controlling factor. Several known deposits occur in marble without any associated pegmatite. Fluorite and apatite are proximal to many uranium deposits and recent investigations indicate that apatite-bearing marble occurs as continuous stratigraphic units which are generally radioactive.

With regard to current exploration for uranium, it has been noted that uranium occurs as individual crystals of uraninite and uranothorite in marble. It is difficult to obtain a representative analysis from many core samples, particularly if small diameter core is recovered. For detailed or follow-up drilling it is recommended that a large hole size and a short sample interval be used with statistical analysis to ease hole-to-hole correlation. Using gamma ray logging to locate appropriate sections of core for sampling can be misleading and one should consider sampling the whole zone where radioactivity is indicated.

Evidence indicates that the potential for large phosphate deposits in the Region has not been evaluated. The possibility of combined mining of phosphates and uranium in overlapping deposits has not been studied. Both phosphates and uranium are found in marble intermittently in Renfrew County and from the northwestern part of Cardiff Township to Somerville Township.

The gamma ray survey released by the Federal-Provincial governments in 1978 indicated some interesting anomalies that have not been tested.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

S. B. Lumbers continued reconnaissance mapping of the Pembroke area.

S. Themistocleous carried out a detailed mapping program in the Khartum area of Renfrew County. This area comprises parts of the Townships of Griffith, Sebastopol, Grattan, Brougham, and Lyndoch.

R. L. Morton completed a detailed geological survey of Precambrian rocks within Harvey Township.

Mineral deposit studies were continued in Renfrew County under the supervision of B. Gordon. Steve Masson carried out detailed stratigraphic mapping of several uranium deposits northeast of the Madawaska Mine. C. C. Storey continued a study of industrial mineral deposits in the Pembroke-Renfrew area. T. R. Carter continued a study of mineral deposits, exclusive of uranium in the Pembroke-Renfrew area.

P. Barnett continued a program of mapping the Quaternary geology in Renfrew County (N.T.S.: 31F/11 and 31F/6) and indicated a similar program in the Bancroft area (N.T.S.: 31F/4).

D. Sharpe initiated a program of mapping the Quaternary geology in the Gravenhurst, Bracebridge, and Huntsville areas (N.T.S.: 31D/14, 31E/3, 31E/6). All but part of the N.T.S. sheet 31E/6 was completed.

D. Wadge carried out detailed airborne gamma ray traverses on selected anomalies in the Region. Of note, a large thorium anomaly in the northern part of Algonquin Park was checked out.

MINISTRY OF NATURAL RESOURCES AND OTHER PROVINCIAL GOVERNMENT ACTIVITIES

P. McLellan and A. Poschmann from Eastern Region conducted a slope stability mapping program of selected areas in Renfrew County.

C. Spek conducted earth science inventories in twelve proposed parks for the Recreation Group of the Ministry. B. Warner studied the geomorphology of several natural zones in Algonquin Park for Algonquin Park District.

W. Snider, of the Ministry of Environment, continued the study of the acid rain problem in Southern Ontario.

R. Keevil, at the Leslie M. Frost Natural Resources Centre, lectured at three junior ranger camps. He continued his mapping program at the Centre and is working on a finalization of the bedrock geology map. These

results may be viewed at the Centre.

RECENT PUBLICATIONS AND REFERENCES

Card, K.D.
1978: Metamorphism of the middle Precambrian (Aphebian) rocks of the eastern southern province; p.269-282 *in* Metamorphism of the Canadian Shield, Geol. Surv. Canada Paper 78-10.

GSC
1978: Current Research, Part B; Geol. Survey Canada, Paper 78-1B, 231p.

McMillan, R.H.
1978: Genetic aspects and classification of important Canadian uranium deposits; C.I.M. Bulletin, December, p.61-67.

Thomas, R.A.
1978: Soaring prices spawn high activity by Canadian uranium explorers and producers; Eng. and Mining Journal, Vol.179, No.11, p.151-165.

TABLE 1 MAPS AND REPORTS PERTAINING TO THE ALGONQUIN REGION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

MISCELLANEOUS PAPERS
- MP 78
- MP 82

PRELIMINARY MAPS
- P.1560
- P.1610 - 1804 (inclusive)

OPEN FILE REPORTS
- 5236
- 5239
- 5251

TABLE 2 **Exploration activity in 1978.**

Number on Figure	Individual or Company	Activity	Number on Figure	Individual or Company	Activity
1	N. Axiotis	Str.	24	Jorex	Geol., Geophys., Drilling
2	T. Barton		25	Kerr Addison	
3	J. A. Bryan	Tr., Str.	26	Lacana Mining	
4	Can. Occidental Petroleum Ltd.		27	La Chib Mines	Geol., Geophys., Drilling
5	Carbrew Exploration		28	J. V. Lupo	Tr., Str.
6	Carday Uranium Mines		29	Mid-North Engineering	
7	Cardiff Uranium Mines		30	New Kelore Mines	
8	Chukuni Gold Mines		31	Noranda	
9	A. H. Clark	Tr.	32	Northgate	
10	Copper Lake Exploration		33	Northumberland	
11	R. J. Crawford		34	Opawica Explorations Inc.	Geol., Geophys.
12	T. J. Czuppon	Tr., Str.	35	M. Phillips	
13	R. W. Drude		36	Powerex Resources	
14	R. L. Ekstrom	Geophys.	37	Royal Bank	
15	Enertex		38	L. Smith	
16	Forefront Uranium Mines		39	St. Joseph Explorations	Geophys., Drilling
17	Goshawk Mines		40	Paul Kneeshaw	Tr.
18	Grenville Uranium Syndicate		41	Western Mines Ltd.	Drilling
19	C. D. Gris		42	G. S. Culbert	Tr., Str.
20	A. Hopkins		43	Jack McVittie	Tr.
21	I. M. C.		44	Wm. Blott	Tr., Str., Drilling
22	Esso Minerals	Drilling	45	Robert Cloughley	Drilling
23	E. Jones	Tr.			

TABLE 3 Assessment work and other information received in 1978.

Abbreviations

D. D. (2-715') - Diamond drilling, 2 holes, 715 feet total
EM. - Electromagnetic survey
Geochem. - Geochemical survey
Geol. - Geological survey
Geophys. - Geophysical survey
Mag. - Magnetic survey
MEAP - Mineral Exploration Assistance Program
Rad. - Radiometric survey
Str. - Stripping
Tr. - Trenching

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
HALIBURTON CO. CARDIFF TWP.	31D/16	Kerr Addison Mines Ltd.	Uranium	Geophys.	Mag.	1977	2.2389	Cardiff 185
	31D/16	Powerex Resources	Uranium	Evaluation Geophys. (MEAP)	Property evaluation. Rad.	1977	MEAP EO-26	Cardiff 186
	31D/16	Enertex Developments Inc.	Uranium	Property Summation (MEAP)	Rad. Tr.	1977	MEAP EO-25	Cardiff 187
	31E/1	Carbrew Explorations	Uranium Molybdenite Fluorite	Property evaluation Geol., Geophys. Drill logs (MEAP)	Geol. EM., Rad., Mag. D.D. (6-2287')	1977	MEAP EO-45	Cardiff 188
	31D/16	Landair Explorations Ltd.	Uranium Fluorite	Property evaluation (MEAP)		1977	MEAP EO-27	Cardiff 189
	31C/13	Chukuni Gold Mines	Uranium	Miscellaneous	Assays	1976		Cardiff 190
	31C/13	Chukuni Gold Mines	Uranium	Sketch	Str.	1976		Cardiff 191
HALIBURTON CO. CARDIFF TWP.	31D/16	Opawica Explorations Inc.	Uranium	Geol. Geophys.	Geol. Rad., EM.	1978	2.2756	Cardiff 192
	31D/16	Opawica Explorations Inc.	Uranium	Geol.	Geol.	1978	2.2836	Cardiff 193
	31D/16	Paul Kneeshaw	?	Sketch	Tr.	1978		Cardiff 194
	31D/16	Paul Kneeshaw	?	Sketch	Tr.	1978		Cardiff 195
	31D/16	A. H. Clark	?	Sketch	Tr.	1978		Cardiff 196
HALIBURTON CO. GLAMORGAN TWP.	31C/16	St. Joseph Explorations Ltd.	?	Geophys.	Mag.	1977		Glamorgan 16
HALIBURTON CO. MONMOUTH TWP.	31D/16	Thomas Czuppon	?	Sketch	Tr., Str.	1978		Monmouth 100
	31D/16	Imperial Oil Ltd.	Uranium	Drill Logs	D.D. (2-188')	1978		Monmouth 101
	31D/16	St. Joseph Explorations Ltd.	Uranium Zinc	Geochem.	Ur., Pb., Zn., Mn., Fe., in Soils	1976	2.2604	Monmouth 102
HALIBURTON CO. SNOWDON TWP.	31D/15	G. M. Gordon	Zinc (?)	Geophys.	Mag.	1977		Snowdon 9
	31D/15	St. Joseph Explorations Ltd.	Zinc	Drill Logs	D.D. (1-618')	1978		Snowdon 10
	31D/15	St. Joseph Explorations Ltd.	Uranium	Geophys.	Mag.	1978	2.2748	Snowdon 11
HASTINGS CO. FARADAY TWP.	31E/1	Western Mines Ltd.	Uranium	Geophys.	Airborne Mag., Rad.	1977	2.2443	Faraday 58
	31C/13	Chukuni Gold Mines	Uranium	Sketch	Str., Tr.	1976		Faraday 59
	31F/4	Robert L.V. Ekstrom	Uranium	Geophys.	EM.	1978	2.2664	Faraday 60
	31E/1	Western Mines Ltd.	Uranium	Drill Logs	D.D. (3-462')	1978		Faraday 61

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
HASTINGS CO. MONTEAGLE TWP.	31F/4	Forefront Consolidated Explorations Ltd.	Uranium	Drill Logs	D.D. (10-1835')	1977		Monteagle 14
DIST. OF MUSKOKA FREEMAN TWP.	31E/4	M.M. Phillips	?	Sketch	Tr.	1977		Freeman 12
	31E/4	M.M. Phillips	?	Sketch	Tr.	1977		Freeman 13
	31E/4	M.M. Phillips	?	Sketch	Tr.	1977		Freeman 14
DIST. OF MUSKOKA FREEMAN TWP.	31E/4	M. M. Phillips	?	Sketch	Tr.	1977		Freeman 15
	31E/4	M. M. Phillips	?	Sketch	Str.	1977		Freeman 16
	31E/4	M. M. Phillips	?	Sketch	Tr.	1977		Freeman 17
	31E/4	M. M. Phillips	?	Sketch	Tr.	1977		Freeman 18
	31E/4	La Chib Mines Ltd.	Uranium	Geophys.	Mag.	1978	2.2625	Freeman 19
	31E/4	La Chib Mines Ltd.	Uranium	Geol. Geophys. Drill Logs	Geol. Rad. D.D. (7-1635')	1978		Freeman 20
	31E/4	La Chib Mines Ltd.	Uranium	Prospectus		1977		Freeman 21
	31E/4	Cable Copper Mines	Prospectus			1978 (report)		Freeman 22
DIST. OF NIPISSING BUTT TWP.	31E/11	J. V. Lupo	Uranium	Sketch	Tr., Str.	1978		Butt 13
	31E/11	J. V. Lupo	Uranium	Sketch	Tr.	1978		Butt 14
DIST. OF NIPISSING LYELL TWP.	31F/5	G.S. Culbert	?	Sketch	Tr., Str.	1978		Lyell 3
DIST. OF PARRY SOUND FERRIE TWP.	31E/12	E. Jones	Copper	Sketch	Tr.	1977		Ferrie 8
	31E/12	E. Jones	Copper	Sketch	Tr.	1978		Ferrie 9
DIST. OF PARRY SOUND LOUNT TWP.	31E/13	Jack McVittie	?	Sketch	Tr.	1978		Lount 7
	31E/13	Jack McVittie	?	Sketch	Tr.	1978		Lount 8
DIST. OF PARRY SOUND MCKELLAR TWP.	31E/12	Jack McVittie	Calcite (?)	Sketch	Tr.	1978		McKellar 2
	31E/12	Jack McVittie	Calcite (?)	Sketch	Tr.	1978		McKellar 3
PETERBOROUGH CO. ANSTRUTHER TWP.	31D/16	Kerr Addison Mines Ltd.	Uranium	Geophys.	Mag.	1977	2.2389	Cardiff 185
	31D/9	St. Joseph Explorations Ltd.	Uranium	Geochem.	Soil	1976	2.2461	Anstruther 65
	31C/16	Roy Newman	Uranium	Drill Logs	D.D. (7-1067.9')	1977		Anstruther 66
	31D/9	W. Blott	Uranium	Sketch	Tr.	1976 & 77		Anstruther 67
	31D/9	W. Blott	Uranium	Sketch	Tr.	1978		Anstruther 68

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
PETERBOROUGH CO. ANSTRUTHER TWP.	31D/9	Simon John Haynes	?	Sketch	Tr.	1977(?)		Anstruther 69
	31D/9	Simon John Haynes	?	Sketch	Tr.	1977		Anstruther 70
	31D/16	Esso Minerals Canada	Uranium	Geophys.	Rad.	1976	2.2654	Anstruther 71
	31D/16	W. Blott	Uranium	Sketch	Str.	1978		Anstruther 72
PETERBOROUGH CO. BURLEIGH TWP.	31D/9	Mid North Engineering Services	Uranium	Geol. Geophys.	Geol. Rad., Mag.	1976	2.2285	Burleigh 18
	31D/9	W. Blott	Uranium	Drill Logs	D.D. (2-319')	1978		Burleigh 19
PETERBOROUGH CO. CAVENDISH TWP.	31D/9	H.G. Greene	Uranium	Sketch	Tr.	1968(?)		Cavendish 69
	31D/9	Goshawk Mines Ltd.	Vermiculite	Property Summation (MEAP)	Tr., D.D. (56-3410.3')	1977	MEAP EO-24	Cavendish 70
	31D/16	R.W. Drude	Uranium	Miscellaneous	Assays	1977	2.2479	Cavendish 71
	31D/16	Ken Webster	?	Sketch	Tr.	1977		Cavendish 72
	31D/16	Ken Webster	?	Sketch	Tr.	1977		Cavendish 73
PETERBOROUGH CO. CAVENDISH TWP.	31D/16	Ken Webster	?	Sketch	Tr.	1977		Cavendish 74
	31D/16	Robert W. Drude	Uranium	Miscellaneous	Assays	1977	2.2722	Cavendish 75
	31D/16	Robert W. Drude	Uranium	Miscellaneous	Assays	1977	2.2601	Cavendish 76
RENFREW CO. BLITHFIELD TWP.	31F/2	Nickolas Axiotis	Uranium	Sketch	Str.	1978		Blithfield 11
RENFREW CO. BROUGHAM TWP.	31F/6	Imperial Oil Ltd.	Uranium	Drill Logs	D.D.(3-414')	1977		Brougham 10
RENFREW CO. GALWAY TWP.	31D/16	St. Joseph Explorations Ltd.	Uranium	Geophys.	Mag.	1978	2.2748	Snowdon 11
RENFREW CO. LYNDOCH TWP.	31F/6	J.A. Bryan	?	Sketch	Tr.	1977		Lyndoch 12
	31F/3	N.J. Crawford	?	Sketch	Str.	1977		Lyndoch 13
	31F/3	N.J. Crawford	?	Sketch	Tr.	1977		Lyndoch 14
	31F/6	St. Joseph Explorations Ltd.	Zinc	Geochem.	Soils	1976	2.2570	Lyndoch 15
RENFREW CO. LYNDOCH TWP.	31F/6	J.A. Bryan	?	Sketch	Tr.	1978		Lyndoch 16
	31F/6	J.A. Bryan	?	Sketch	Str.	1978		Lyndoch 17
VICTORIA CO. DALTON TWP.	31D/14	Robert Cloughley	Silver	Drill Logs	D.D.(2-209')	1978		Dalton 3
VICTORIA CO. SOMERVILLE TWP.	31D/10	Jorex Ltd.	Uranium	Property Evaluation		1978		Somerville 1

1978 Report of Eastern Regional Geologist

M.A. Klugman[1] and A.E. McKay[2]

CONTENTS

TABLES

FIGURE

INTRODUCTION

Continuing from programs underway in 1977, emphasis this year was primarily on industrial minerals, aggregate resources, and sensitive clay studies. Ongoing projects also included work on public awareness and interpretive programs, resource planning, and geological mapping.

The Eastern Region staff maintained a geological and geotechnical liaison with government agencies including the Ministries of Environment, Transportation and Communications, Labour, Housing, and Industry and Tourism; the St. Lawrence Parks Commission; Ontario Hydro; and Energy, Mines and Resources Canada. Consultants, companies, and individuals received geological, engineering, and mining economic data from this office. Exploration companies, prospectors, and members of the public used our services to obtain information on mineral management.

The Regional Mines Co-ordinator was deeply involved with industrial mineral feasibility studies as well as attending and speaking at several technical meetings and seminars. Field visits were carried out in conjunction with several potential development projects in the industrial mineral field.

Reflecting the general trend, exploration activity has decreased considerably compared to the past several years. The number of claims staked in 1978 dropped to 191 compared to 539 in the preceding year, a decrease of almost 65 percent.

EXPLORATION ACTIVITIES

Exploration for uranium was again very active in the western part of the region. Most of the uranium activity was centred in Palmerston, Olden, and Asa Townships with other programs in Miller, Hungerford and Kaladar Townships. A major drilling program is planned for their properties in Olden and Asa Townships by Mid-East Developments Limited.

Exploration for base metals continued in Lavant and Darling Townships in Lanark County. There has also been some activity for base metals and uranium, in the Paleozoic rocks bounding the east flank of the Frontenac Axis.

An unidentified firm was flying high resolution electromagnetic survey throughout the region this past fall, presumably exploring for base metal deposits.

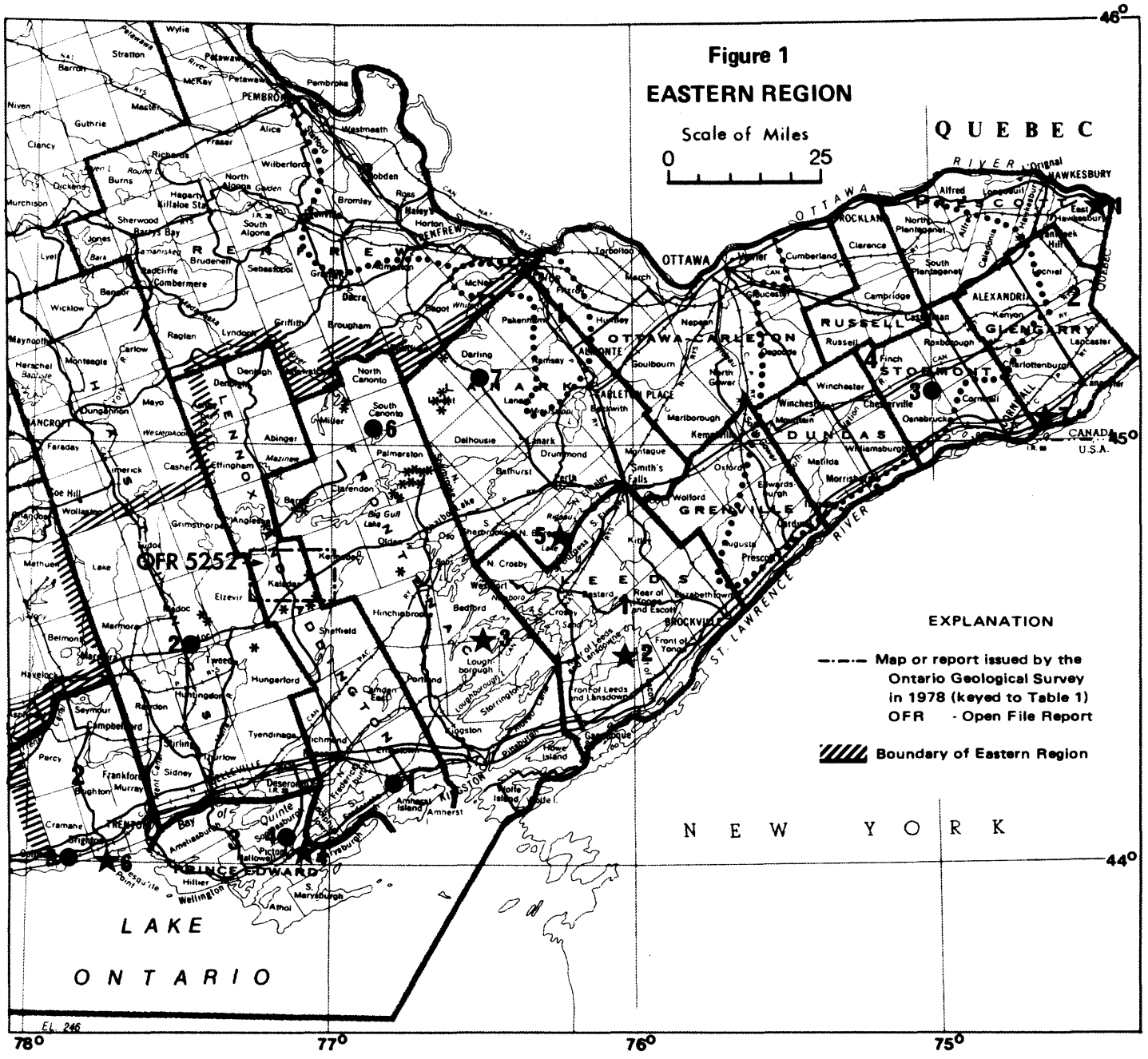
MINERAL MANAGEMENT

Industrial Minerals

The industrial mineral assessment program, started in the Region four years ago, has been greatly intensified

[1] Regional Mines Co-ordinator, Eastern Region, Concession Road, Kemptville.

[2] Resource Geologist, Eastern Region.



EXPLANATION

- ● Producing mines (excepting stone quarries, clay, sand, gravel, and silica extractive operations)
  1. Canada Cement Lafarge Ltd. . . . limestone (cement)
  2. Canada Talc Industries Ltd. . . . . talc
  3. Diamond Peat Moss . . . . . peat
  4. Lake Ontario Cement Co. Ltd. . . limestone (cement)
  5. St. Lawrence Cement Co. Ltd.- Ogden Point Quarry . . . . limestone (cement)
  6. TMF Mineral Resources Ltd. . . . . magnetite
  7. William R. Barnes Co. Ltd. . . . . calcium carbonate

- ——— Aggregate Assessment Studies
  1. Leeds County
  2. Northumberland County
  3. Prince Edward County

- * Assessment work filed in 1978 (keyed to Table 1)

- ★ Geological Mapping of Provincial Parks
  1. Carillon Provincial Park
  2. Charleston Lake Provincial Park
  3. Ferris Provincial Park
  4. Lake-on-the-Mountain Provincial Park
  5. Murphys Point Provincial Park
  6. Presqu'ile Provincial Park
  7. St. Lawrence Parks

- ••••• Slope Stability Studies
  1. Mississippi & Madawaska River Basin
  2. Raisin & Rigaud Rivers Basin
  3. Renfrew Area
  4. South Nation River Basin

over the last year. The potential for the development of industrial minerals in eastern Ontario is high and by demonstrating their viability it is hoped that the private sector will invest in such an industry. Since the bulk of industrial minerals consumed in eastern Canada is at present imported from the United States, the development of a domestic source would contribute much to the economy.

Funded by the Ministry of Treasury, Economics and Intergovernmental Affairs, the program examines a number of mineral commodities by determining their geological setting, potential tonnage, amenability to beneficiation and processing, pertinent logistics, grade and marketability, and the economics and possible viability. Due to the premature closure of the Marmoraton Iron Mine, a study was undertaken with the full cooperation of Bethlehem Steel Corporation and Armbro Holdings Limited to find alternate uses for the three million tons of magnetite ore blocked out in the Marmora pit. This study included possible uses as heavy aggregate, in heavy media, and in the manufacture of cement. Also, the Ministry of Natural Resources commissioned Canadian Bechtel Limited to determine the feasibility and cost of converting the Marmora plant to producing high-grade calcium carbonate and magnetite, as speciality products. The study determined that conversion was feasible and that the cost of conversion was reasonable. The report of this study is on open file at the Regional office in Kemptville.

Calcium carbonate studies by the Ministry of Natural Resources have continued throughout the Region and in some adjoining townships in the Central Region.

In addition to this work, Northumberland Mines Limited has commissioned Canadian Bechtel Limited to undertake a major feasibility study of the viability of producing high-grade magnetite and high-grade calcium carbonate in the Marmora area. This study, completed in December 1978, includes estimated operating and capital costs, owners costs and financial analyses, as well as the technical aspects of the proposed operations.

One of the prime objectives of the Ministry of Natural Resources has been to find alternate uses and markets for the magnetite reserves in the Eastern Region and in adjacent townships in both the Central and Algonquin Regions.

A detailed study on silica was started in May 1978. In addition to previous background work, the Nepean and Potsdam sandstones were examined for their market potential in the glass and foundry industries. A total of 16 diamond drill holes were drilled through the sandstone to basement to determine stratigraphy and quality. The ongoing results of this study will be released as open file reports.

Studies on talc are continuing both independently and in conjunction with interested companies in the private sector. Ram Petroleums Limited is constructing a pilot plant to market tremolite to be used as an additive to asphalt in road construction. Talc will also be produced from this plant.

Studies on other industrial minerals including lime, fluorite, hematite, peat, and vermiculite are in progress.

Aggregate Resources

The counties of Leeds and Prince Edward underwent aggregate assessment this past year. Field studies delineated Pleistocene aggregate resources and classified them as to quantity and quality. Areas that were sterilized by transportation corridors, residential and industrial development reduced the amount of aggregate that could be extracted. Reports on these two counties as well as Northumberland County and the Regional Municipality of Ottawa-Carleton will be published in 1979 and will serve as planning tools to allow reservation of mineral extraction areas. This classification of reserves based upon use will allow operators and land use planners to make rational decisions relative to the aggregate resources of any particular area.

The inventory of all pits and quarries in the Eastern Region continued this year and was completed in Lanark, Grenville, Dundas, Stormont, Glengarry, Russell, and Prescott Counties. This study located all pits and quarries, estimated the quality and quantity of reserves, the status of the operation, and the amount of rehabilitation completed. It is anticipated that this project will be completed in 1979.

Geotechnical Engineeering

General awareness of the stability problem of the sensitive Champlain Sea clay is increasing. This is born out by extensive use of the slope classification maps and more particularly by the voluntary construction of protective works along the Rideau River and Graham Creek.

This office continued to provide specific information on the stability of slopes and soils, and to provide suggestions for protective or remedial work. Field inspections were carried out on proposals for land severance and subdivisions, dams, bridges, berms, and other construction.

A slope stability field study was done this summer on the sensitive clays of the Ottawa River watershed in Renfrew County. The height and inclination of slopes was measured and used to determine a factor of safety to reflect possibility of slope failure. A report and map on this study will be published in 1979 as will the reports and maps for the Mississippi, South Nation, and Raisin and Rigaud Watersheds.

GEOLOGICAL MAPPING

Provincial Parks

Staff from the Regional Mines Co-ordinator's office mapped the geology of Presqu'ile Park in co-operation with the Parks Branch. The map and report will be ready early next year.

Technical back-up was provided to the Parks Branch in their mapping of Carillon, Murphys Point, Charleston Lake, Ferris, and Lake-on-the-Mountain Provincial Parks. These projects will provide the necessary background to identify significant earth science features.

The geological mapping project along the St. Lawrence River continued in its third field season. Surficial geology was mapped south of Highway 401 between Morrisburg and the Quebec border. Mapping was carried out in conjunction with the regional and district staff of the Division of Fish and Wildlife, who undertook a life science survey. This program is part of a co-operative project to map geological and biological features in detail along the St. Lawrence River valley from the Quebec border to Prince Edward County.

Land Use Plans

Geological input into District Land Use Plans continued this past year with background information provided for the Ottawa and Cornwall Districts as well as further information given to the Tweed and Lanark Districts.

MINERAL EDUCATION PROGRAMS

Members of the public have used this office to obtain information on exploration activities, on their own property, on mining regulations, and on geological topics for school projects.

The number of Junior Ranger Camps in the Eastern Region increased to four this year. Staff from the Regional Mines Co-ordinator's office gave talks at the camps on geology and the Ontario Geological Survey activities. A field trip was conducted on each occasion to a nearby geological or mining feature.

Continued attempts were made to enlighten the public in regard to the role of the Ministry of Natural Resources. Several panels on geology were included in the Eastern Region's display at the Central Canada Exhibition in Ottawa.

A unique project was undertaken in the Ottawa District when the Pits and Quarries inspector, in co-operation with the Aggregate Producers, arranged a tour of an operating quarry for a number of elementary school children. The students wrote compositions to enter a contest arranged by the Aggregate Producers.

Assistance was provided from this office again at the Mineral Education Course held in Madoc and presented by E. B. Freeman of the Ontario Geological Survey. This course provides useful information in exploration techniques for prospectors. A second course was held for Ministry personnel from the Algonquin and Eastern Regions. This course was aimed at providing staff with an insight into geological activities as well as into exploration techniques and to create more understanding between the Divisions of Mines and Lands.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

The Long Lake in Frontenac County was mapped in detail by J. M. Wolff. This area in the Grenville structural province is adjacent to the map sheet to the west that was mapped by Wolff in 1977.

J. B. Gordon, A. C. Colvine, and M. A. Vos studied mineral resources in the Pembroke-Renfrew region (NTS 31F) to determine the relationship between mineral deposits and the geological setting, to assess the potential for discovery of additional deposits, and to provide guidelines for exploration.

GEOLOGICAL SURVEY OF CANADA ACTIVITIES

N. R. Gadd was doing reconnaissance mapping of the Pleistocene in the Ottawa-Pembroke-Trenton area. Dr. Gadd is prosposing a new concept on deglaciation.

Other members of the Geological Survey of Canada have been making visits to mineral deposits in the Precambrian, sometimes in co-operation with members of the Ontario Government. Elements of interest in these studies are mercury, gold, copper, and uranium.

TABLE 1 MAPS AND REPORTS PERTAINING TO THE EASTERN REGION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY OF THE MINISTRY OF NATURAL RESOURCES IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

OPEN FILE REPORTS
OFR 5236
OFR 5251
OFR 5252
MISCELLANEOUS PAPERS
MP 78
MP 82
HIGHWAY MAP
2418

TABLE 2 Assessment work and other information received in 1978.

Abbreviations

Ag	- silver	EM	- Electromagnetic Survey	Pb	- lead
Air	- Airborne Survey	GC	- Geochemical Survey	RA	- Radiometric Survey
Assess	- Assessment Work	GL	- Geological Survey	SA	- Sampling, Assaying
BM	- base metals	Mag	- Magnetometer Survey	TR	- Trenching
Cu	- copper	MEAP	- Mineral Exploration Assistance Program	U	- uranium
DDH 4-230	- 4 diamond drill holes totalling 230 feet			Zn	- zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work	Year	Toronto File No.	Local File No.
Anglesea	31C/14	Lyle Smith		Assess	TR	1978		Anglesea 4
Anglesea	31C/14	Ultimate Energy & Resources Ltd.		Assess	DDH 10-1445	1978		Anglesea 5
Barrie	31C/14	Henry F. Cook	Ag, Cu, Pb, Zn	Assess	TR	1977		Barrie 35
Barrie	31C/14	Henry F. Cook	Ag, Cu, Pb, Zn	Assess, MEAP	DDH 2-317	1978		Barrie 36
Barrie	31C/14	Henry F. Cook		Assess	SA, TR	1978		Barrie 37
Darling	31F/2	Canadian Occidental Petroleum Ltd.		Assess	GC, GL	1978	2.2644	Darling 5
Hungerford	31C/6 & 11	Hudson Bay Exploration and Development Co. Ltd.	U	Assess	GL, RA	1978	2.2621	Hungerford 1
Kaladar	31C/11	Glenshire Mines Limited	Cu, Ni, Pb, Zn, U	Assess	GC, GL, TR	1977	63-3499	Kaladar 15
Kaladar	31C/11	Hudson Bay Exploration and Development Co. Ltd.	U	Assess, MEAP	GL, RA	1977	2.2602	Kaladar 16
Kaladar	31C/11	Canadian Occidental Petroleum Ltd.	BM	Assess, MEAP	GC, GL	1978	2.2727	Kaladar 17
Kaladar	31C/11	C. Roger Young		Assess	DDH 1-203	1978		Kaladar 18
Lavant	31F/2	Lynx-Canada	BM	Assess	GC, GL, Assay	1976		Lavant 10
Lavant	31F/2	Lynx-Canada	BM	Assess	GC, GL, Assay	1976	2.2047	Lavant 12
Lavant	31F/2	Selco Mining Corporation Limited	BM	Assess	DDH 2-327	1978		Lavant 13
Lavant	31F/2	Dalton Smith	BM	Assess	DDH 1-179	1978		Lavant 14
Madoc	31C/11	Earl C. Sager		Assess	DDH 1-106	1978		Madoc 31
Madoc	31C/11	Earl C. Sager		Assess	DDH 1-310	1978		Madoc 32
Miller	31F/2	Thomas Skimming & Associates Ltd.	U	Assess	Mag, RA	1978		Miller 2
Miller	31F/2	R.J. Wright	U, BM	Assess	EM, Mag, RA	1978	2.2773	Miller 3
Olden	31C/10	Lynx-Canada Explorations Ltd.	Zn	Case History		1976		Olden 13
Palmerston	31C/15	Noranda Exploration Co. Ltd.	U	Assess	GL, RA	1977	2.2490	Palmerston 27
Palmerston	31C/15	Ram Petroleums Limited	U	Assess	GL, RA	1976, 1978	2.2469	Palmerston 30
Palmerston	31C/15	Elwood L. Reid	U	Assess	Air, Mag, RA	1977	2.2363	Palmerston 31
Palmerston	31C/15	Douglas W. Riddell	U	Assess	RA	1977	2.2502	Palmerston 32
Palmerston	31C/15	Bijou Mines Limited		Assess	TR	1977		Palmerston 35
Palmerston	31C/15	Ram Petroleums Limited	talc	Assess, MEAP	GL	1977	63.3517	Palmerston 36
Palmerston	31C/15	W.C. Bidgood		Assess	TR	1978		Palmerston 37
Palmerston	31C/15	Groundstar Resources Limited	U	Assess, MEAP	GL, RA DDH 13-2329	1976, 1977	2.2729	Palmerston 38
Palmerston	31C/15	Douglas Riddell		Assess	TR	1978		Palmerston 39

1978 Report of Central Regional Geologist

Mahendra Narain[1] and Murthy Ghandikota[2]

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TABLES

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INTRODUCTION

The Regional Geologist administered the geological programs which provided geoscience information for mineral resource management in the Region. The Regional Geologist's office at Richmond Hill continued providing information and geoscience consultative services to various government agencies, private consulting firms, the aggregate industry, and the general public, through the staff in the Region and the Districts. Input to other branches of the Ministry and other government agencies, particularly with respect to land use planning, increased during the year.

The regional geoscience library has been reorganized and is now better equipped with reference material pertaining to the Central Region. All interested parties are encouraged to use this facility along with the consulting services provided by this office.

Mining operations at two gypsum mines within the Region continued at full production levels during 1978. A third mine came on stream during December 1978.

Staff members included Murthy Ghandikota, Resource Geologist and Pat Taylor, Secretary.

REGIONAL GEOLOGIST'S ACTIVITIES

Resource and Land Use Planning

A major part of the Regional Geologist's time was spent in supervising mineral resource inputs to Regional and District Strategy exercises now being carried out in the Region and in performing reviews of Niagara Escarpment plan proposals, Canada-Ontario Rideau and Trent-Severn Corridor draft reports, and other land use planning documents related to this Ministry's programs. This involved numerous meetings with the other program representatives to discuss the objectives and targets of the Mineral Resources Group and to provide technical data to meet these objectives and targets.

The Region now holds regular geological workshops to discuss and resolve technical problems encountered by both the Region and the District staff. These workshops have been very useful and ensure efficiency, quality, and uniformity of the geological work performed in the Region. The workshops are supervised by the Regional Geologist.

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[2]Resource Geologist.

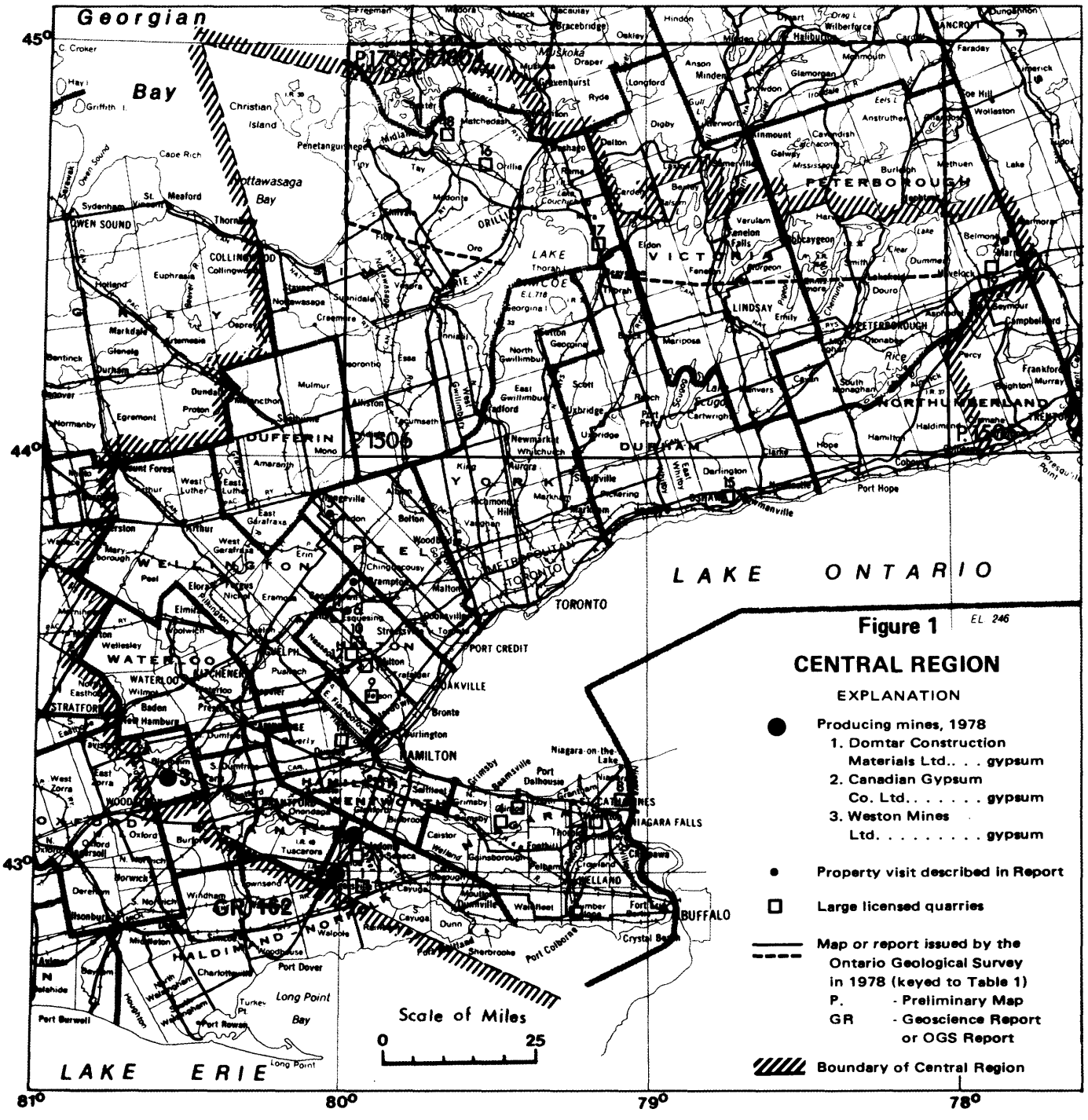

Figure 1

CENTRAL REGION

EXPLANATION

- ● Producing mines, 1978
  1. Domtar Construction Materials Ltd. . . . gypsum
  2. Canadian Gypsum Co. Ltd. . . . . gypsum
  3. Weston Mines Ltd. . . . . gypsum
- • Property visit described in Report
- □ Large licensed quarries
- —— Map or report issued by the Ontario Geological Survey in 1978 (keyed to Table 1)
  - P. - Preliminary Map
  - GR - Geoscience Report or OGS Report
- ▨ Boundary of Central Region

A few of the projects for which geological review and information were provided by the District and Regional staff included: Balsam Lake Provincial Park Master Plan; Earl Rowe Provincial Park Master Plan; Conceptual Master Plan for the Scugog Island Provincial Park Reserve; CORTS Corridor Project; Ganaraska Forest Study; Peterborough-Victoria Tak-Facts Project; University of Guelph–Research Study on Woody Plants; Environmental Assessment of Puslinch Crown Resources Area; Welland River Drainage Basin; Old Gibson Quarry in the town of Lincoln.

Mineral resources evaluation studies were carried out in the vicinity of the proposed new routes of Provincial Highways 6 and 24 and a special study area in Brantford Township, Cheltenham Forest property.

Official Plans were reviewed for the Counties of Victoria and Brant; the Regional Municipalities of Hamilton-Wentworth, Halton, Haldimand-Norfolk, Niagara; the townships of Otonabee, Emily, Glanbrook, North Dumfries, West Luther, Brantford, Uxbridge; the towns of Halton Hills, Milton, Richmond Hill, Ajax, Caledon, Pickering, Lincoln, Pelham; the cities of Port Colborne and Mississauga and the village of Erin.

Geological Consultation

Geological consultation in the Central Region is provided both at the Regional Office at Richmond Hill and the District Offices at Fonthill, Maple, Cambridge, Lindsay, and Midhurst. Public and other groups are encouraged to use the facilities at these offices of the Ministry.

Geological consultation was continued to municipal planning boards on matters relating to zoning by-laws, official plan preparations, and amendments to offical plans; to the Ministry of Housing on proposed sanitary landfill sites in inactive pits; the Ministry of Labour on health and safety problems; the Conservation Authorities and Ontario Hydro. Geological information was provided to the public, consulting firms, and the aggregate industry. The information consisted of aggregate potential evaluations of individual land sites, water-table problems, metallic and industrial mineral potential evaluations, as well as rock and mineral identifications. Inquiries from students training in geological and other related disciplines were also answered. An increasing number of inquiries were directed to this office for information and advice on groundwater supplies, water well drilling problems, and engineering and construction projects. Student inquiries were mostly related to specific commodities, such as coal, and gold, on which they are asked to prepare school project reports.

Pits and Quarries

The Regional Geologist contributed to the preparation of new legislation on pits and quarries and provided consultation on problems related to the enforcement of The Pits and Quarries Control Act, 1971, as this was required.

Property Examinations

The following are some important properties that were visited by the Regional Geologist to assess their future potential.

Blairton Iron Mine (Property Visit 1 on Figure 1):

The Blairton Mine is located on part of Lots 7 and 8 Concession I, Belmont Township, on the south shore of Crowe Lake. The mine consists of three pits which were opened on a magnetic zone with a strike-length of about 1,500 feet and a horizontal width of about 200 feet. Drilling has indicated that the zone extends to a depth of 550 feet.

The magnetite deposit is of contact metasomatic origin. It is located in a narrow zone of metamorphic pyroxenite and amphibolite which occurs at the contact between crystalline limestone to the west and gabbro-diorite intrusions to the east. The southern part of the deposit is overlain by Paleozoic conglomerate, ferruginous dolomite and limestone. Fine-grained magnetite occurs in disseminations, stringers and layers in sheared and altered skarn. Pyrite also is found in varying amounts throughout the deposit.

The Blairton Mine has produced a reported 300,000 tons of ore between 1820 and 1875 (Source Mineral Deposit Record, Geoscience Data Centre, Doc. SMDR 001041).

Ledyard Iron Mine (Property Visit 2 on Figure 1):

The mine is located on Lot 19, Concession I, Belmont Township. Two quarries were developed on a magnetite deposit that is located at the contact between Precambrian crystalline limestone and intrusive gabbroic diorite and extrusive basalt. The magnetite zone is about 600 feet long and 50 to 150 feet wide. It strikes roughly north-south and dips steeply west and extends to a depth of at least 260 feet. Nearly one million long tons of magnetite iron ore have been outlined, averaging 31.5 percent magnetic iron. This mine was operated intermittently between 1899 to 1914. In 1970, Canada Costa Rica Mines Limited acquired a six-month option on the property which was allowed to lapse. Bulk sampling and metallurgical and mill tests were carried out by this company.

Cordova Gold Mines Limited (Property Visit 3 on Figure 1):

The Cordova Gold Mine is located on the east half of Lot 20, Concession I, Belmont Township. Mineralization occurs in an intrusive mass of diorite characterized by multiple shear zones. The auriferous veins consist of carbonate, feldspar, and quartz with up to 50 percent pyrite. All of the gold appears to be associated with the pyrite and no native gold has been reported. Average recovery from 120,670 tons of ore milled from 1892 to 1940 was 0.19 ounces of gold per ton and the gold produced in this period was valued at $474,548 (Source Mineral Deposit Record, Geoscience Data Centre, Ontario Geological Survey). The Ministry of Labour have decided to cap the inclined shaft at the mine with the consent of the owner.

Other Properties:

The other properties examined by the Regional Geologist for their aggregate and building stone potential are listed below:

Owner	*Location*	*Commodity*
Georgetown Quarries Ltd.	Pt. Lot 27, Conc.10, Town of Halton Hills	Dolostone and Sandstone
Walter H. Presswood	Lot 17, Conc. 2 WHS Town of Caledon	Sand and Gravel
J. C. Duff Ltd.	Lot 23, Conc. V Town of Halton Hills	Sand and Gravel

Recommendations concerning these properties were made to the Niagara Escarpment Commission and the Ministry.

Field Trips

Two tours were organized and conducted by the Regional Geologist along with the staff from Maple and Cambridge Districts for the planning staff of the Niagara Escarpment Commission. This has resulted in better understanding of the mineral resource industry and its problems by the Commission staff members.

A field trip of old abandoned iron and gold mines was organized and conducted along with the Lindsay District staff for the Ontario Geological Survey staff.

STAKING AND EXPLORATION ACTIVITIES

During 1978, 15 claims were recorded. Three claims were staked in Belmont Township. Some assessment work has been performed on these claims. There are now a total of 14 claims in this township, all of which are in good standing. In 1978, 12 claims were staked in the northern part of Orillia Township.

RECOMMENDATIONS FOR EXPLORATION

According to the present owner of Cordova Mines Limited about 200,000 tons of ore averaging 0.12 percent gold is still available at considerable depth. Mining of this is not possible at the current price of this metal. However, it may be economic to mine if the price of gold goes over $300.00 (U.S.) per ounce and if more sophisticated exploration and mining technology is developed.

The iron deposits of Belmont Township are worthy of consideration if a suitable market can be identified.

In the northern part of the Region there is moderate potential for uranium and base metal finds. Also mining of high purity limestone may be feasible.

In Harvey Township the presence of felsic and associated felsic and mafic metavolcanics and evidence of widespread pyroclastic volcanism would indicate a potential target for base metal exploration (Morton 1978). Showings of pyrite, pyrrhotite, chalcopyrite, and sphalerite mineralization in Belmont Township have attracted some interest in the past.

Radioactive pegmatite dikes and sills in Harvey Township, especially in metasediments and metavolcanics west of the Burleigh gneiss dome, may have potential for uranium mineralization.

Large deposits of granite, some of which is suitable for building stone, occur in Harvey, Matchedash and Rama Townships. High-calcium marble and trap rock occur in Belmont Township.

MINING AND RELATED INDUSTRIAL ACTIVITY

Mining activity in the Central Region consists mainly of extraction of industrial minerals such as gypsum, sand and gravel, clay, dolostone, limestone, sandstone, and shale.

The new gypsum mine of Westroc Industries Limited is located on the north side of Highway 401 near Drumbo and is the third producing gypsum mine in Ontario. Proven reserves of gypsum at the site are approximately 11 million tons. The deposit averages 1.7 m in thickness, at a depth of about 117 m. Development in 1978

included erection of headframe, installation of hoist, and surface and underground handling equipment. Production was started in the middle of December 1978 at the rate of about 200 tons per day. This production is coming mainly from the underground development to create working faces. The mine is expected to achieve its planned production of 1000 tons per day in early February 1979.

Other gypsum mines were operated at full capacity by Canadian Gypsum Mines Limited, at Caledonia, and by Domtar Construction Materials Limited at Hagersville. Both companies are planning to increase production in the coming years.

Canadian Gypsum Company Limited continued to mine a four-foot seam of high-grade gypsum throughout 1978. The room and pillar method was followed and low profile equipment was used to develop new headings.

Domtar Construction Materials Limited at Caledonia, also mined by the room and pillar method. The gypsum was recovered from a 8 to 9 foot seam, using LH D equipment and auger drills. In 1978, the mine installed a 42-inch conveyor system to a depth of 500 feet. Production at this mine is about 500,000 tons per year.

The dollar values of materials produced in 1976 and the aggregate production for 1977 by the Districts in the Central Region are shown in Tables 1 and 2.

At present, there are only three licensed quarry operations in Precambrian rock in this region. Two are in Belmont Township and the other one is in Rama Township.

The main quarry of 3M Canada at Havelock is in basalt. The basalt, or traprock as it is more commonly known, is used in the production of No.1 grade asphalt and in the manufacture of roofing shingles. This company supplies most of the raw aggregate requirements for No.1 grade asphalt in the southwestern and south-central parts of the province.

Two other quarries are developed in medium- to coarse-grained pink granite. The granite in these quarries is ideal for block quarrying since it is uniform and massive with minimal jointing and it also splits evenly. The production from these quarries is mainly utilized as building stone.

A large number of quarries in this region are situated in Paleozoic strata and all of these produce crushed stone products except St. Mary's Cement Company near Bowmanville. Here the company mines limestone from the Lindsay Formation, which is low in magnesium content and highly suited for cement and some crushed stone products. Although there is over 40 feet of overburden at this site, the limestone is still economical to mine, due to its close proximity to the plant, transportation routes, and markets. Also, the shales of the Whitby Formation found in this quarry can be used for blending in the manufacture of cement.

The Central Region is the largest producer of aggregate in the province. There are over 840 licensed operations in the Region. In 1978, the District offices issued about 125 wayside pit and quarry permits. Out of a total of 840 licensed operations, 70 are stone quarries and the rest are sand and gravel pits. Many of these operations produce over 500,000 tons per year. A few of the large quarries are listed in Table 3.

TABLE 1 MINERAL PRODUCTION IN THE CENTRAL REGION DURING 1976.

	Volume (Tons)	Value ($)
Stone	19,718,416	46,016,731
Sand and Gravel	38,510,047	59,566,092
Cement	1,595,342	48,827,430
Lime	96,767	3,494,771
Clay Products	–	45,536,198
Nepheline Syenite	595,381	10,566,411
Gypsum and Peat	639,045	3,275,297
Petroleum and Natural Gas	–	305,959
GRAND TOTAL		217,588,889

(Source: Mineral Resources Branch, Ontario Ministry of Natural Resources)

Chemical, Metallurgical and Research Facilities in Central Region

Chemical, metallurgical and research facilities in Central Region include:

Indusmin Limited, Ontario Silica Operation, Midland:

High purity fines from quartzites from Badgeley Island are stockpiled at Midland plant site. The fines are dried and processed through two stages of grinding, screening and air classification to make a range of products to meet customer specifications. These products are used in the foundry, glass-making, constructional materials and cleanser industries.

St. Mary's Cement Company, Bowmanville:

The company recently converted to a new dry process plant for cement manufacturing. The new plant came on stream in August 1978. The plant is rated for a production capacity of 650,000 tonnes of finished cement annually.

Port Colborne Nickel Refinery, Port Colborne:

Nickel-bearing matte from Sudbury is processed into electrolytic nickel, s rounds, incomag and incocal.

Lakefield Research of Canada Limited, Lakefield:

The mineral processing research laboratories provide services in ore evaluation and mineral processing. This facility has a well equipped pilot plant.

Ontario Research Foundation, Sheridan Park, Mississauga:

Pilot plant and mineral processing research facilities are available for the mining and metallurgical industries.

Falconbridge Metallurgical Laboratories, Richmond Hill:

These laboratories provide technical assistance to the group of Falconbridge companies in the areas of extractive and physical metallurgy, geology, mineralogy, and analytical chemistry.

Niagara Metals Limited, Niagara Falls:

These facilities carry out electrical smelting and metallurgical research.

Electric Reduction Company of Canada Limited, Port Colborne:

These facilities consist of a zinc roaster and a sulphuric acid plant.

Inco Limited, Toronto:

Metallurgical and related research is carried out at these facilities.

J. Roy Gordon Research Laboratories, Mississauga:

Research in treatment of sulphide ores and concentrates, and in locating alternative sources of metals, is performed.

REGIONAL GEOLOGICAL EVALUATION PROJECTS

Abandoned Pits and Quarries Study:

This study was initiated in 1978 to identify the location of all abandoned pits and quarries on township maps (1:50 000) and to estimate their resource potential, if any. The study has been completed partially by some districts and will move into second phase in 1979.

Regional District Strategies:

Under these exercises all the Districts and the Region are preparing mineral resource and geological data for evaluation in relation to other programs of the Ministry within the Region.

Aggregate Inventory Reports on Townships:

The Maple District staff prepared five reports on townships in York which were reviewed by the Regional Geologist and submitted to the Ontario Geological Survey for publication. The Regional and District staff are now engaged in preparation of other township reports.

Niagara Escarpment Planning Area:

The Proposed High Priority, Industrial Mineral Resources, Effective Reserve Areas Map (Preliminary Map 1235) is now being revised in relation to the modified Niagara Escarpment Planning Area.

Southern Ontario Coordinated Program Strategy:

Additional mineral resource input to this strategy was provided by the Regional and District staff. The data on target testing for this exercise are now being prepared.

PUBLIC AWARENESS PROGRAMS

E. B. Freeman of the Geoscience Information Office, Ontario Geological Survey, organized the basic mineral exploration course and the special topics course in Toronto. He led one field trip for teachers; acted as judge for one science fair; presented a geological program to a mineral club. Three presentations at Junior Ranger Camps in the Central Region were given by the Resource Geologists from Maple and Lindsay Districts and the Regional Office. Maple, Cambridge, and Lindsay Districts organized field trips for various groups to familiarize them with mineral resources programs. Lindsay District staff also presented a talk at Sir Sandford Fleming College and participated in a live radio broadcast on the mineral resources program.

ACTIVITIES OF THE ONTARIO GEOLOGICAL SURVEY

R. L. Morton of the Precambrian Geology Section, completed a detailed geological survey of Precambrian rocks in Harvey Township. The primary objectives of the program were to define regional stratigraphy and structure and examine known mineral deposits.

Revision of the Quaternary Geology of the Hamilton-Cambridge Area (GR16; Pleistocene Geology of the Hamilton-Galt Area, published in 1963 and out-of-print) was undertaken by P. F. Karrow. Revision involves substantial rewriting and incorporating the results of numerous studies published since GR16 appeared. Important changes include reclassification of the tills in the area and some reinterpretation of the geological history according to the most recent information.

Mapping of the Quaternary geology of the Markham area, York and Durham Region Municipalities was undertaken by J. A. Westgate.

D.R. Sharpe mapped the Quaternary geology of the Gravenhurst, Bracebridge, and Huntsville areas of the District Municipality of Muskoka, which includes a small part of the Central Region.

Results of an airborne gamma-ray spectrometer survey, a joint project of the Geological Survey of Canada and the Ontario Geological Survey, were released in July 1978. The survey covers an area within NTS quadrangle 31 D.

An inventory of all known carbonate solution features in Ontario with special emphasis on those posing engineering hazards was undertaken by A. J. Cooper and O. L. White.

Work on a compilation map of the Quaternary geology of the Kitchener area was undertaken by W. R. Cowan, P. F. Karrow, and A. J. Cooper.

D. R. Sharpe and O. L. White have undertaken to prepare a brochure or guidebook on the geology of the Toronto area for the general public.

Maps and reports of areas within the region published during 1978 by the Ontario Geological Survey are shown in Figure 1, and listed in Table 4.

ACTIVITIES OF THE MINISTRY OF NATURAL RESOURCES AND OTHER ONTARIO AGENCIES

G. Cordiner has compiled an inventory of earth science features for the Provincial Parks Branch. This study incorporated field checks of 47 sites in small parks and park reserves within the Central Region. Technical liaison has been established with Regional Parks staff and editorial reviews are provided by the Regional Geologist.

Ministry of the Environment:

1. Groundwater resources in the Grand River Basin.
   Sibul, U., Ostry, R. C., Woerns, N.
2. Aquifer Mapping.
   Sibul, U., Turner, M.
3. Flowing Wells in Ontario.
   (Maps for all of Southern Ontario have been completed.)
   Sibul, U., Vallery, D. J.

GEOSCIENCE RESEARCH IN THE CENTRAL REGION

Graduate theses in progress include:

1. Trace element distributions in nepheline syenites, Stonell, R., University of Toronto, M.Sc. Thesis.
2. Numerical modelling of sediment transport patterns in the Toronto waterfront and an assessment of the impact of manmade structures, McGillivray, D. G., University of Toronto, Ph.D. Thesis.
3. Hydrodynamical, geotechnical and artificial controls on shoreline change in the Toronto waterfront, and assessment of natural hazard, Greenwood, B., Price, A.G., Bryan, R.B., and Dworkin, J.W., University of Toronto, M.Sc. Theses.
4. The relationship of weathering to plasticity in tills, Bells, M., University of Waterloo, B.Sc. Thesis.
5. Lead, zinc occurrences in rocks and natural waters in Niagara Peninsula, Mostaghel, M., Brock University, M.Sc. Thesis.
6. Till microfabrics as an indicator of direction of ice movement for clay tills near Waterloo, Baker, C.L., University of Waterloo, M.Sc. Thesis.

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Karrow, P.F., Cowan, W.R., Dreimanis, A. and Singer, S.N.
1978: Middle Wisconsinan Stratigraphy in Southern Ontario; p.17-27 *in* Toronto '78, Field Trip Guide Book, Geological Association of Canada, edited by A.L. Currie and W.O. Mackasey, 361p.

Morton, R.L.
1978: Harvey Township, Peterborough County; p.128-130 *in* Summary of Field Work, 1978, by the Ontario Geological Survey, edited by V.G. Milne, O.L. White, R.B. Barlow and J.A. Robertson; Ontario Geological Survey, MP82, 235p.

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Engineering and Contract Record, Vol.91, No.12, December 1978, p.16-17.

St. Mary's Cement Cuts Fuel Costs with New Dry Process Plant:
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Pit and Quarry, Vol.71, No.6, December 1978, p.66, 104.

TABLE 4 MAPS AND REPORTS PERTAINING TO THE CENTRAL REGION ISSUED BY THE ONTARIO GEOLOGICAL SURVEY OF THE ONTARIO MINISTRY OF NATURAL RESOURCES IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

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Rock and Minerals Information 1978
Ontario Mineral Review 1976-77 (issued by the Ministry of Natural Resources)

PRELIMINARY MAPS
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P.1506
P.1766 to P.1804 inclusive

COLOURED MAPS
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MINISTRY OF NATURAL RESOURCES:
Statistics 1978

TABLE 2 Preliminary statistics, 1977 for sand, gravel and production in the Central Region.

County/Region	Tons	Value
Brant	1,581,561	$ 3,149,844
Dufferin	1,074,594	1,360,131
Durham	6,339,822	10,353,530
Haldimand/Norfolk	1,281,184	2,747,066
Halton County	9,723,763	18,113,244
Hamilton/Wentworth	2,830,258	7,295,682
Niagara	5,821,226	12,776,797
Northumberland	851,139	1,927,558
Oxford	1,032,222	3,115,119
Peel	6,892,223	12,098,793
Peterborough	1,877,310	9,608,636
Simcoe	5,377,448	8,180,086
Victoria	2,786,363	3,815,192
Waterloo	1,527,149	2,800,301
Wellington	1,906,326	3,162,171
York	5,647,309	7,969,948
TOTAL	56,549,897	$ 108,474,098

SOURCE: Mineral Resources Branch, Ontario Ministry of Natural Resources

NOTE: The above figures are subject to revision as the additional is made available.

TABLE 3 Large licensed quarries in the Central Region.

Operator	Location
Regional Municipality of Haldimand-Norfolk	
1. Cayuga Materials and Construction Ltd.	Pt. Lots 44, 45, 46 & 47, Conc. 1, North Cayuga Twp.
2. Haldimand Quarries and Construction Limited	West pt. Lots 28 & 29, Range East of Plant Rd. Oneida Twp.
3. Haldimand Quarries and Construction Limited	East pt. Lots 28 & 29, Range East of Plant Rd. Oneida Twp.
Regional Municipality of Niagara	
4. King Paving and Materials Division of the Flintkote Company of Canada Ltd.	Pt. Lot 20, Conc. 9; Pt. Gore Lot 20, Conc. 9, Clinton Twp.
5. Vineland Quarries and Crushed Stone Limited	Pt. Lots 1, 2, 3 & 4, Conc. 6; Pt. Lots 3 & 4, Conc. 7; Clinton Twp.
6. Walker Brothers Quarries Ltd.	Lots 11, 30, 31, 49, 50 & 66, Stamford Twp., Pt. Lots 43, 44 & 45, Thorold Twp.
7. Port Colborne Quarries Ltd.	Pt. Lots 19, 20, 21 & 22, Conc. 2, Humberstone Twp.
8. Queenston Quarries Division of Steetley Industries Limited	Lots & Pt. Lots 44, 45, 47, 48 & 49, Niagara Twp.
Regional Municipality of Halton	
9. King Paving and Materials Division of Flintkote Company of Canada Limited	Pt. Lot 1, Conc. 3, Nelson Twp.
10. Dufferin Materials and Construction Limited	Lot 10 and Pt. Lots 8 & 9, Conc. 1, Esquesing Twp. Lots 10, 11, Pt. Lots 7, 8, 9, 12 & 13, Conc. 7, Nassagaweya Twp.
11. Indusmin Limited	Pt. Lots 22, 23 Conc. 3, Pt. Lots 21, 22, 23 & 26, Conc. 4, Esquesing Twp.
12. Indusmin Limited	Pt. Lots 7, 8, Conc. 6 Nassagaweya Twp.
13. Milton Aggregates	Pt. Lots 1 and 2, Conc. 7, Nassagaweya Twp.
Regional Municipality of Hamilton-Wentworth	
14. Canada Crushed Stone Division of Steetley Industries Ltd.	Pt. Lot 10, Conc. 4, West Flamborough Twp.
Regional Municipality of Durham	
15. St. Mary's Cement Limited	Lots 12, 13, 14, 15, 16 & 17, Conc. BFC, Darlington Twp.
Simcoe County	
16. King Paving and Materials Division of Flintkote Company of Canada Limited	Pts. Lots 7, 8, 9 and 10, Conc. 3 & 4; Pts. Lots 7 & 8, Conc. 5, Orillia Twp.
17. Standard Industries Limited	Pt. Lots 7, 8, 9, & 10, Conc. 1 & 2, Mara Twp.
18. Allan G. Cook Limited	Lot 9, Pt. Lots 10 & 11, Conc. 14, Tay Twp.
Victoria County	
19. 3M Canada Limited	Pt. W½ Lot 8, Conc. 4; Lots 6, 7 & 8, Conc. 5; S.E. ¼ Lots 7 & 8, Conc. 6; E½ Lot 6, Conc. 6; Pt. W½ Lot 6, Conc. 6; Belmont Twp.

1978 Report of Southwestern Regional Geologist

R.G. Bryant[1]

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TABLES

FIGURE

INTRODUCTION

In the Southwestern Region, the position of Regional Geologist is combined with the duties of Regional Geological Engineer or Chief Inspector of Petroleum Resources, and the incumbent is responsible for all drilling and production of oil and gas in the Province.

The main functions of this dual role are liaison with the oil and gas industry, enforcement of the Petroleum Resources Act and Mining Act with respect to drilling and production of oil and gas (both on land and offshore) in Ontario, and co-ordination and overview of the resource programs with staff at the Petroleum Resources Laboratory situated in London.

This program aids the Ministry in developing methods to ensure proper conservation of oil and gas reserves and to maximize production efficiency by assisting in research programs related to geological interpretation and evaluation of producing and prospective oil and gas pools in Ontario, including oil and gas reserve calculations.

This research leads to eventual publication of geological and engineering reports and maps.

Participation in mineral resources management and strategic land use planning ensures that the optimum utilization and development of mineral resources are considered.

Technical assistance is provided to the Ontario Energy Board in respect to public hearings by examining all geological, geophysical, and engineering documents in support of applications for designation of boundaries for new gas storage pools and authorization to inject gas into depleted gas reefs.

Liaison with the Ministry of Environment is maintained in regard to feasibility studies involving subsurface disposal of liquid waste effluents and produced brine.

All applications for municipal subdivisions in oil and gas producing areas, as forwarded by the Ministry of Housing are reviewed. This ensures that previously drilled and unplugged wells that could cause serious pollution problems or are a source of concern to property and life are properly located, plugged, and abandoned on a priority basis.

OIL AND NATURAL GAS

All of the petroleum and natural gas exploration and development in southern Ontario occurs within the Southwestern Region, with the exception of a minor part in the extreme west end of the Central Region. The following is a synopsis of last year's activities in Ontario.

A total of 178 wells were drilled during 1978, not including 4 lost holes and deepening of a 1977 well. These wells amounted to a total of 96 741.7 m drilled, compared to 187 wells for 1977 with a total of 95 953.0 m. This represents a decrease of 4.8 percent in the number of wells drilled, but an increase of 0.9 percent in total metres drilled.

During the past year, 64 exploratory and 99 development wells were drilled, an increase of 15.6 percent in

[1]Chief Inspector of Petroleum Resources, 1106 Dearness Drive, London, N6E 1N9.

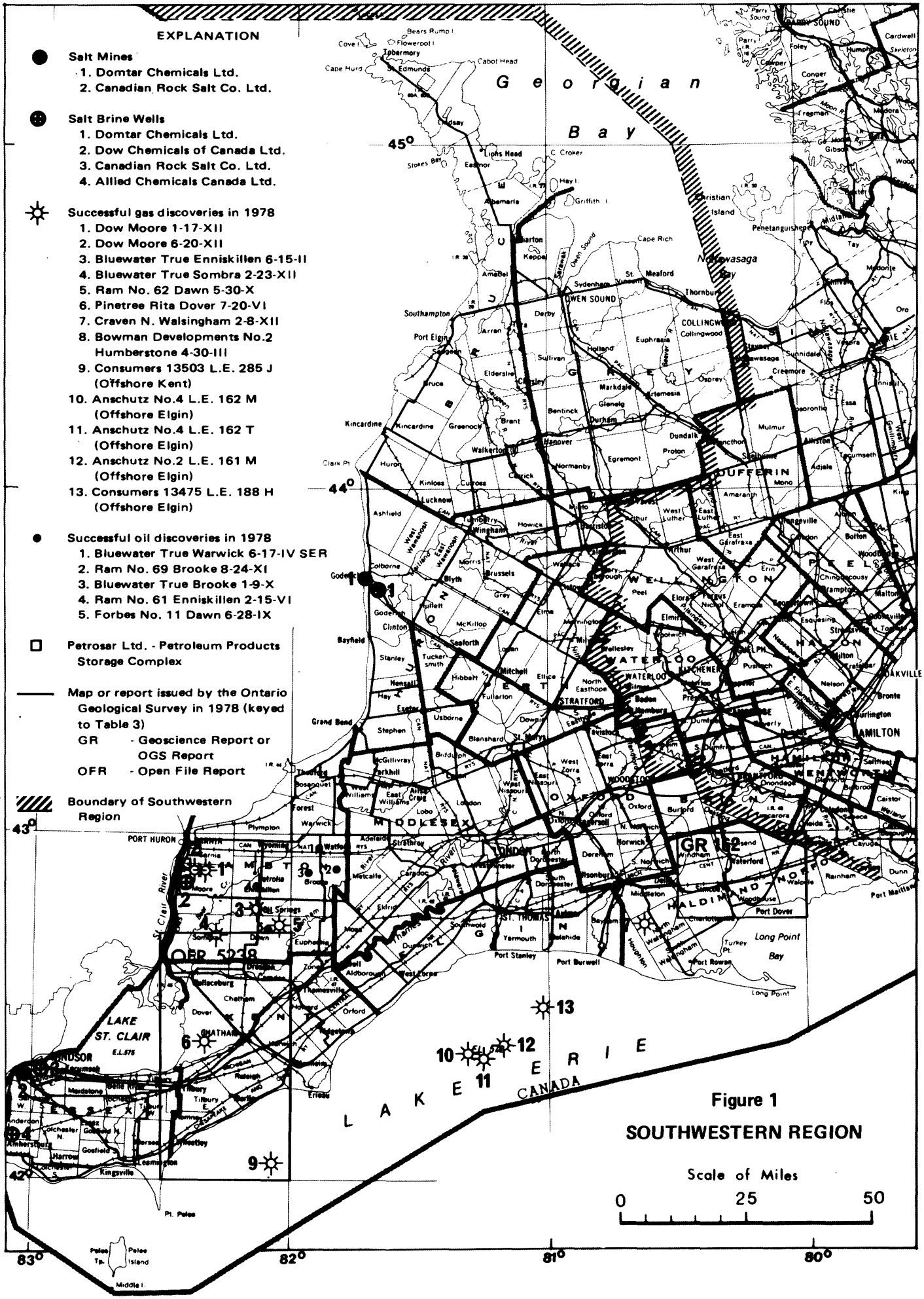

Figure 1

SOUTHWESTERN REGION

the exploratory class, but a 13.1 percent decrease in development drilling over 1977. An additional 15 wells were completed throughout the year, consisting of 3 wells for brine production, 5 for petroleum products storage, 4 for gas storage, 2 water injection wells, and 1 suspended oil show (a re-entry of an old abandoned well, previously drilled in 1910).

Offshore drilling for natural gas in Lake Erie increased 23.5 percent from the previous year with 85 wells being completed, as either gas producers or dry holes.

Of the 85 wells drilled during 1978, 27 were classified as exploratory and 58 as development attempts. Five of the 27 exploratory tests were successful as were 31 of the 58 development tests for an overall success ratio of 42.35 percent. Total metres drilled in Lake Erie amounted to 47 028.8, as compared to 38 887.9 during the previous drilling season. This represents an increase of 17.3 percent over the previous year.

Several major discoveries were made during 1978, which again proved significant production acreage in central Lake Erie. Essentially all of the available acreage in the lake was held by seven operators. At the end of 1978, a total of 2,702,796 acres were under disposition. Of this amount, 2,470,189 acres were under license of occupation and 232,607 acres were under lease. To the end of 1978, a total of 1,123 wells had been drilled in Lake Erie with approximately 542 productive or capable of production. A cumulative figure of approximately 121 billion cubic feet of gas has been produced from the lake to date. Lake Erie production accounted for 68 percent of the Province's gas production. Last year Ontario's total gas production for 1978 was approximately 27.5 percent over the 1977 production figures.

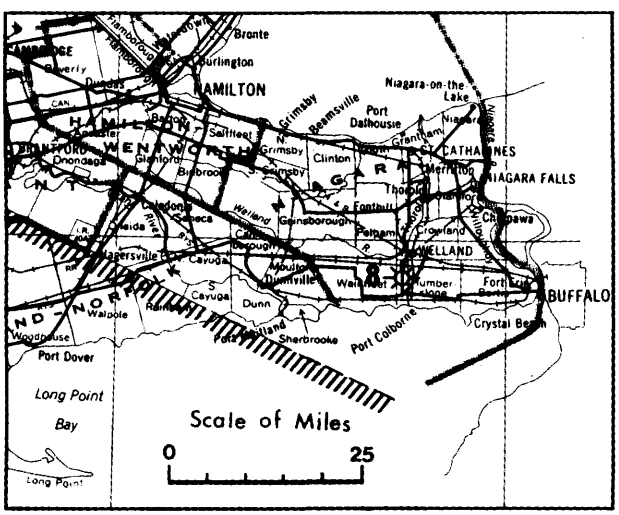

Figure 1a

Several significant discoveries were made on land this year. A total of five pinnacle reefs, three gas and two oil, were discovered in Lambton County (two in Moore Township, one in Enniskillen Township, one in Sombra Township, and one in Warwick Township), slightly down from last year's success of six pinnacle reef discoveries. One Ordovician gas discovery in Kent County has continued interest in deeper tests for this part of the Province.

Oil production for 1978 amounted to approximately 607,000 barrels, down 1½ percent from the previous year. Oil production has been declining steadily each year at a rate of approximately 10 percent. An increase in reserves in the order of 3.5 billion cubic feet of gas were realized during the past year. Three of the pools have definite potential as gas storage reefs.

The major oil and gas companies infilled their lease areas and completed most of their seismic work within Huron and Bruce Counties by the end of 1977. Drilling operations commenced in mid December of 1977 and to date, 7 wells have been drilled, all of which has been examined, has not come close to evaluating the oil and gas potential of Bruce and Huron Counties. It is expected that increased drilling activity will continue in this area as the major companies commence their drilling programs for 1979.

MINING ACTIVITY

Massive beds of salt extend as a broad band from Essex County northward to the base of the Bruce Peninsula. Conventional underground mining methods for salt are employed at Goderich and near Windsor. Several wells have been drilled and completed at Goderich and Windsor from which the mineral is extracted by means of a brining operation. Brine for chemical purposes is extracted from wells at Amherstburg and at Sarnia. Shipments of rock salt from the Goderich mine (Domtar Chemicals Limited) totalled 2.2 million tons, whereas approximately 2.1 million tons were produced at Windsor (Canadian Rock Salt Company Limited).

PITS AND QUARRIES

Southwestern Ontario has approximately 900 operational sand, gravel, clay pits, and quarries in production, of which approximately 425 are licenced. An increased awareness both by the public and industry of environmental impact has led to a more critical evaluation of the effects on the landscape of these operations.

In November 1971, the Pits and Quarries Control Act was passed as an attempt to regulate operations

under a uniform set of standards. There are 80 designated townships in the region. Operators are required to screen the working operations from public view. An application for required licence must be accompanied by a detailed site plan which includes a plan for pit development and progressive and ultimate rehabilitation plans.

An annual security deposit based on the previous year's production is required to ensure rehabilitation. Projects involving inventories of pits and quarries in undesignated areas were completed during the year, both in Chatham and Wingham. These projects were extensions or updates of work initiated in previous years. In the Owen Sound District, an inventory of abandoned pits was finalized during the year.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Quaternary field parties were active in three specific areas within the Southwestern Region this past year. Mapping was continued in the Markdale area of Grey County by B.H. Feenstra. The west half of this area, located south of Georgian Bay was completed in 1975 by Feenstra and mapping on the east half was resumed during the summer of 1978.

In the Kincardine area of Bruce and Huron Counties, surficial mapping was completed in 1978 by W.R. Cowan. This eventually led to some test drilling last summer. This program originally commenced in 1975 with reconnaissance stratigraphy being carried out while mapping was initiated two years later.

Mapping of the surface and subsurface glacial units in the Lucan area was completed this year by E.V. Sado. These works will now permit correlation with similar deposits in adjoining map-areas.

This project is a continuation of the work previously published by E.V. Sado and U.J. Vagners in 1975. This study area has the City of London as its southerly boundary, and includes other population centres such as Thamesford, Thorndale, Lucan, and Ilderton.

TABLE 3 MAPS AND REPORTS PERTAINING TO THE SOUTHWESTERN REGION, ISSUED BY THE ONTARIO GEOLOGICAL SURVEY IN 1978. SEE "LIST OF PUBLICATIONS" (BACK POCKET) FOR DETAILS.

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TABLE 1 Oil and gas statistics: well completion report.

LAND	1978	1977	% Change over 1977
Exploratory	37	33	+ 10.8
Development	41	64	- 23.0
Other	15	19	- 21.0
Total Land Wells	93	116	- 19.8
Total Land Metres	49712.9	56970.5	- 12.7
LAKE ERIE			
Exploratory	27	20	+ 25.9
Development	58	45	+ 22.4
Total Lake Wells	85	65	+ 23.5
Total Lake Metres	47028.8	38887.9	+ 17.3
TOTAL SOUTHWESTERN ONTARIO			
Exploratory	64	54	+ 15.6
Development	99	114	- 13.2
Other	15	19	- 21.1
Total Wells*	178	187	- 4.8
Total Metres	96741.7	95858.4	+ 0.9

* These totals do not include 2 lost holes in 1977 & 4 lost holes + 1 deepening of a 1977 well for 1978 figures.

TABLE 2 Oil and gas statistics: success ratios.

ONSHORE		1978	Success	1977	Success
Exploratory	Gas	8		14	
	Oil	5	34.2%	2	47.1%
	Dry	24		18	
		37		34	
Development	Gas	25		48	
	Oil	5	73.2%	7	79.7%
	Dry	11		14	
		41		69	
OFFSHORE					
Exploratory	Gas	5	18.5%	6	30.0%
	Dry	22		14	
		27		20	
Development	Gas	31	50.8%	28	60.9%
	Dry	27		17	
		58		45	
OTHER		15		19	
		178		187	

N.B. Success Ratios take into consideration: 1 lost hole Onshore (Exploratory), 3 lost holes Offshore (Development) for 1978 figures; 1 lost hole Onshore (Development), 1 lost hole Offshore (Development) for 1977 figures.